Earnings and Working Conditions

Many daily newspapers have negotiated, with the American Newspaper Guild, contracts which set minimum wages based on experience and provide for annual salary increases. In 1970, the minimum starting salaries on most daily newspapers with Guild contracts ranged between $100 and $135 a week for reporters having no previous experience. On a few small dailies, the Guild minimum starting salaries were less than $90 a week; on a few large dailies, Guild minimum rates for beginning reporters exceeded $140 a week. Young persons working as copy boys earn less than new reporters; minimum Guild rates for copy boys with some experience ranged from about $65 to $120 a week.

On most dailies, minimum Guild rates for reporters who have some experience (usually for those with 4 to 6 years) ranged from $170 to $230 a week in 1970. Contract minimums for experienced reporters on a few small dailies were less than $160 a week; on a few large dailies, they were over $250 a week. Papers under Guild contracts often pay salaries higher than the minimum rates called for in their contracts. Particularly successful, experienced reporters on city dailies may earn over $300 a week.

Newspaper reporters on big city papers frequently work 7 to 7½ hours a day, 5 days a week; most other reporters generally work an 8-hour day, 40-hour week. Most of those employed by morning papers start work in the afternoon and finish about midnight. Many newspapers pay overtime rates for work performed after the regularly scheduled workday, or for more than 40 hours of work a week; they often provide various employee benefits such as paid vacations, group insurance, and pension plans.

Sources of Additional Information

Information about opportunities with daily newspapers may be obtained from:

American Newspaper Publishers Association, 750 Third Ave., New York, N.Y. 10017.

Information on opportunities in the newspaper field, as well as a list of scholarships, fellowships, assistantships, and loans available at colleges and universities, may be obtained from:

The Newspaper Fund, Inc., Box 300, Princeton, N.J. 08540.

Information on union wage rates is available from:

American Newspaper Guild, Research Department, 1126 16th St. NW., Washington, D.C. 20036.

General information on journalism opportunities may be obtained from:

American Council on Education for Journalism, School of Journalism, University of Missouri, Columbia, Mo. 65201.

Association for Education In Journalism, 425 Henry Mall, University of Wisconsin, Madison, Wis. 53706.

Sigma Delta Chi, 35 East Wacker Drive, Chicago, Ill. 60601.

Names and locations of daily newspapers and a list of departments and schools of journalism are published in the *Editor and Publisher International Yearbook,* available in most large newspaper offices and public libraries.

TECHNICAL WRITERS

(D.O.T. 139.288)

Nature of the Work

The many technical and scientific developments of recent years have created a growing demand for writers skilled in interpreting these developments. The technical writer organizes, writes, and edits material about science and technology so that it is in a form most useful to those who need to use it—be it a technician or repairman, a scientist or engineer, an executive, or a housewife. When writing for the nonspecialist, he must present his material in a simple, clear, and factual manner; for the specialist, he must include technical detail, using a highly specialized vocabulary. Regardless of what kind of writing he does, the technical writer serves to establish easy communication between scientists, engineers, and other technical specialists, and the users of their information.

The technical writer's product takes many forms, such as a publicity release on a company's scientific or technical achievement or a manufacturer's contract proposal to the Federal Government. It may be a manual that explains how to operate, assemble, disassemble, maintain, or overhaul components of a missile system or a home appliance. Technical writers also write for scientific and engineering periodicals and for popular magazines.

Technical writers, as defined in this statement, include only those people primarily employed to interpret, write about, or edit technical or scientific subject matter. It excludes those primarily employed as scientists, engineers, or other techni-

Technical writer discusses project with engineer.

cal specialists who also do a considerable amount of writing.

Before starting a writing assignment, a technical writer usually must research his subject. This process involves studying reports, reading technical journals, and consulting with the engineers, scientists, and other technical personnel who have worked on the project. Then he prepares a rough draft that may be revised several times before it is in final form. Technical writers usually arrange for the preparation of tables, charts, illustrations, and other artwork, and in so doing may work with technical illustrators, draftsmen, or photographers.

Places of Employment

An estimated 20,000 technical writers and editors were employed in 1970. Most technical writers are employed in the electronics and aerospace industries. Many work for research and development firms or for the Federal Government—mainly in the Departments of Defense and Agriculture, the Atomic Energy Commission, and the National Aeronautics and Space Administration. Some work in firms that specialize in technical writing. Others are in business for themselves as freelance technical writers.

Technical writers are employed all over the country, but primarily in the Northeastern States, Texas, and California. They are concentrated in the Washington, D.C., Los Angeles-Long Beach, Houston, Fort Worth-Dallas, Chicago, New York, Boston, St. Louis, Kansas City, Denver, and Philadelphia metropolitan areas.

Training, Other Qualifications, and Advancement

The bachelor's degree is the desirable minimum entrance requirement for work in this field, although talented and experienced writers having less academic training may qualify. Employers do not agree on the most appropriate kind of college training needed by technical writers, but graduates usually must have a combination of courses in writing and scientific and technical subjects. Some employers prefer applicants who have degrees in engineering or science who have had courses in writing. Others seek graduates who majored in English or journalism and have taken some courses in scientific and technical subjects. Regardless of the college training they prefer, all employers place great emphasis on writing skills.

An increasing number of schools offer formal undergraduate programs leading to a bachelor's degree in technical writing or technical journalism. Some schools now offer graduate work and degrees in the field. In addition, about 170 colleges and universities provide pro-

fessional education leading to a bachelor's degree in journalism; most of these offer at least one course in technical writing or technical journalism as part of the regular curriculum. Liberal arts colleges and some engineering schools offer English and other courses that sharpen writing skills. Many colleges and universities conduct short-term summer workshops and seminars for technical writers.

When still in high school young people who plan to become technical writers should supplement the required science and mathematics courses with as many elective courses in grammar and composition as possible. They also may gain helpful experience by working as editors or writers for their school papers.

In addition to the ability to write well, technical writers must be able to think logically, and should also like to do detailed accurate work. They should be able to work and communicate well with others, since they often work as part of a team. At other times, however, technical writers must work alone with little or no supervision.

Beginners often assist experienced technical writers by doing library research, by editing, and by preparing drafts of portions of reports. Experienced writers in organizations that have large technical writing staffs may advance to positions of technical editors or progress to supervisory and administrative positions. After gaining experience and contacts, a few may open their own job shops.

It also is possible to advance by becoming a specialist in a particular scientific or technical subject. These writers sometimes prepare syndicated newspaper columns or articles for popular magazines.

Employment Outlook

Well-qualified and experienced technical writers are expected to find good employment opportunities through the 1970's. Beginners who have good writing ability and appropriate education also should find many opportunities; those who have minimum qualifications will find stiff competition for jobs, however. The greatest demand probably will be for technical writers with backgrounds in electronics and communications to work in the aerospace and related industries, particularly in research and development activities.

The employment of technical writers is expected to increase moderately during the 1970's, because of the need to put the increasing volume of scientific and technical information into language that can be understood by management for decision making and by technicians for operating and maintaining complicated industrial equipment. Also, since many products will continue to be assembled from components manufactured by different companies, technical writers will be in demand to describe, in simple terms, the interrelationships of these components. The growth in this occupation will be accelerated also by the need for improved and simplified operating and maintenance instructions for new consumer products.

The demand for technical writers will continue to be related to research and development expenditures. During the 1970–80 decade research and development expenditures of Government and industry are expected to increase, although at a slower rate than during the 1960's. The anticipated slowdown in Federal R&D spending basically reflects anticipated reductions in the relative importance of the space and defense components of R&D expenditures. These trends were evidenced in the late 1960's and in 1970.

Technical writers who have training in journalism also will find opportunities in other fields that employ writers, such as advertising, public relations, trade publishing, and radio and television broadcasting. In addition to new opportunities resulting from growth expected in this profession, hundreds of technical writers will be needed each year to replace those who retire, die, or transfer to other occupations.

Earnings and Working Conditions

In 1970, inexperienced technical writers having bachelor's degrees were hired in private industry at starting salaries ranging from $6,000 to $8,000 a year; those who have moderate experience earned from $8,000 to $12,000 a year; highly experienced writers earned from $12,000 to $16,000; and those in supervisory and management positions, up to $20,000 or more. Differences in the earnings of experienced writers depended not only on their ability and previous experience, but also on factors such as the type, size, and location of their employing firms. Earnings of freelance technical writers vary greatly and are related to the writer's reputation in the field.

In the Federal Government in late 1970, inexperienced technical writers with a bachelor's degree and credit for about five science courses could start at either $6,548 or $8,098 a year, depending on their college records. Those who have 2 years' experience could begin at $9,881 and with 3 years' experience, $11,905.

Technical writers usually work

the standard 40-hour week. They may work under considerable pressure, frequently working overtime when a deadline has to be met on a publication or report.

Sources of Additional Information

Additional information on this occupation, including a list of schools offering accepted courses of study and specific training programs in accredited colleges and universities, may be obtained from:

Society for Technical Communications, Inc., Suite 421, 1010 Vermont Ave. NW., Washington, D.C. 20005.

OTHER PROFESSIONAL AND RELATED OCCUPATIONS

ARCHITECTS

(D.O.T. 001.081)

Nature of the Work

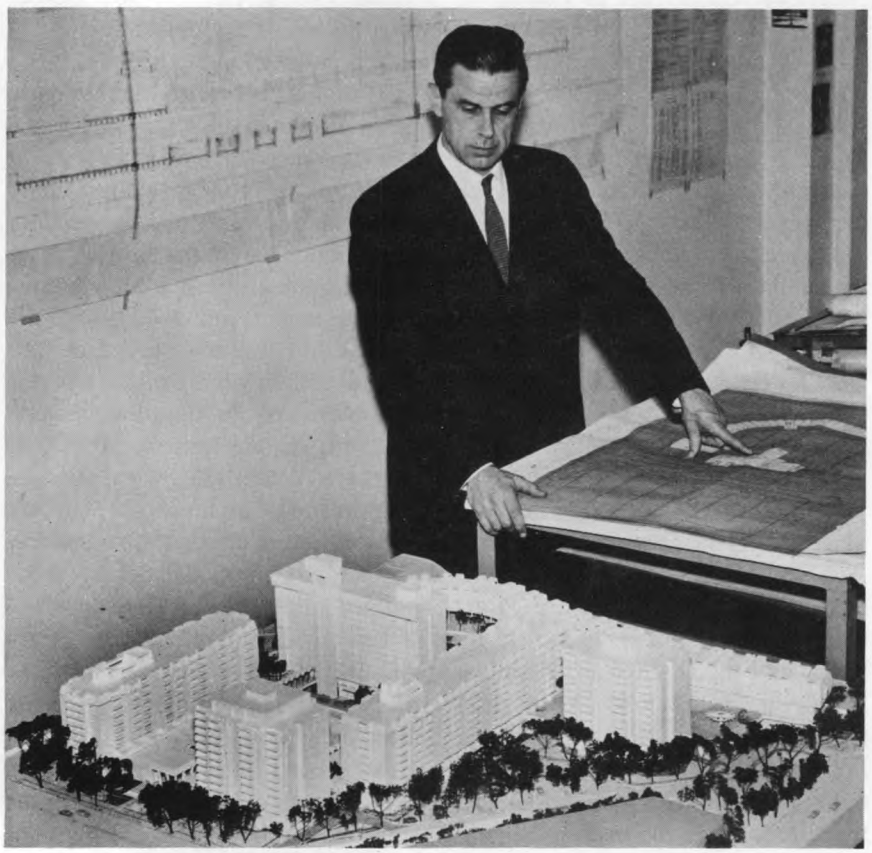
Architects plan and design buildings and other structures that are safe, useful, and pleasant in appearance. Architects also work with other professionals, such as engineers, urban planners, and landscape architects, to design cities and towns and plan and improve overall physical environments.

When an architect is commissioned to design a building, he discusses with the client the purpose, requirements, and cost limitations, as well as preferences as to style and plan. Subsequently, the architect makes hundreds of decisions and considers not only the requirements of the building, but also local and State building codes, zoning laws, fire regulations, and other ordinances. For example, in planning a school, the architect must decide the amount of corridor and stairway space which students need to move easily from one class to another; the type and arrangement of storage space, and the location, size, and interior of classrooms, laboratories, lunchroom, gymnasium, and administrative offices.

The architect makes preliminary drawings of the structure and meets with the client to develop a final design. This design includes floor plans and the interior and exterior details of the building. The final design then is translated into working drawings, showing the exact dimensions of every part of the structure and the location of the plumbing, heating, electrical, air-conditioning, and other equipment. Consulting engineers usually prepare detailed drawings of the structural, plumbing, heating, and electrical work. Engineers' drawings are coordinated with the architect's working drawings, and specifications are prepared listing the construction materials to be used, the equipment, and, in some cases, the furnishings.

The architect then assists his client in selecting a building contractor and in negotiating the contract between client and contractor, and he acts as the client's advisor and representative in dealings with the contractor. As construction proceeds, the architect makes periodic visits to the construction site to see if the design is being followed, and that the materials specified in the contract are being used. The architect's work is not completed until the project is finished, all required tests are made, and guarantees are received from the contractor.

Most self-employed architects plan and design a wide variety of structures, ranging from homes to churches, hospitals, office buildings, and airports. They also plan and design multibuilding complexes for urban renewal projects, college campuses, industrial parks, and new towns. Some architects specialize in one particular type of structure or project. When working on large-scale projects or for large architectural firms, architects frequently specialize in one phase of the work, such as design, drafting, specification writing, or construction contract administration (insuring that a



structure is built according to plans and specifications).

Places of Employment

An estimated 33,000 registered (licensed) architects were employed in the United States in late 1970. In addition, many other architectural school graduates who are unlicensed were working in positions requiring a knowledge of architecture. About 4 percent of all architects are women.

Approximately two-fifths of all architects are self-employed, either practicing individually or as partners. Most of the others work for architectural firms. Some architects work for engineers, builders, real estate firms, and for other businesses having large construction programs. Others are employed by government agencies, often in fields such as city and community planning and urban redevelopment. About 1,500 of these are employed by the Federal Government.

Architects are employed in all parts of the country. However, they are concentrated in those States with large metropolitan areas. Nearly half of all architects are employed in six States—California, New York, Illinois, Texas, Pennsylvania, and Ohio.

Training, Other Qualifications, and Advancement

A license for the practice of architecture is required by law in all States and the District of Columbia, mainly to insure that architectural work which may affect the safety of life, health, or property is done by qualified architects. Requirements for admission to the licensing examination are set by the individual States. These generally include graduation from an accredited professional school followed by 3 years of practical experience in an architect's office. As a substitute for formal training, most States accept longer periods of practical experience (usually 10 to 12 years) for admission to the licensing examination.

In 1970, professional training in architecture was offered by 85 colleges and universities in the United States, 67 of which were accredited by the National Architectural Accrediting Board. Most of these schools offered a 5-year curriculum leading to the bachelor of architecture degree. Many architectural schools also offered graduate education leading to the master's degree, and a few schools offered the Ph. D. degree. Graduate training is not essential for the practice of architecture, but is often desirable for research and teaching positions.

Most schools of architecture admit qualified high school graduates who meet the entrance requirements of the college or university with which the school is associated. Some schools require 1 or 2 years of college education before admitting the student to a 3- or 4-year architectural training program. In general, architectural schools prefer that students' preparation include mathematics, science, social studies, language, and art. A typical curriculum includes architectural courses as well as English, mathematics, physics, chemistry, sociology, economics, and a foreign language.

Persons planning a career in architecture should have a capacity to master technical problems, a gift for artistic creation, and a flair for business and for human relations. Students are frequently encouraged to work for architects or for building contractors during summers to gain knowledge of practical problems.

New graduates usually begin as junior draftsmen in architectural firms where they make drawings and models of building projects or draft details in the working drawings. As they gain experience, they are given more complex work. After several years, they may progress to chief or senior draftsman, with responsibility for all the major details of a set of working drawings and for the supervision of other draftsmen. Other architects may work as designers, construction contract administrators, or specification writers. An employee who is particularly valued by his firm may be designated an associate and may receive, in addition to his salary, a share of the profits. Usually, however, the architect's goal is to establish his own practice.

Employment Outlook

The outlook is for continued rapid growth of the profession through the 1970's. Employment opportunities are expected to be favorable both for experienced architects and for new graduates.

A major factor contributing to this favorable outlook is the expected growth in the volume of nonresidential construction—the major area of work for architects. Moreover, the increasing size and complexity of modern nonresidental buildings, as well as the homeowners' growing awareness of the value of architects' services, are likely to bring about a greater demand for architectural services. Urban redevelopment and city and community planning projects, other growing areas of employment for architects, also are expected to increase considerably in the years ahead. (See statement on Urban Planners.) In

addition, expanding college enrollments will create a need for additional architects to teach architectural courses.

Besides those needed to fill new positions due to growth, deaths and retirements will account for about 1,000 new openings every year.

Along with the anticipated rise in demand for architects, an increase is expected in the number of architectural graduates. If this field follows the trend expected in all college graduations, the number of architectural degrees awarded each year during the 1970's should be considerably greater than the estimated 4900 awarded in 1970. However, many architectural graduates work in fields such as sales and administration in the building industry and do not enter the profession. Thus, those who choose to enter the field and become registered should have good employment opportunities through the 1970's.

Earnings and Working Conditions

Starting salaries of architectural school graduates employed in private industry were generally between $120 and $160 a week in 1970, according to available information. Draftsmen having 3 years' experience or more earned between $135 and $180 a week; job captains, specification writers, and other senior employees usually earned from $150 to $250 a week. Senior employees often receive yearly bonuses in addition to their salaries.

Architects well established in private practice generally earn much more than high-paid salaried employees of architectural firms. The range in their incomes is very wide, however. Some architects that have many years of experience and good reputations earn well over $25,000 a year. Young architects starting their own practices may go through a period when their expenses are greater than their income.

Depending on their college records, architects having bachelor's degrees and no experience could start in the Federal Government in 1970 at either $8,510 or $10,528 a year. Architects who had completed all requirements for the master's degree could start at $10,528 or $11,855; those having the Ph. D. degree could begin at either $13,493 or $14,665 a year.

Most architects work in well-lighted, well-equipped offices and spend long hours at the drawing board. However, their routine often is varied by interviewing clients or contractors or discussing the design, construction procedures, or building materials of a project with other architects or engineers. Architects involved in construction contract administration frequently work out of doors during inspections at construction sites.

Sources of Additional Information

General information about careers in architecture is included in a number of publications of the American Institute of Architects; a catalog of publications is available, as well as two free publications, "Designing a Better Tomorrow" and "Your Building, Your Architect." They can be obtained from:

The American Institute of Architects, 1785 Massachusetts Ave., NW., Washington, D.C. 20036.

COLLEGE CAREER PLANNING AND PLACEMENT COUNSELORS

(D.O.T. 166.268)

Nature of the Work

Career planning and placement counselors, sometimes called college placement officers, provide a variety of services to college students and alumni. They are concerned with the aspects of a student's development involving his career selection: studying himself, exploring and choosing an occupational area, making a decision either to pursue graduate study or to enter the labor market. They also aid students in obtaining part-time and summer positions to meet an economic need or to assist in career exploration.

They arrange for employer representatives to visit the campus to discuss their firms' personnel needs and to interview qualified applicants. Career planning and placement counselors provide information about students to employer representatives and assist in appraising the qualifications of students. They also make new contacts with employers to develop additional employment opportunities. In addition, they may suggest improvements in employer recruitment literature and inform the college faculty of any change in job requirements that might warrant adjustment in curriculum.

Many assemble and maintain a library of career guidance information and recruitment literature from public and private sources for the use of students and alumni. Such material includes information on various occupations, together with data on current opportunities, educational requirements, earnings, ad-

College career planning and placement counselor and student discuss employment offers.

vancement, and the long-term outlook.

Placement counselors may specialize in areas such as law and part-time and summer work. However, the extent of specialization usually depends upon the size and type of the college, as well as the size of the placement staff.

Places of Employment

Nearly all colleges and universities offer career planning and placement services. Large colleges may employ several counselors working under a director of placement activities; in many institutions, however, a combination of placement functions is performed by one director and his clerical staff. In some colleges, especially the smaller ones, the functions of counselors may be performed on a part-time basis by members of the faculty or administrative staff. Universities frequently have placement offices for each major branch or campus. In most universities, there is a central office which coordinates the work of all career planning and placement counselors; in some, each office works as a separate unit.

An estimated 2,800 career planning and placement counselors were employed in 4-year colleges and universities in 1970, most of them on a full-time basis. Of this total number, about one-fourth were women. In addition, an increasing number of placement officers are employed full-time or part-time in 2-year colleges.

Training, Other Qualifications, and Advancement

No specific education program exists to prepare persons for college career planning and placement work. However, a bachelor's degree, preferably in one of the behavioral sciences, is considered the minimum requirement for entry into the field.

In 1970, more than 100 colleges and universities offered programs leading to a graduate degree in college student personnel work. Graduate study is becoming increasingly important for career counseling and placement workers. Graduate courses that are considered helpful include counseling theory and techniques, vocational testing, theory of group dynamics, and occupational research and employment trends.

Some persons enter the career planning and placement field after gaining a broad background of experience in business, industry, government, or educational organizations. Also helpful is an internship in a career planning and placement office.

Persons who would like to enter the career planning and placement field should have an interest in people. They must be able to communicate with and gain the confidence of students, faculty, and employers. The ability to develop a keen insight into the employment problems of both employers and students and to maintain honest and confidential communications also is important in college placement work. They must be energetic and able to work under pressure and to organize and administer a wide variety of tasks.

Advancement for career planning and placement professionals usually is through promotion to an assistant or associate position, placement director, director of student personnel services, or to some other higher level administrative position. However, the extent of such opportunity usually depends upon the type of college or university and the size of the staff.

Employment Outlook

The number of job opportunities in the college career planning and placement field is expected to rise very rapidly through the 1970's. In general, employment prospects will be good for new or recent college graduates seeking beginning positions.

Among the factors expected to contribute to the favorable outlook for college career planning and placement counselors are the increasing number of college students; a growing number of minority group

students and students from low-income families who require special counseling and assistance in obtaining part-time jobs to help finance their education; the expansion of counseling and placement programs on many campuses as greater recognition is given to the need for such programs; and the increasing number of two-year institutions and the establishment of career counseling and placement offices on these campuses.

Regional college placement associations and their coordinating organization, the College Placement Council, foster activities to upgrade and expand existing career planning and placement programs and encourage the establishment of placement services where none presently exist. The results of their efforts should create additional job opportunities for professional personnel in this field.

Some openings also will occur each year as placement officers transfer to other positions, retire, or leave the field for other reasons.

Earnings and Working Conditions

In 1970, annual earnings of placement office directors ranged from less than $5,000 to a high of over $27,500, with the median salary about $12,250, according to a National Education Association survey of public and private colleges and universities. The survey reports that annual earnings of deans of testing and counseling in 1970 ranged from under $6,500 to more than $29,500 with a median salary of $13,800. In general, the larger institutions paid the highest salaries.

Career planning and placement professionals frequently work more than a 40-hour week; irregular hours and overtime often are necessary, particularly during the "recruiting season." Most placement personnel are employed on a 12-month basis. They are paid for holidays and vacations, and receive the same benefits as other professional personnel employed by colleges and universities.

Sources of Additional Information

The College Placement Council, Inc., P.O. Box 2263, Bethelem, Pa. 18001.

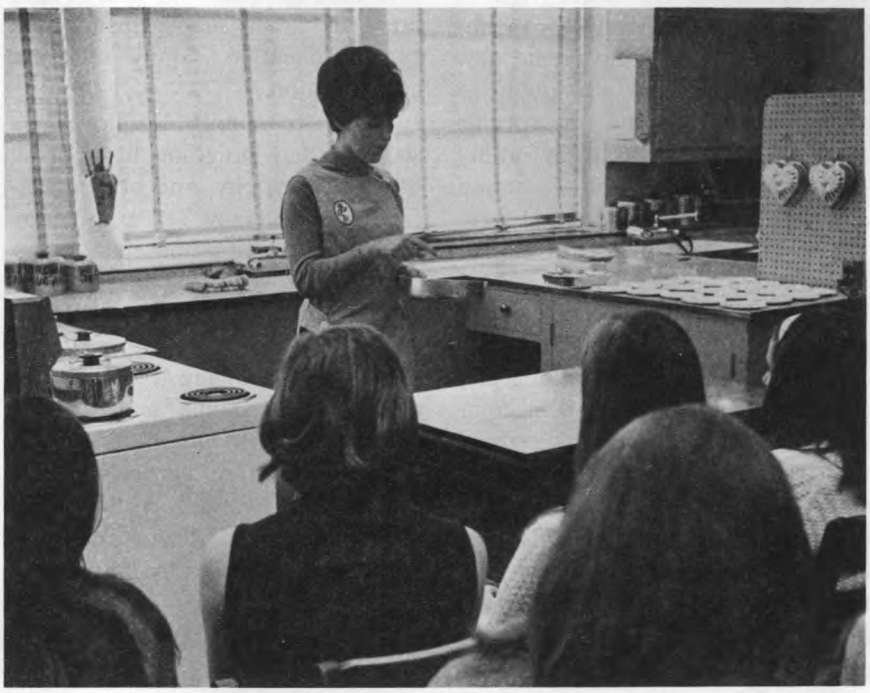
HOME ECONOMISTS

(D.O.T. 096.128)

Nature of the Work

Improving products, services, and practices that affect the comfort and well-being of the family is the primary function of home economists. These professional workers have a broad knowledge of the home economics field or are specialists in a particular area, such as food, clothing and textiles, housing, home furnishings and equipment, child development, household management, or family economics.

Teachers make up the largest group of home economists. Secondary school teachers instruct classes in food, nutrition, clothing, textiles, child development, family relations, home furnishings, home management, and consumer education. In addition, they may sponsor local chapters of Future Homemakers of America and conduct related activities. Other work done by home economics teachers is similar to that described in the statement on Secondary School Teachers, elsewhere in this *Handbook*. Teachers in adult education programs help homemak-



Home economist teaches cooking.

ers to increase their understanding of family relations and to improve their homemaking skills. They also train those who wish to prepare for jobs in home economics. College teachers may combine teaching and research, and often specialize in one particular area of home economics.

Private business firms and trade associations employ home economists to promote the development, use, and care of specific home products. These home economists may do research; test products; prepare advertisements and booklets with instructional materials; plan, prepare, and present programs for radio and television; serve as consultants; give lectures and demonstrations before the public; and conduct classes for such workers as salesmen and appliance servicemen. They also may study consumer needs and help manufacturers translate these needs into useful products.

Home economists employed by food manufacturers often work in test kitchens or laboratories to improve products or help create new products. They may also publicize the nutritional value of specific foods. Those employed by utility companies describe the operation and benefits of appliances and services and often give advice on household problems. Home economists employed by manufacturers of kitchen and laundry equipment may work with engineers on product development. Those engaged in communications work for magazines, newspapers, radio and television stations, advertising and public relations agencies, trade associations, and other organizations. They usually prepare articles, advertisements, and speeches about home products and services. Their work may include product testing and analysis, and the study of consumer buying habits. Still other home economists work for dress-pattern companies, department stores, interior design studios, and other business firms that design, manufacture, and sell products for the home. A small number of home economists are employed in financial institutions, giving customers advice on spending, saving, and budgeting.

Some home economists are engaged in research for the Federal Government, State agricultural experiment stations, colleges, universities, and private organizations. The U.S. Department of Agriculture employs the largest group of these workers, some of whom study the buying and spending habits of farm families, and then develop budget guides. A few in other Federal agencies are engaged in research on space travel, working on such problems as food needs in outer space.

Cooperative Extension Service home economists conduct adult education programs for women and 4-H Club programs for girls in such areas as home management, consumer education, family relations, and nutrition.

Home economists employed on social-welfare programs by Federal, State, county, city, and private welfare agencies may act as advisers and consultants on household budgets and improved homemaking. They help handicapped homemakers and their families adjust to physical limitations by changing the arrangements in the home and revising methods of work. Other home economists in welfare agencies supervise or train workers who provide temporary or part-time help to households disrupted by illness.

Places of Employment

About 105,000 persons were employed in home economics occupations in 1970. This figure includes an estimated 30,000 dietitians and approximately 5,200 extension workers who are discussed in separate statements on Dietitians and Cooperative Extension Service Workers in the *Handbook*. About 65,000 home economists were teachers. Approximately 45,000 were secondary school teachers. About 13,500 were adult education instructors, some of whom also taught part-time in secondary schools. In addition, there were about 4,000 college and university teachers. The remainder taught in elementary schools, kindergartens, nursery schools, recreation centers, and other institutions. More than 5,000 home economists were in private business firms and associations. Several hundred were government research workers, and some worked in social welfare programs. A few were self-employed.

Although home economics is generally considered a woman's field, a growing number of men are employed in home economics positions. Most men specialize in foods and institution management, though some are in the family relations and child development field, applied arts, and other areas.

Training, Other Qualifications, and Advancement

Approximately 400 colleges and universities offer training leading to a bachelor's degree in home economics, which qualifies graduates for most entry positions in the field. A master's or doctor's degree is required for college teaching, for certain research and supervisory positions, for work as an extension specialist or supervisor, and for some jobs in the nutrition field.

The undergraduate curriculum in

home economics gives students a strong background in science and liberal arts and also includes courses in each of the areas of home economics. Students majoring in home economics may specialize in various subject-matter areas. Advanced courses in chemistry and nutrition are important for work in foods and nutrition; science and statistics for research work; and journalism for advertising, public relations work, and all other work in the communications field. To teach home economics in a high school, a student must complete the professional education courses and other State requirements for a teacher's certificate.

Scholarships, fellowships, and assistantships are available for undergraduate and graduate study. Although colleges and universities offer most of these financial grants, government agencies, research foundations, businesses, and the American Home Economics Association Foundation provide additional funds.

Home economists must be able to work with people of various living standards and backgrounds and should have a capacity for leadership, including an ability to inspire cooperation. Good grooming, poise, and an interest in people also are essential, particularly when dealing with the public. The ability to communicate effectively is also important.

Employment Outlook

Home economists are expected to have good employment opportunities through the 1970's. The greatest demand will stem from the need to fill teaching positions in secondary schools and in colleges and universities. Many business establishments also are becoming increasingly aware of the contributions that can be made by professionally trained home economists and probably will hire more of them to promote home products and to act as consultants to customers. Increased national focus on the needs of low-income families may also increase the demand for home economists. In addition, the need for more home economists in research is expected to increase because of the continued interest in improving home products and services.

Many home economists will be needed to replace those who die, retire, or leave the field because of family responsibilities or other reasons through the 1970's. Opportunities for those who leave the profession but later wish to return will be good, especially as part-time teachers in adult education programs.

Earnings and Working Conditions

Home economics teachers in public schools generally receive the same salaries as other teachers, as most school districts have a single-salary schedule, based on education and experience. In school districts of 100,000 pupils or more, the median salary of beginning teachers who have a bachelor's degree was $7,200 for the school year 1970–71, according to a National Education Association survey; in districts of 50,000 to 99,999 enrollment, the median starting salary was $6,800; and in districts of 25,000 to 49,999 enrollment, $6,850. The median salary of home economics instructors teaching in colleges and universities was about $8,360 a year in 1969–70.

In 1970, average annual salaries received in the Cooperative Extension Service were as follows: inexperienced county extension home economists, $7,000; experienced county extension home economists, $9,600; and State specialists, $13,400.

The Federal Government paid inexperienced workers who have a bachelor's degree in home economics $6,548 or $8,098 in late 1970, depending on their scholastic records. For those having additional education and experience, salaries generally ranged from $9,881 to $16,760 a year, depending upon the type of position and level of responsibility.

Many home economists work a regular 40-hour week or less. Those in teaching and extension positions, however, frequently work longer hours as they are expected to be available for evening lectures, demonstrations, and other work. Most home economists receive fringe benefits, such as paid vacation, sick leave, retirement pay, and insurance benefits.

Sources of Additional Information

A list of schools granting degrees in home economics is available from:

Home Economics Education, Bureau of Adult, Vocational, and Technical Education, Division of Vocational and Technical Education, U.S. Department of Health, Education, and Welfare, Washington, D.C. 20202.

Additional information about careers in this profession, the types of home economic majors offered in each school granting degrees in home economics, and graduate scholarships may be obtained from:

American Home Economics Association, 2010 Massachusetts Avenue, NW., Washington, D.C. 20036.

LANDSCAPING ARCHITECTS

(D.O.T. 019.081)

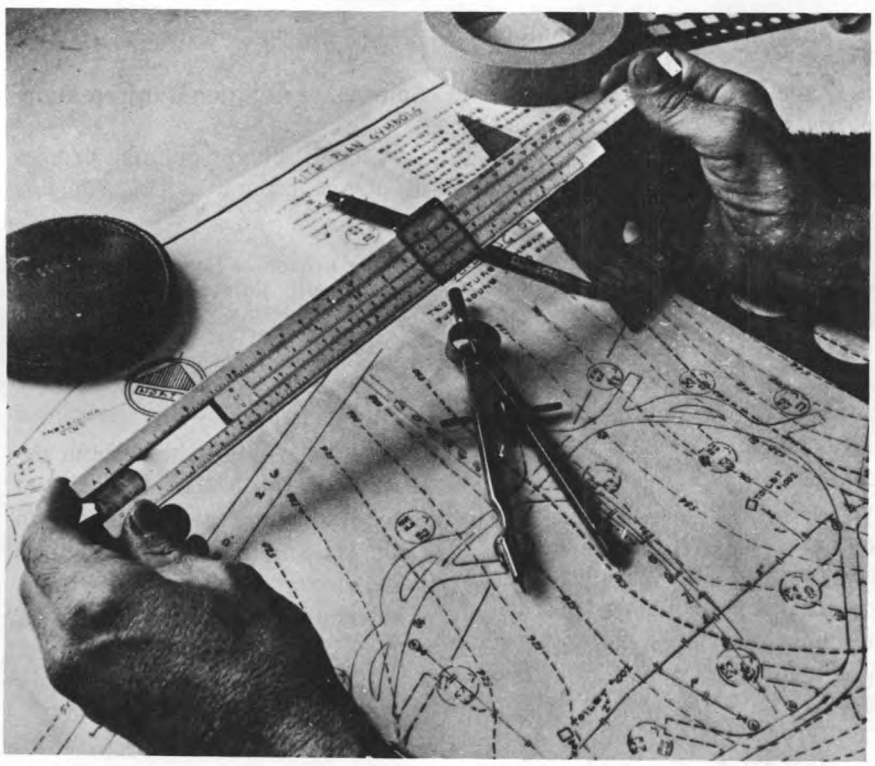
Nature of the Work

Everyone enjoys walking through an attractively designed park or driving along a scenic road. Landscape architects plan, design, and supervise the arrangement of these outdoor areas for people to use and enjoy. The attractiveness of parks, highways, housing projects, campuses, and country clubs reflects the skill of these architects in designing useful and pleasing landscapes. Their knowledge of site planning allows landscape architects to serve many types of clients, from a real estate firm embarking on a new suburban development to a city preparing to build an airport.

Landscape architects may plan the entire arrangement of a site and supervise the grading, construction, and planting required to carry out the plan. Whether they perform all or only part of these services on a particular project, however, depends on the client's wishes and the available funds.

To plan a site, landscape architects first study the nature and purpose of the client's project, and the various types of structures needed. Next, they study the site itself, observing and mapping features such as the slope of the land and the position of existing buildings and trees. They also consider the parts of the site that will be sunny or shaded at different times of the day, the structure of the soil, existing utilities, and many other factors. Then, after consultation with the architect and engineer working on the project, they draw up preliminary plans for the development of the site. After the client approves the preliminary plans, working drawings are made which show all existing and proposed features such as buildings, roads, walks, terraces, grading, and drainage structures in planted areas. Landscape architects outline in detail the methods of constructing features such as walks and terraces and draw up lists of materials to be used. Landscape contractors then are invited to submit bids for the work.

Firms of landscape architects usually handle a wide variety of assignments. Some, however, specialize in projects such as parks and playgrounds, campuses, hotels and resorts, shopping centers, roads, or public housing.



Landscape architect plans site design.

Places of Employment

An estimated 10,000 landscape architects were employed in 1970. The majority were self-employed or worked for other landscape architects in private firms. About one-third of all landscape architects were employed by government agencies concerned with public housing, city planning, urban renewal, highways, and parks and recreational areas. Some were on the staffs of engineering firms; others were employed by landscape contractors and a few taught in colleges and universities.

Training, Other Qualifications, and Advancement

A bachelor's degree in landscape architecture is usually the minimum requirement for entering the profession. This training is offered in at least 64 colleges and universities, of which 24 have been accredited by

the American Society of Landscape Architects. Another 40 schools offer courses in landscape architecture but not a complete 4-year program. The curriculum for the bachelor's degree requires 4 to 5 years of study, depending on the institution. Fifteen universities also offer master's degrees in landscape architecture.

Entrance requirements for the landscape architecture course are usually the same as those for admission to the liberal arts college of the same university. Some schools also require completion of a high school course in mechanical or geometrical drawing, and most schools advise high school students to take courses in art and more mathematics than the minimum required for college entrance.

Courses in design, including architecture and drawing as well as landscape design, constitute over half of the typical curriculum in landscape architecture. Other major fields of study are civil engineering and horticulture. In addition, courses in English, science, the social sciences, and mathematics usually are required. A bachelor's degree in landscape architecture provides a good background for graduate work in city planning.

Young people who plan to become landscape architects should be interested in both art and nature, for the profession demands a talent for design and an understanding of plant life, as well as technical ability. Successful practice as an independent landscape architect also requires a good business sense and the ability to deal with people.

Working for landscape architects or landscape contractors during summer vacations will help the student to discover the phases of landscape architecture that interest him most and may better qualify him for employment upon graduation.

New graduates usually begin as junior draftsmen, or designers tracing drawings and doing other simple drafting work. As their skill increases, they progress to more responsible work. After 2 or 3 years, they usually become registered as landscape architects and are qualified to carry a design through all stages, from preliminary sketches to finished working drawings. Experienced draftsmen often handle other aspects of landscape architects' work also, such as preparing specifications and detailing methods of construction. Employees who demonstrate ability for all phases of work may become associates of the firm; landscape architects who progress this far often open their own offices.

A license is required for the independent practice of landscape architecture in 20 States—Arizona, California, Colorado, Connecticut, Florida, Georgia, Hawaii, Kansas, Louisiana, Massachusetts, Michigan, Nebraska, New York, North Carolina, Ohio, Oregon, Pennsylvania, Texas, Utah and Washington. Candidates for the licensing examination are usually required to have 6 to 8 years' experience, or a degree from an accredited school of landscape architecture plus 2 to 4 years' experience.

Employment Outlook

Employment opportunities for graduates that have professional training in landscape architecture are expected to be favorable throughout the 1970's. The profession probably will continue to expand in the years ahead as a result of the continued growth of metropolitan areas with their needs for parks and recreational areas, the growing population's requirements for outdoor recreational facilities, the continued increase in public construction (including public housing), and the rising interest in city and regional planning. The expected increase in homeownership, coupled with rising per capita incomes and living standards, also will spur the demand for landscape architects.

Women represent between 10 and 15 percent of all landscape architects. Well-trained and competent women landscape architects can look forward to interesting and worthwhile careers in the profession, particularly as specialists in garden and planting design.

Earnings and Working Conditions

In 1970, starting salaries in private offices for new graduates having bachelors' degrees in landscape architecture ranged from about $7,000 to $9,000 annually; holders of master's degrees generally earned starting salaries between $12,000 and $15,000. Experienced persons employed by private firms typically earned from about $15,000 to $20,000 a year, although it was not unusual for especially well-qualified people to receive annual salaries of more than $25,000.

Landscape architects in independent practice often earn more than salaried employees with considerable experience, but their earnings may vary widely and may fluctuate from year to year.

In the Federal Civil Service in 1970, newly graduated landscape architects were paid annual entrance salaries of either $8,510 or $10,528 depending on their qualifications. Others with advanced degrees earned between $11,855 and

$13,493. The salary schedule also provides for periodic increases above this amount.

Salaried employees both in the government and in landscape architectural firms usually work regular hours. Self-employed persons often work long hours, especially during the latter stages of a project. Salaried employees in private firms may also work overtime during seasonal rush periods.

Sources of Additional Information

Additional information on the profession and a list of colleges and universities offering accredited courses of study in landscape architecture may be obtained from:

American Society of Landscape Architects, Inc., 2013 I St., NW., Washington, D.C. 20006.

For information on a career as a landscape architect in the Forest Service, write to:

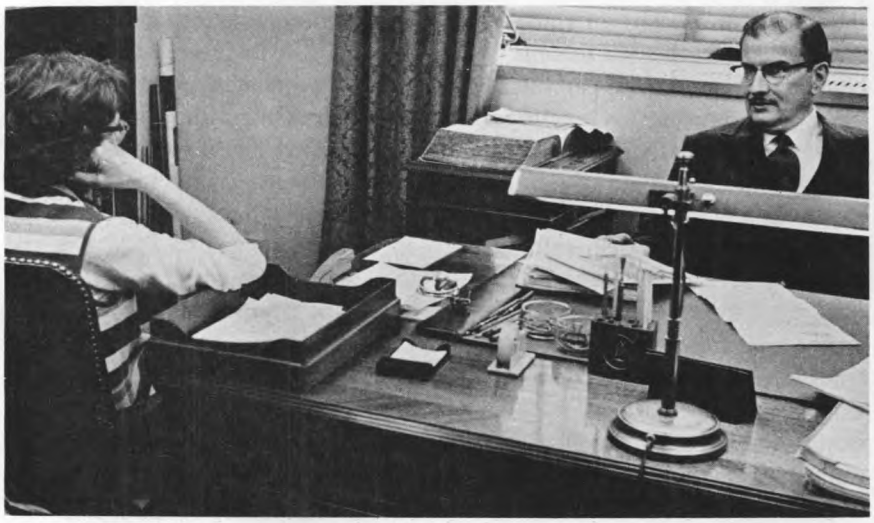
U.S. Department of Agriculture, Forest Service, Washington, D.C. 20250.

LAWYERS

(D.O.T. 110.108, .118 and 119.168)

Nature of the Work

When people need legal help they retain lawyers, who advise them of their rights and obligations and, when necessary, represent them in courts of law. In addition, lawyers (also called *attorneys*) negotiate settlements out of court and represent clients before quasi-judicial and administrative agencies of the government, such as the Internal Revenue Service and the Social Security Administration. They may act as trustees, guardians, or executors. Government attorneys play a large part in developing and administering Federal and State laws and programs; they prepare drafts of proposed legislation, establish law enforcement procedures, and argue cases.



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 spend all their time drawing up wills, trusts, contracts, mortgages, and other legal documents; conducting out-of-court negotiations; and doing the investigative and other legal work necessary to prepare for trials. Still others are primarily engaged in teaching, research, writing, or administrative activities.

Many people who have legal training are not employed as lawyers but are in other occupations where they can use their knowledge of law. They may, for example, be insurance adjusters, tax collectors, probation officers, credit investigators, or claims examiners. A legal background also is a valuable asset to people seeking or holding public office.

Places of Employment

About 280,000 lawyers were employed in 1970, the great majority working full time. Of the total number almost three-fourths were in private practice. About half of the private practitioners were in practice by themselves; the other half were in partnership or working for other lawyers or law firms.

Government agencies employ the greatest number of salaried attorneys. In 1970, about 10,000 attorneys worked for the Federal Government, chiefly in the Justice, Defense and Treasury Departments, and the Veterans Administration. About twice as many attorneys were employed by State and local government. Other salaried lawyers are employed by private companies, such as large manufacturing firms, banks, and insurance companies.

Most of the remainder teach in law schools. Some lawyers in salaried legal positions also have an independent practice; others do legal work on a part-time basis working primarily in another occupation. Most lawyers work in cities and in the more populous States.

Training, Other Qualifications, and Advancement

Before a person can practice law in the courts of any State, he must be admitted to its bar. In all States, applicants for bar admission must pass a written examination; however, a few States waive this requirement for graduates of their own law schools. Other usual requirements are U.S. citizenship and good moral character. A lawyer who has been admitted to the bar in one State can usually 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. The special rules of each court or agency control the right to practice before Federal courts and agencies.

To qualify for the bar examinations in the majority of States, an applicant must have completed a minimum of 3 years of college work and, in addition, must be a graduate of a law school approved by the American Bar Association or the proper State authorities. A few States will accept as qualification study of the law wholly in a law office or in combination with study in a law school. Only one State will accept study of the law by correspondence. A number of States require registration and approval by the State Board of Examiners before students enter law school or during the early years of legal study. In a few States, candidates must complete a period of clerkship in a law office before they are admitted to the bar.

As a rule, 7 years of full-time study after high school is necessary to complete the required college and law school work. The most usual preparation for becoming a lawyer is 4 years of college study followed by 3 years in law school. However, many law schools admit students after only 3 years of college work. A few schools may accept students after 2 years of college work. On the other hand, an increasing number of law schools are requiring applicants to have a college degree. Law schools seldom specify the college subjects which must be included in students' prelegal education. However, English, history, economics and other social sciences, logic, and public speaking are all important for prospective lawyers. In general, their college background should be broad enough to give them an understanding of society and its institutions. 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.

Prospective lawyers should also enjoy working with people and be capable of winning their confidence.

Acceptance by most law schools is dependent upon the applicant's ability to demonstrate an aptitude for the study of law, usually through the "Law School Admissions Test."

Of the 173 law schools in existence in 1970, 148 were approved by the American Bar Association and the others—chiefly night schools—were approved by State authorities only. A substantial number of full-time law schools have night divisions designed to meet the needs of part-time students; some law schools have only night classes. Four years of part-time study are usually required to complete the night-school curriculum. In 1969, almost a quarter of all law students in ABA approved schools were enrolled in evening classes.

The first 2 years of law school are generally devoted to fundamental courses such as contracts, criminal law, property law, and judicial procedure. In the third year, students may elect courses in specialized fields such as tax, labor, or corporation law. Practical experience is often obtained by participating in school-sponsored legal aid activities, in the school's practice court where students conduct trials under the supervision of experienced lawyers, as well as by writing on legal issues for the school's law journal. Graduates receive the degree of juris doctor (J.D.) from many schools, although other schools confer the bachelor of laws (LL.B.) as the first professional degree. Advanced study is often desirable for those planning to specialize or to engage in research and law-school teaching.

Most beginning lawyers start in salaried positions, although some go into independent practice immediately after passing the bar examination. Young salaried attorneys usually act as assistants (law clerks) to experienced lawyers or judges. Initially, their work is limited to research, such as checking points of law; they rarely see a client or argue a case in court. 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

Graduates from highly regarded

law schools, as well as those who rank high in their classes, will have good employment prospects through the 1970's. They should find opportunities for salaried positions with well-known law firms, on the legal staffs of corporations and government agencies, and as law clerks to judges. Graduates of the less prominent schools and those who graduate with lower scholastic ratings may experience some difficulty in finding salaried positions as lawyers. However, numerous opportunities will be available for law school graduates to enter a variety of other types of salaried positions requiring a knowledge of law.

Prospects for establishing a new practice will probably 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 rent and other business costs somewhat lower. Also, young lawyers may find it easier to become known to potential clients. On the other hand, salaried employment will be limited largely to metropolitan areas where the chief employers of legal talent —government agencies, law firms and big corporations—are concentrated. For many able and well-qualified lawyers, opportunities to advance will be available in both salaried employment and private practice.

Although the majority of employment opportunities for new lawyers will arise from the need to replace those who retire, die, or otherwise leave the field, the total number of lawyers is expected to grow moderately over the long run. Most of the growth will result from continuing expansion of business activity and population, and the increased use of legal services by low- and middle-income groups. For example, expansion of legal services for low-income groups has come about through the Community Action Programs authorized under the Economic Opportunity Act of 1964. In addition, the growing complexity of business and government activities is expected to create a steadily expanding demand for lawyers who have extensive experience in corporation, patent, administrative, labor, and international law. However, continuing a recent trend, the number of lawyers in independent practice may remain stable or decline somewhat.

Earnings and Working Conditions

In 1970, law firms in several States offered annual starting salaries as high as $15,000 to law school graduates from widely recognized schools or those having high academic standing. For lawyers employed by manufacturing and other business firms the average starting salary was over $11,500 a year in 1970; with 1 year's experience, over $13,000; and with a few years' experience, an average of $16,800. In the Federal Government, annual starting salaries for attorneys passing the bar were either $9,881 or $11,905 in 1970, depending upon their academic and personal qualifications. Those with a few years' experience earned $16,760 a year. Some exceptional government lawyers earned more than $35,000 annually.

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 work part time in another occupation.

Lawyers' earnings generally increase with experience. Those on a salaried basis receive increases as they assume greater responsibilities. In 1970, the average annual salary in private industry for those in charge of legal staffs was more than $33,000. Incomes of lawyers in private practice usually grow as their practice develops. Private practitioners who are partners in law firms generally have greater average incomes 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 are able to determine their own hours and workload, many stay in practice until 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 from the clerk of the Supreme Court or the secretary of the Board of Bar Examiners at that State capital. Information on law schools and on law as a career is available from:

Information Service, The American Bar Association, 1155 East 60th St., Chicago, Ill. 60637.

Association of American Law Schools, Suite 370, 1 Dupont Circle, NW., Washington, D.C. 20036.

LIBRARIANS

(D.O.T. 100.118 through .388)

Nature of the Work

Making information available is the job of librarians. Librarians se-

lect and organize collections of books, pamphlets, manuscripts, periodicals, clippings, and reports, and assist readers in their use. In many libraries, they also may make available phonograph records, maps, slides, pictures, tapes, films, paintings, braille and talking books, microfilms, and computer tapes and programs. In addition to classifying and cataloging books and other loan items, they publicize library services, study the reading interests of people served by the library, and provide a research and a reference service to various groups. Librarians also may review and abstract published materials and prepare bibliographies.

In small libraries, librarians perform a great variety of tasks. In a large library, each librarian may perform only a single function, such as cataloging, publicizing library services, or providing reference service, or he may specialize in a subject area such as science, business, the arts, or medicine.

Librarians are generally classified by the type of library in which they are employed: Public library, school media center, college or university library, or special library. There are two principal kinds of library work—reader services and technical services. Those who perform reader services—for example, reference librarians and children's librarians—work directly with the public. Librarians who perform technical services, such as catalogers or acquisition librarians, deal less frequently with the public.

Public librarians serve all kinds of readers—children, students, teachers, research workers, and others. Increasingly, librarians are providing special materials and services to culturally and educationally deprived persons and to physically handicapped persons unable to 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. This system also may include librarians who supervise branch libraries, and other librarians who are specialists in certain areas. The duties of some of these specialists are briefly described as follows:

Acquisition librarians purchase books and other library materials recommended by staff members, or requested by patrons, keep a well-balanced library in quantity and quality, make sure that the library receives what it orders, and maintain close contact with book jobbers and publishers. *Catalogers* classify books under various subjects and otherwise describe them so they may be located through catalogs on cards or in other forms. *Reference librarians* aid readers in their search for information—answering specific questions or suggesting sources of information. This work requires a thorough understanding of bibliographic material and a general knowledge of library materials in various subject fields. *Children's librarians* plan and direct special programs for young people. Their du-

ties include helping children find books they will enjoy, instructing them in the use and content of the library, giving talks on books, conducting film programs, and maintaining contact with schools and community organizations. Often, they conduct regular story hours at libraries, playgrounds and day care centers, and sometimes on radio or television. *Adult services librarians* may select materials for adult readers and advise them. They are often asked to suggest reading materials, and to cooperate in or plan and conduct educational programs on such topics of adult interest as community development, public affairs, creative arts, problems of the aging, or home and family life. *Young adult services librarians* may select books and other materials for young people of junior high school and high school age and guide them in the use of these materials. They may arrange book or film discussion groups, concerts of recorded popular and classical music, and other programs related to the interests of young adults. They also may help to coordinate the services of the school libraries and the local public library. *Bookmobile librarians* take library materials into areas where public library services are nonexistent or inadequate, in inner city neighborhoods, migrant camps, and institutions such as hospitals and homes for the aged and others.

School media specialists (school librarians) instruct students in the use of the library and visit classrooms to familiarize students with print and nonprint materials relating to the subjects being taught. They also work with teachers and school supervisors in planning and developing units of study and independent study programs and participate in team teaching. They prepare lists of printed and nonprinted materials on certain subjects; meet with faculty members to select materials for school programs; and select, order, and organize library materials. Many school media specialists are employed by school district central offices as supervisors to plan and coordinate library services for the entire school system, as catalogers and as librarians to administer professional libraries for teachers and administrators. Very large high schools may employ several media specialists, each responsible for a special function of the library program or for special subject materials.

College and university librarians work with students, faculty members, and research workers in general reference work or in a particular field of interest, such as law, medicine, economics, or music. In addition, they may teach one or more classes in the use of the library. A few librarians who are employed in university research projects operate documentation centers. Computers and other modern devices are being increasingly used to record and retrieve specialized information.

Special librarians work in libraries maintained by commercial and industrial firms, such as pharmaceutical companies, banks, advertising agencies, and research laboratories; professional and trade associations; government agencies; and other types of organizations such as hospitals and museums. They plan, acquire, organize, catalog, and retrieve information from collections designed to provide intensive coverage of information resources about subjects of special interest to the organization. Special librarians utilize their extensive knowledge of the subject matter, as well as of library science, in building library resources, advising and assisting library users, abstracting, and routing available materials. They must be able to evaluate the importance of new information to their organization. Literature searching and the preparation of summaries, translations, bibliographies, and special reports are among the major duties of special librarians. These operations may involve the use of electronic data processing equipment.

Information science specialists, like special librarians, work in technical libraries maintained by commercial and industrial firms. However, they must possess a more extensive technical and scientific background than special librarians. They not only perform many of the duties of special librarians, but they also develop coding and programing techniques for using electronic and electromechanical information storage devices and abstract complicated information into short, readable form, and interpret and analyze data for a highly specialized clientele.

Information on library technicians, is found in a separate statement in the *Handbook*.

Places of Employment

In 1970, about 125,000 persons were employed as professional librarians. Most of them worked full time. School librarians accounted for more than two-fifths of all librarians; public librarians represented nearly one-fourth; librarians in colleges and universities accounted for one-fifth; and those employed in special libraries (including libraries in government agencies), one out of seven. Some librarians were employed in correctional institutions, hospitals, and State institutions. A small number of librarians were employed as

teachers and administrators in schools of library science.

More than 85 percent of all librarians are women. Men are more frequently employed than women in executive and administrative positions in large library systems 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, mostly in suburban or rural areas.

Training, Other Qualifications, and Advancement

To qualify as a professional librarian, one must ordinarily have completed 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 school 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 also is highly desirable.

In 1970, 46 library schools in the United States were accredited by the American Library Association. Many other colleges offer courses within their 4-year undergraduate programs, as well as at the graduate level, which prepare students for some types of library work.

Entrance requirements to most graduate schools of library science include (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 library schools prefer a liberal arts background and majors in areas such as social sciences, physical and biological sciences, the arts, or comparative literature. Some schools require entrance examinations.

Special librarians and science information 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 foreign language or more. They also must be well informed about new equipment, methods, and techniques used in storing and recalling technical information.

Many students attend library schools under cooperative work-study programs, combining their academic program with practical work experience in a library. Most library schools make every effort to arrange the student's schedule to permit him to take the necessary courses while working part-time. 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.

School librarians must be certified in most States as having met the requirements for both librarians and teachers. Sometimes local, county, or State authorities establish other requirements, that are based on different combinations of education and experience. In the Federal Government, beginning positions require completion of a 4-year college course and all the work required for a master's degree in library science or the equivalent in experience and education.

In addition to an appropriate educational background, a person interested in becoming a librarian should have an interest in people, intellectual curiosity, an ability to express himself clearly, a desire to search for recorded materials and use them, and an ability to work with others.

Experienced librarians may advance to administrative positions or to specialized work. However, promotion to these positions is limited primarily to those who have completed graduate training in a library school, or to those who have had specialized training.

Employment Outlook

The employment outlook for trained librarians is expected to be good through the 1970's. The best opportunities probably will be in school and college and university libraries, especially in research, subject specialties, and some languages. Some librarians will probably continue to find opportunities for employment in the Armed Forces and the U.S. Information Agency overseas.

Persons who have only a bachelor's degree with a major in library science, probably will encounter stiff competition in finding professional level jobs. Many part-time positions also will be available for persons trained in library work.

The demand for qualified librarians to meet the requirements of a growing and increasingly well-educated population will be intensified by the vast and continuing expansion in the volume and variety of materials which must be processed for reader use. Because of the ever-increasing demands upon high-level executives in business and industry, management will rely more heavily on the services of special librarians and science informa-

tion specialists to keep abreast of new developments. Expanding use of computers to store and retrieve information also will contribute to increased demands for science information specialists. The increase of Federal grant assistance through the Library Services and Construction Act, the Medical Assistance Act, the Elementary and Secondary Education Act, and the Higher Education Act may further increase the demand for librarians. Improved standards for school media centers and college libraries and the expanding student population also will contribute to the demand for librarians. Additional librarians will be needed to provide services to inmates and patients in correctional institutions and to residents in schools for the blind, deaf, and handicapped people who cannot use conventional materials.

In addition to openings resulting from growth of the occupation, many librarians also will be needed each year to fill positions vacated by young women who leave their jobs to care for their families, and to replace librarians who transfer to other types of work, retire, or leave the field for other reasons. Opportunities for women wishing to reenter the field also will be favorable.

Earnings and Working Conditions

The annual starting salary of new library school graduates averaged about $8,700 in 1970. The degree of responsibility and technical skill required, as well as geographic location, size, and type of library, are important factors determining individual salaries. The higher paying positions generally are found in college, school, and special libraries. College and university libraries offered an average beginning salary of about $8,700 in 1970. New graduates employed in special libraries received about $8,400; those employed in public libraries averaged about $8,100. Librarians having extensive experience and information specialists having a Ph. D. degree in a subject matter field generally earned between $10,000 and $15,000 a year.

Qualified special librarians can usually expect to earn salaries in excess of those paid to public and school librarians because of their additional specialized subject training. The annual salary for all special librarians was $11,800 in 1970, but head librarians reported an average salary of $13,600, with a few making over $20,000 a year. Information science specialists received an average of $12,000 a year in 1970.

In the Federal Government, the annual entrance salary for librarians having a master's degree in library science was $9,881 in 1970. Experienced librarians generally earned from $10,200 to $19,800.

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 Saturday, Sunday, 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.

Information on requirements of special librarians may be obtained from:

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 may be obtained from:

Division of Library and Educational Facilities, Bureau of Libraries and Educational Technology, 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 Avenue, 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 TECHNICIANS

(D.O.T. 249.368)

Nature of the Work

Library technicians assist librarians in furnishing information on library sciences, facilities, and rules; in assisting readers in the use of card catalogs and indexes to locate books and other materials; and in answering questions that require only brief consultation of standard references. In some libraries, they train and supervise the clerical staff.

Cataloging books is one of their most important duties. Such work includes identifying the title, author, edition, publisher, publication data, and number of pages. Notations in the card catalog reflect the use of a classification system other than the Library of Congress System. Some technicians catalog new editions of works and compare information in the new edition with that on the cards already in the library's catalog. In some libraries, technicians prepare orders for library materials by looking up prices and publisher information, maintain files of special materials, such as newspaper clippings and pictures, and arrange displays.

In a large library, technicians may maintain controls on checkouts, reserves, renewals, and overdue materials. They may operate and maintain audiovisual and data processing equipment, including photographs, slide projectors, and tape recorders, as well as readers that magnify, project on a screen, and sometimes print out information on microfilm and microfiche cards.

Places of Employment

An estimated 76,000 library technicians were employed in 1970; four-fifths were women. Most technicians were employed in public and school libraries. Smaller numbers worked in college and university libraries, and in business, medical, and other special libraries. In 1970, the Federal Government employed about 3,300 library technicians, chiefly in the Department of Defense and the Library of Congress.

Training, Other Qualifications, and Advancement

Most library technicians employed in 1968 were trained on-the-job in programs that required from 1 to 3 years to complete. Recently, however, an increasing number have received training in formal post-high school programs. In the future, a larger number of employers may require such training.

In 1970, about 115 colleges offered a 2-year program for library technicians which led to an associate of arts degree in library technology. Curriculums generally include one year of liberal arts and one year of library-related work, such as introductory courses in bibliographic science, and cataloging. Most programs also include an introduction to library organization, and the purposes, procedures, and development of libraries. Some offer training to familiarize the student with data processing and audiovisual materials.

The number of junior and community colleges that offer library technician programs is expected to increase rapidly in the future, continuing the trend of the 1960's. A high school diploma or its equivalent is the standard entrance requirement for both academic and on-the-job training programs. Many programs require that a student be proficient in typing. A few schools require on-the-job experience under the supervision of a librarian.

College programs for library technicians vary since many of them are established to meet a particular local need. For this reason, young people should select a program with care and obtain information on the curriculum, instructional facilities, faculty qualifications, and kinds of jobs obtained by graduates. Credits earned in a two-year college program in library technology may not apply toward a professional degree in library science.

Library technicians should enjoy detailed work, have manual dexterity, verbal ability to explain procedures and regulations, and numerical ability to handle circulation statistics. The job requires much standing, stooping, bending, and reaching.

Employment Outlook

The employment outlook is excellent for library technicians through the 1970's, particularly for

graduates of academic programs. A growing population and recent Federal legislation authorizing funds to construct, expand, and improve libraries are factors that influence demand.

Several thousand technicians will be needed annually through the 1970's to replace those who die, retire, and transfer to other fields.

Earnings and Working Conditions

Salaries vary widely with the size of the community and the library system in which library technicians are employed. Starting salaries generally range from $5,000 to $6,300; experienced library technicians sometimes make over $9,000.

In the Federal Government, annual salaries generally ranged from $5,212 to $8,098 in 1970. A few technicians earned $9,881 a year or more.

Library technicians employed in public and private school systems usually work only during school hours. The work schedule in public and college libraries may include some weekend and evening hours. In government and special libraries, a 40-hour week is common.

Most libraries provide fringe benefits such as group insurance and retirement pay. Additional benefits offered by private business often include educational assistance programs. Library technicians employed by the Federal Government receive the same benefits as other Federal workers.

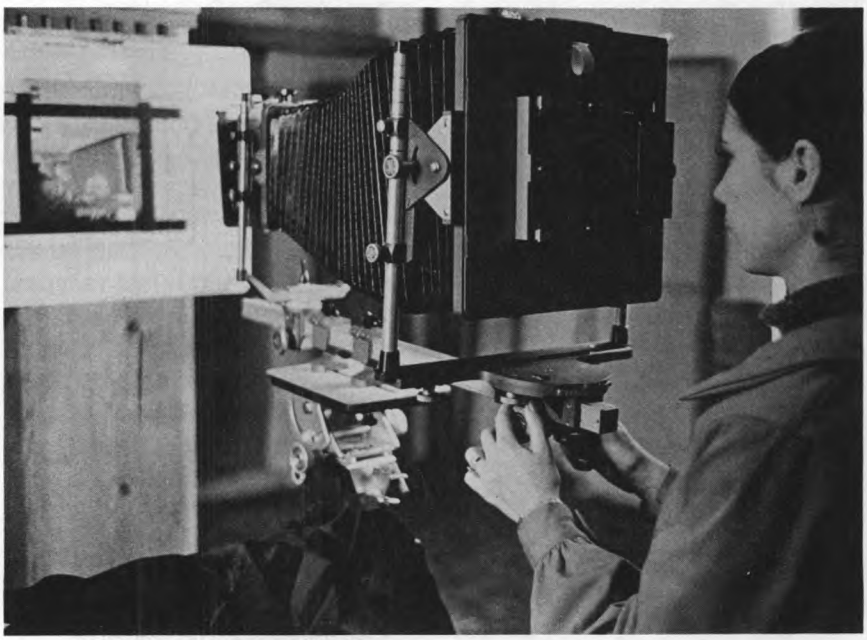
PHOTOGRAPHERS

(D.O.T. 143.062, .282 and .382)

Nature of the Work

Photography involves much more than just taking clear pictures. Skillful portrait photographers, for example, take pictures which not only are natural looking and attractive but which also express the personality of the individual. Photographing sports and other news events also requires special photographic skills, as do other areas of photographic work.

The work of photographers varies greatly, depending on the area of specialization; however, all photographers use equipment and materials that are basically the same. Photographers use a variety of still and motion picture cameras. These cameras may be equipped with telephoto, wide-angle, or other special lenses, and have different types of light filters that enable the photographer to obtain the particular effects desired in each picture. Photographers also utilize many kinds of film and must know which to use for each type of picture, lighting condition, and camera. The photographer must be able to select the proper filter to be used with different film. When taking pictures indoors or after dark, photographers use lighting equipment—flash bulbs or electronic flash for some pictures, flood lights and other special lights and reflectors for others. In addition, photographers must be able to execute the chemical and mechanical processing by which pictures are developed, enlarged, and printed. (See statement on Photographic Laboratory Occupations.) In small shops and photographic departments, the photographer often does all this technical work; as a rule, large studios employ photographic technicians to do the needed laboratory work. The procedures involved in taking motion pictures differ



Photographer adjusts distance scale.

greatly from those used in still photography and, therefore, most photographers restrict themselves to either one field or the other.

Photographers also need some knowledge of art and design, and they should know how to use makeup and props. In addition, photographers must be able to arrange their subjects properly against a setting.

Many professional photographers specialize in such areas as portrait photography, commercial photography, or industrial photography. Portrait photographers usually work in their own studios, although they also take pictures in people's homes and other places. Commercial photographers generally take pictures for use in advertising real estate, furniture, food, apparel, and other items, but they may also do other kinds of photographic work. The industrial photographer usually works for a single firm or company, taking pictures that are used in company publications and for advertising company products or services. He may take motion pictures of workers on the job and of equipment and machinery operating at high speed; these pictures are then used to simplify work methods or to improve the production process. Other photographic specialists include press photography (photo journalism that combines a "nose for news" with photographic ability); aerial photography; instrumentation photography; illustrative photography; educational photography (preparing slides, film strips, and movies for use in the classroom); and science and engineering photography (the development of photographic techniques for use in space photography and related fields). Some photographers teach in high schools or colleges, act as representatives of photographic equipment manufacturers, manage photo-finishing establishments, sell photographic equipment and supplies, produce documentary films, or do freelance work.

Places of Employment

About 65,000 photographers were employed in 1970. Approximately half of them worked in commercial studios—many in business for themselves, the rest as salaried employees. In addition, sizable numbers were employed in industry; some worked for Federal, State, and local government agencies; and others operated camera stores or worked on the staffs of newspapers and magazines. Still others worked as freelance photographers, taking many kinds of pictures and selling them to advertisers, magazines, and other customers.

Photographers work in all parts of the country, in small towns as well as large cities. They are concentrated, however, in States which are heavily populated—California, New York, Pennsylvania, Ohio and Illinois—and which also have great numbers of businesses and industrial establishments.

Training, Other Qualifications, and Advancement

After high school, young people may prepare for work as professional photographers through 2 or 3 years of on-the-job training in a commercial studio. A trainee generally starts by working in the darkroom, where he learns how to develop film and do other related work such as photo printing and enlarging. Later, he may set up lights and cameras or otherwise assist an experienced photographer in taking pictures.

Photographic training also can be obtained in many colleges and universities, trade schools, and technical institutes, or by taking correspondence school courses. There are colleges, universities, or other institutions in almost every State that offer courses in some area of photography. Several colleges and universities offer 4-year curriculums leading to a bachelor's degree with a major in photography. These curriculums include liberal arts subjects as well as courses in professional photography. The master's degree with a major in various specialized areas, such as color photography, is offered by some colleges and universities. A few institutions have 2-year curriculums leading to a certificate or an associate degree in photography. Training in design at art schools or institutes is also useful, although these schools usually do not provide the technical training for camera work. (See statement on Commerical Artists.) Some photographers are trained in 3-year apprenticeship programs. Also, many young people learn photographic skills while serving in the Armed Forces.

The kind and amount of training obtained greatly influences the type of photographic work for which a young person can qualify. Amateur photographic experience may be helpful to the young person considering entry jobs in this field.

Considerable post-high school training, plus some photographic experience, is usually needed to enter industrial, news, or scientific photography. Photographic work in scientific and engineering research generally requires a background in science or engineering, as well as skill in photography.

The prospective photographer

should have manual dexterity, good eyesight and color vision, as well as some artistic ability. In addition, a pleasant personality and the ability to put people at ease are needed by photographers. Imagination and originality are particularly important assets for successful careers in commercial photography or freelance work. For press photography, a knowledge of news values and the ability to act quickly are important.

Beginning photographers often work in established studios until they accumulate the capital and experience needed to start their own businesses, although some open their own immediately after completing their training.

Employment Outlook

Thousands of talented and well-trained photographers will be needed each year though the 1970's to fill new positions and replace those who retire, die, or stop working for other reasons. However, those with limited ability and training are likely to encounter competition and find few opportunities for advancement.

Competition for employment in the portrait and commercial fields of photography is expected to be keen; nevertheless, opportunities should exist for those who are competent and well trained. These fields may be entered easily, since a photographer can go into business for himself with a modest financial investment. Moreover, the available supply of portrait and commercial photographers is continually enlarged by people who are employed in other occupations but who take pictures in their spare time.

In coming years, the employment of industrial photographers is expected to rise at a more rapid rate than that of either portrait or commercial photographers. Major factors contributing to this growth are the increasing use of photographers in research and development and the more widespread production of audio-visual aids for use by business, industry, civic organizations, and government. Because of advances in photographic technology, such as more sophisticated cameras, improved color, and high-speed photography, more and more business concerns and other organizations are utilizing photographic work. Microfilming will offer employment opportunities for persons having basic photographic skills. In this process, photo methods are used to reduce large quantities of file material to 16 millimeter film for easier filing and retrieval. In addition, opportunities are expected to be favorable for photographers working in scientific and engineering photography, illustrative photography, photo-journalism, and other highly specialized areas that require a thorough knowledge of photography as well as training in a technical or scientific field. Population expansion and the growth of the suburbs also will create some opportunities for photographers to open studios in new shopping centers.

Earnings and Working Conditions

Beginning photographers generally earned from $125 to $140 a week in 1970, according to the limited information available. Many photographers who have established reputations earned much more.

Inexperienced photographers employed by most daily newspapers having contracts with the American Newspaper Guild received minimum starting salaries ranging from about $105 to $140 a week. For photographers employed by a few small daily newspapers, the Guild minimum starting salaries were less than $95 a week; on a few large dailies, Guild minimum rates for beginning photographers approached $200 a week or more. Minimum rates for newspaper photographers having some experience (usually for those with 4 to 6 years) averaged about $200 a week in 1970. Contract minimums for experienced newspaper photographers on a few small dailies were less than $165 a week; on a few large dailies, they ranged from about $260 to $290 a week. Photographers who have a science or engineering background usually received beginning salaries of between $9,000 and $10,000 a year.

Depending on the level of experience, the entrance salary of photographers in the Federal Civil Service ranged from $5,853 to $9,881 a year in 1970. In addition, the salary schedule provides for periodic increases above this amount. Most experienced photographers in the Federal Government earned between $6,500 and $14,000 a year; a few earned over $17,000 annually.

Self-employed photographers generally earn more than salaried workers, but their earnings are affected greatly by business conditions and many other factors such as the type and size of community and clientele.

Photographers who have salaried jobs usually work the standard 5-day, 40-hour week and receive benefits such as paid holidays, vacations, and sick leave. Photographers in business for themselves frequently work longer hours. Working conditions are generally pleasant. Freelance, press, and commercial photographers may be required to travel frequently.

Sources of Additional Information

Information about photography as a career, as well as a list of schools of photography, is available from:

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

SYSTEMS ANALYSTS

(D.O.T. 033.187, 012.168, 020.081 and 020.088)

Nature of the Work

Systems analysts plan, schedule, and coordinate the activities necessary to develop systems which process data to solve business, scientific, or engineering problems. Individual parts of a problem are viewed within the context of the overall problem. Although a system can be developed to process data manually, mechanically, or with electronic computers, most systems analysts develop methods for computer usage. (This statement discusses only the work of systems analysts who devise systems using electronic computers to process data and solve problems.)

Business firms employ systems analysts to solve accounting, inventory, and other problems. With the assistance of managers or subject matter specialists, they determine the exact nature of the data-processing problem. Then systems analysts define, analyze, and structure the problem logically. They identify all of the data needed and define exactly the way it is to be processed. They prepare charts, tables, and diagrams to describe the processing system and the steps necessary to its operation. Systems analysts use various techniques as tools of analysis; these may include cost accounting, sampling, and mathematical methods. After analyzing the problem and devising a system for processing data, systems analysts recommend the equipment to be used and prepare instructions for programers. They also interpret and translate final results into terms that are understandable to management, subject matter specialists, or customers.

Data processing problems are vast and solutions so varied and complex that many systems analysts specialize in a particular area. For example, systems analysts who work for scientific or engineering organizations may determine the flight of a space vehicle. Other analysts may develop systems to plan and forecast sales or conduct marketing research.

Some analysts improve systems already in use to handle additional or different types of data. Others do research, described as advanced systems design, to devise new methods of systems analysis. Analysts engaged in this type of activity usually have mathematical, scientific, or engineering backgrounds.

Systems analysts, who are managers or administrators and responsible for overall systems design, assign analysts to various phases of a project. They also may plan, organize, and control systems analysis throughout the organization in which they work and prepare reports.

Places of Employment

More than 100,000 persons were estimated to be employed as systems analysts in 1970. They work

mainly for insurance companies, manufacturing concerns, banks, wholesale and retail businesses, and the Federal Government. A growing number of systems analysts are employed by universities and independent service organizations that furnish computer services to business firms and other organizations on a fee basis. Systems analysts work chiefly in large cities.

Training, Other Qualifications, and Advancement

There is no universally acceptable way of preparing for work in systems analysis. Some employers prefer that candidates have a bachelor's degree and experience in mathematics, science, engineering, accounting, or business. Other employers stress a graduate degree.

Educational preparation and experience often determine the kind of job opportunities available. For example, employers are likely to seek an analyst having a background in business administration to work in finance or similar areas; those having an engineering background are sought for engineering or scientifically oriented systems. 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 computer operator or programer.

Most employers prefer to hire people who have had some experience in computer programing. A young person 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 programers. After gaining some experience, they may be promoted to systems analyst trainees and later qualify as systems analysts.

In large electronic 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 having proven leadership ability also can advance to positions as manager of systems analysis or an electronic data-processing department.

Employment Outlook

Employment opportunities for systems analysts should be excellent through the 1970's. Systems analyst has ranked among the fastest growing professional occupations in recent years. However, because people having a systems analysis or similar background work in fields such as mathematics and science, employers have had difficulty recruiting these workers.

A growing demand for systems analysts will result from the rapid expansion of electronic data-processing systems in business and government. Greater emphasis will be placed on developing computer systems that will retrieve information more efficiently; solve complex business, scientific, and engineering problems; and monitor industrial processes. These developments and others, such as the extension of computer technology to small business, the use of systems analysis to determine plant and store location, and the growth of computer centers to serve individual clients for a fee, signify a rapid rise in employment.

In addition to opportunities due to growth, some openings will occur as systems analysts advance to more responsible positions or leave their jobs to enter other employment. Because many of the workers are young, relatively few positions will result from retirement or death.

Earnings and Working Conditions

In 1970, beginning salaries of systems analysts averaged between $8,950 and $12,700 a year, according to a private survey which covered more than 80,000 workers in business, government, and educational data-processing installations in all parts of the country. Earnings of experienced systems analysts averaged $14,300 annually, and in some cases they were paid $25,000 or more a year.

Systems analysts usually work about 40 hours a week—the same as other professional and office workers. Unlike many console operators who work on two or three 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 may be obtained from the following sources:

American Federation of Information Processing Societies, 210 Summit Avenue, Montvale, N.J. 07645.

Data Processing Management Association, 505 Busse Highway, Park Ridge, Ill. 60068.

A list of reading materials on career opportunities in the data processing field may be obtained from:

Association for Computing Machinery, 1133 Avenue of the Americas, New York, N.Y. 10036.

PROGRAMERS

(D.O.T. 020.188)

Nature of the Work

An electronic computer, although sometimes called a "mechanical brain," can only follow step-by-step instructions. The programer prepares these instructions.

A computer not only makes mathematical calculations at fantastic speeds, but stores large amounts of data for later use. Because computers work with masses of information at tremendous speed and accuracy, they are used for much "data processing" that otherwise would require many employees. They handle varied assignments such as maintaining inventories and controlling production machinery in factories.

Every "problem" processed in a computer first must be carefully analyzed so that exact and logical steps for its solution can be worked out. An experienced programer or systems analyst does this preliminary work. (See the statement on systems analysts elsewhere in the Handbook.)

Once this preliminary work has been completed, the "program," or detailed instructions for processing the data, can be prepared by the programer. Exactly how he does this depends not only on the type of equipment to be used but on the nature of the problem. The mathematical calculations involved in billing a firm's customers, for example, are very different from those required in most kinds of scientific and technical work. The programing techniques also are different. Still other techniques are required in writing programing "aids" to reduce the amount of detail. Because of these differences, many programers specialize in certain kinds of work.

In business offices, computers frequently are used to bill customers, make up payrolls, and keep track of inventories. First, the programer determines what information is necessary to prepare the documents and the form in which it is entered on company records. He next makes a flow chart or diagram, showing in what order the computer must do each step. Then, he prepares detailed instructions for the computer's control unit to tell the machine exactly what to do with each piece of information. The programer also prepares an instruction sheet for the console operator to follow when the program is run. (The work of the console operator is described in the statement on Electronic Computer Operating Personnel.)

The final step in programing is "debugging"—that is, checking on whether the instructions have been correctly written and will produce the desired information. A program usually is debugged in two steps. First, the programer takes a sample of the data to be processed and reviews step by step exactly what will happen as the computer follows the series of instructions that make up the program. Then, after he has revised the instructions to take care of any difficulties that have appeared, he completes the test by having a trial run made in the computer. The console operator sometimes helps with this part of the debugging process.

A comparatively simple program can be made for a computer within a very few days. A program that deals with a complex problem or is designed to produce many different kinds of information may require a year or more of preparation—sometimes by a large number of programers. On involved problems, several programers at different levels of responsibility often work as a

Programer prepares flow chart.

team, under the supervision of a senior programer.

The programer may perform other related duties, such as designing forms to use in data presentation. In addition, existing programs must be updated to keep pace with administrative changes or to improve efficiency. Also, larger or newer model computers often require that programs be rewritten.

Places of Employment

Nearly 200,000 programers were employed in 1970. In addition, some professional workers such as engineers, scientists, mathematicians, economists, and accountants spend a portion of their time programing.

Programers are employed chiefly by large business organizations and government agencies. A great many work for insurance companies and banks, public utilities, wholesale and retail establishments, and manufacturing firms of almost every kind. A considerable number are government employees doing work related either to scientific and technical problems, or to the processing of the vast amount of paperwork that is handled in many government offices. In addition, a growing number of programers are employed by computer manufacturers and independent service organizations that furnish computer and programing services to business firms and other organizations on a fee basis.

Training, Other Qualifications, and Advancement

The special abilities most sought by employers when they hire programers are similar for all types of positions, but requirements regarding education and experience vary according to the problems with which the programer will be occupied. Some programers are college graduates having degrees in engineering, for example, whereas others have had years of experience in work such as accounting or inventory control. In selecting programers, employers look for people having an aptitude for logical thinking and the exacting kind of analysis that is part of the job. The work also calls for patience, persistence, and the ability to work with extreme accuracy. Ingenuity and imagination are particularly important in jobs where programers have to solve problems in new ways.

Organizations which use computers for science and engineering prefer programers who are college graduates having degrees in engineering, the physical sciences, mathematics, or computer science. Graduate degrees may be required for some positions; for almost all positions, an applicant who has no college training is at a severe disadvantage.

Employers who use computers to process business records may not require programers to have technical college training. Many employers promote qualified workers having previous experience in machine tabulation, payroll, or accounting. When hiring outsiders, employers usually prefer applicants having training beyond high school. College courses in data processing or accounting, business administration, engineering, or mathematics provide especially good preparation.

Entrance requirements for jobs in the Federal Government are similar to those in private industry. Applicants are required to have a college degree, preferably with training in mathematics or the equivalent work experience.

Young people interested in programing can acquire some of the necessary skills at a steadily increasing number of technical schools, colleges, and universities. Instruction ranges from introductory home study and extension courses to advanced computer technology at the graduate level. High school courses in computer programing also are offered in many parts of the country.

High school and post-high school instruction, however, do not entirely eliminate the need for on-the-job training. Since technology changes continually and each type of computer has its own special programing, some additional training usually is necessary.

Most beginners in this occupation attend training classes for a few weeks and then, as they work on minor programing assignments, continue with further specialized training. A year or more of experience usually is necessary before a programer can handle all aspects of his job without close supervision. Once he becomes skilled, his prospects for further advancement are good. Experienced and capable programers are in strong demand. In large organizations, employees may be promoted to systems analyst positions or senior programing jobs having supervisory responsibilities.

Employment Outlook

Many thousands of new jobs for programers will become available each year through the 1970's. Employment is expected to increase very rapidly, as the number of computer installations rises to meet the growing demand for data processing. The increase in employment is expected to be particularly sharp in firms that use computers to process

business records or to control manufacturing processes.

The rise in employment is expected to be accompanied by changes in the nature of the work done by programers. Advances in programing techniques and equipment, such as the use of more advanced languages and program parts stored in libraries for future reference, will eliminate much of the routine work associated with writing a program. As a consequence, professionally trained personnel qualified to handle both programing and systems analysis are likely to be increasingly in demand, especially for work on scientific and engineering problems. For other positions, many of them in large business offices where the analysis is done by accountants and other subject matter experts, 2 years of post-high school training may provide a sufficient background for beginning programers.

Most of the openings for programers in the years just ahead will be new jobs that arise as the number of computer installations continues to increase, and computers are put to new uses. Some openings also will occur as programers advance to more responsible positions, or as they leave their jobs to enter other types of employment. Because this occupation includes many comparatively young workers, fewer positions are likely to become vacant because of retirement or death than in other occupations of similar size.

Earnings and Working Conditions

In 1970, beginning salaries for programers averaged $8,530 a year, according to a private survey which covered more than 80,000 data processing workers in all parts of the country. Experienced programers averaged $12,170 a year, with some earning up to $20,000 annually. The average salary for programers having supervisory duties was $14,250 a year; some programing supervisors earned up to $24,000 annually.

The survey indicated salaries varied substantially. Some workers earned up to five times as much as others in the same position. These differences were due to the data processed, the computer used, the industry, and its location.

Federal Government salaries for programers were comparable to those in private industry. The great majority earned between $8,100 and $14,200 a year. The minimum entrance salary for beginners was $6,550 a year in 1970, and the top salaries of experienced programers responsible for complex programing or supervisory and administrative work ranged to $22,900 or more a year.

Programers work about 40 hours a week. Unlike many computer console and auxiliary equipment operators who work on two or three shifts, programers usually work only during the day. Occasionally, evening or weekend work may be necessary.

Work places usually are modern offices, well-lighted and air conditioned. Employers recognize the desirability of providing the best possible work surroundings so that programers can concentrate more readily on the exacting analysis that is essential to their job.

Sources of Additional Information

Additional information about the occupation of programer may be obtained 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.

A list of reading materials on career opportunities in programing may be obtained from:

Association for Computing Machinery, 1133 Avenue of the Americas, New York, N.Y. 10036.

PSYCHOLOGISTS

(D.O.T. 045.088 and .108)

Nature of the Work

The problems of severe emotional stress and abnormal behavior, the causes of low morale, or the effective performance of an astronaut, are among the concerns of psychologists seeking to understand people and to explain their actions. Psychologists study the behavior of individuals and groups and often help individuals achieve satisfactory personal adjustments. Their work includes varied activities such as teaching in colleges and universities; counseling individuals; planning and conducting training programs for workers; performing basic and applied research; advising on psychological methods and theories; and administering psychology programs in hospitals, clinics, research laboratories, and other places.

Psychologists obtain information about the capacities, traits, interests, behavior, and actions of people in several ways. They may interview individuals, develop and administer tests and rating scales, study personal histories, and conduct con-

trolled experiments. In addition, psychologists often conduct surveys, either by personal interviews or by written questionnaires.

Psychologists usually specialize in one of the many interrelated branches of the profession. Clinical psychologists are the largest group of specialists. Generally, they work in mental hospitals or clinics and are concerned mainly with problems of mentally or emotionally disturbed people. They interview patients, give diagnostic tests, and provide individual and group psychotherapy. Other specialties in psychology include experimental psychology (the laboratory study of basic learning and motivation and sensory and perceptual processes); developmental psychology (the study of specific age groups such as young children, teenagers, and the aged); personality and social psychology (the study of human relationships to gain understanding of behavior); school psychology (concerned with psychological factors involved in the educational performance and general well being of school age children); comparative psychology (comparative behavior of different animals); physiological psychology (the relationship of behavior to physiological processes); counseling psychology (helping people achieve satisfactory personal, social, educational, or occupational adjustments); educational psychology (the study of educational processes); industrial psychology (developing techniques for selecting and training workers and improving worker motivation and morale); and engineering psychology (the study of man-machine and other complex system relationships).

Places of Employment

An estimated 40,000 psychologists were employed in 1970. About one-quarter are women.

Colleges and universities employ the largest number of psychologists —nearly three-fifths of the total. Government agencies—Federal, State, and local—employ the second largest group. Within the Federal Government, the agencies having the most psychologists are the Veterans Administration, the Department of Defense, and the Public Health Service.

Many psychologists also work in public schools, industry, and nonprofit foundations and clinics. Some are in independent practice, and others serve as commissioned officers in the Armed Forces and the Public Health Service.

Training, Other Qualifications, and Advancement

Generally, the master's degree with a major in psychology is the minimum educational requirement for professional employment in the field. Psychologists having this degree can qualify for positions where they administer and interpret psychological tests, collect and analyze statistical data, conduct research experiments, and perform administrative duties. In addition, they may teach in colleges, help counsel students or handicapped persons, or —if they have had previous teaching experience—act as school psychologists or counselors. (See statements on School Counselors and Rehabilitation Counselors.)

The Ph. D. degree is needed for many entrance positions and is becoming increasingly important for advancement. Psychologists having doctorates qualify for the more responsible research, clinical, and counseling positions, as well as for the higher level positions in colleges and universities, and in Federal and State programs.

At least 1 year of full-time graduate study is needed to earn the master's degree. An additional 3 to 5 years of graduate work usually is required for the Ph. D. degree. In clinical or counseling psychology, the requirements for the Ph. D. degree generally include an additional 1 year of internship or supervised experience.

Many graduate students receive financial help from universities and other sources in the form of fellowships, scholarships, or part-time employment. Several Federal agencies provide funds to graduate students, generally through the educational institution giving the training. The Veterans Administration offers a large number of predoctoral traineeships, during which time the students receive payments and gain supervised experience in VA hospitals and clinics. The Public Health Service provides funds for predoctoral and post doctoral traineeships and research fellowships. The National Science Foundation, the U.S. Office of Education, the Rehabilitation Services Administration, and the National Institute of Mental Health also provide fellowships,

grants, and loans for advanced training in psychology.

The American Board of Examiners in Professional Psychology awards diplomas in the specialties of clinical, counseling, industrial, and school psychology to those having outstanding educational records and experience and who pass the required examinations.

Some universities require an undergraduate major in psychology for admission to graduate work in that field. Others prefer students with broader educational backgrounds, including not only some basic psychology courses but also courses in the biological, physical and social sciences, statistics, and mathematics.

Psychologists desiring to enter independent practice must meet certification or licensing requirements in an increasing number of States. In 1970, 42 States had these requirements.

Young persons who wish to pursue a career in psychology must be emotionally stable, socially mature, and able to deal effectively with people. Sensitivity, patience, and a genuine interest in others are particularly important attributes for work in clinical and counseling psychology. Research psychologists should be able to do detailed and independent work. Verbal and writing skills are necessary in communicating research findings.

Employment Outlook

Employment opportunities for psychologists having the Ph. D. degree are expected to be excellent through the 1970's. Psychologists holding master's degrees will be in demand, but their opportunities will be less favorable than for those having the Ph. D. degree.

Continued very rapid expansion of the profession is expected through the 1970's. Mental hospitals, correctional institutions, mental hygiene clinics, and community health centers which are currently understaffed, will need many clinical, counseling, and social psychologists in the future. Many openings for psychologists also are anticipated in the Federal Government, primarily in the Veterans Administration and the Department of Defense.

Increasing awareness of the need for testing and counseling children is expected to increase the need for psychologists in schools. In colleges and universities, more psychologists will be needed for student personnel work, as well as for teaching and research. Increased public concern for the development of human resources as evidenced by the Mental Retardation Facilities and Community Mental Health Centers Construction Act of 1963, as amended; and Medicare, Medicaid, and other federal programs will further increase the demand for psychologists.

Many vacancies also will occur each year as a result of retirements and deaths. The transfer of psychologists to do work of a purely administrative nature also may create some job vacancies. Most opportunities, however, will result from the rapid expansion that is anticipated for the profession.

Earnings and Working Conditions

In 1970, starting salaries for psychologists having a master's degree averaged about $9,600 a year, according to the American Psychological Association. Beginning salaries for those having the doctorate degree averaged $10,900.

The median annual salary for all psychologists in the National Science Foundation's Register of Scientific and Technical Personnel was $15,000 in 1970. The median salary for those having a Ph. D. was $16,000. According to the Register, self-employed psychologists generally have higher incomes than salaried employees.

Median salaries in graduate departments of psychology ranged from $11,700 for assistant professors to $19,200 for full professors during the academic year 1970–71 (9–10 months), according to a survey conducted for the Conference of Chairmen of Graduate Departments of Psychology.

In the Federal Government, psychologists having a Ph. D. degree and limited experience started at $13,493 in 1970. The annual average salary in the Department of Medicine and Surgery, Veterans Administration, which requires the doctoral degree for all specialties, was about $18,800 in 1970.

Sources of Additional Information

General information on career opportunities, certification or licensing requirements, and educational facilities and financial assistance for graduate students in psychology may be obtained from:

American Psychological Association,
1200 17th St. NW., Washington,
D.C. 20036.

Information on traineeships and fellowships may be obtained from colleges and universities having graduate psychology departments.

RECREATION WORKERS

(D.O.T. 079.128, 187.118, 195.288)

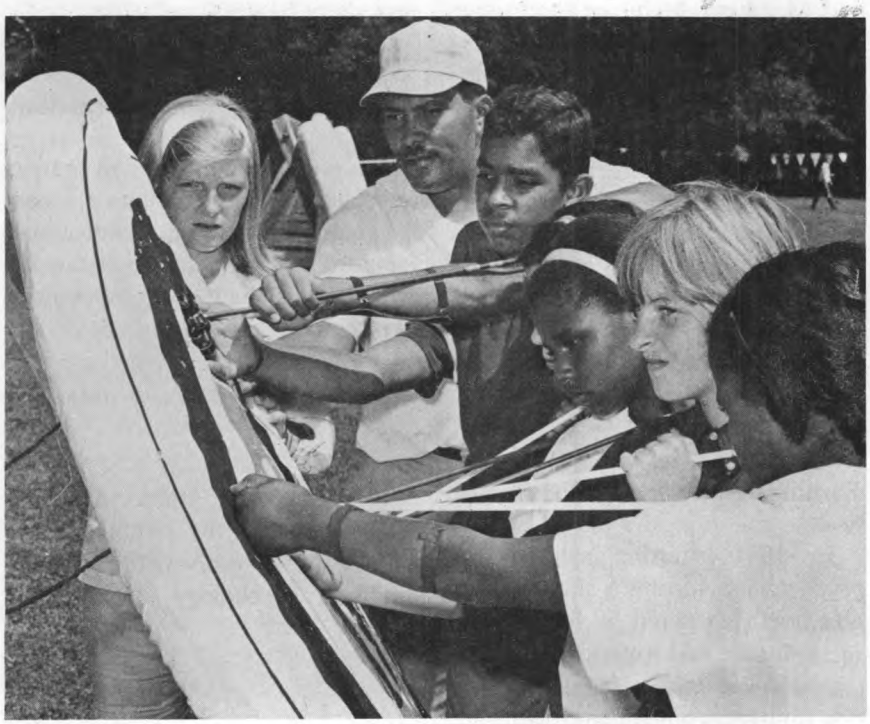
Nature of the Work

Modern technological advances increasingly have raised the standard of living and provided leisure time for most people. How people spend their nonworking hours is now a major concern. Recreation workers help people to enjoy and use their leisure time constructively by organizing individual and group activities and by administering physical, social, and cultural programs for all age groups at camps, playgrounds, community centers, and hospitals. They also operate recreational facilities and study the recreation needs of individuals and communities.

Recreation workers employed by local government and voluntary agencies direct activities at neighborhood playgrounds and indoor recreation centers. They provide instruction in the arts and crafts and in sports such as tennis and basketball. They may supervise recreational activities at correctional institutions and work closely with social workers in organizing programs of recreation for the young and the aged at community centers and social welfare agencies.

Many persons work in industrial, hospital, military, or school recreation. Recreational workers in industry plan programs for company employees and organize bowling leagues, softball teams, and similar activities. Sometimes, they plan fund drives and company social functions. Hospital recreation workers plan recreation programs for the ill and the handicapped in hospitals, convalescent homes, and other institutions. Working under medical direction, they organize and direct sports, dramatics, and arts and crafts for persons suffering from mental problems and physical disabilities. School recreation workers organize the leisure-time activities of school-age children during school-days, weekends, and vacations.

Some part-time recreation workers and volunteers assist full-time workers throughout the year but mostly during the summer months. Part-time workers are largely college students and teachers. They work primarily as recreation leaders and camp counselors, organizing and leading games and other activities at camps and playgrounds.



Recreation worker instructs archery class.

Places of Employment

About 13,500 professional recreation workers were employed full time in 1970; about one-half are women. The majority worked for local governments and voluntary agencies. Most of the remainder were employed by religious organizations or by the Federal Government in national parks, the Armed Forces, the Veterans Administration, and correctional institutions. Some recreational workers were employed by industry, and a few taught in colleges and universities.

Recreation workers are employed in all parts of the country; however, a large proportion are employed in California, Massachusetts, New Jersey, New York, Ohio, Pennsylvania, and Texas.

Training, Other Qualifications, and Advancement

Most employers prefer college graduates who have majored in rec-

reation, social science, or physical education for work in the recreation field. However, fewer than one-half of the recreation workers currently employed have this educational background. Persons interested in becoming recreation workers should take a broad range of courses in college. The typical program of study includes courses in communication, natural sciences, the humanities, philosophy, sociology, drama, and music. Specific courses in recreation include group leadership, program planning and organization, health and safety procedures, outdoor and indoor sports, dance, arts and crafts, and field work (actual recreation leadership experience).

Advanced courses in recreation or public administration leading to the master's degree are desirable for persons interested in higher level administrative postions. Students interested in industrial recreation may find it desirable to take courses in business administration; and those interested in working with the aged in hospitals as recreation specialists should take courses in psychology, health education, and sociology.

Training leading to a bachelor's degree with a major in recreation was available in over 130 schools in 1970. About 70 offered a master's degree and about 30 offered a doctorate in recreation. Over 60 junior colleges offer programs in recreation.

Young people planning a career as a recreation worker must have the ability to motivate people and be sensitive to their needs. Good health and physical stamina are required to participate in sports. Activity planning often calls for creativeness and resourcefulness. Since the recreation worker organizes sports, supervises art projects, and gives fund-raising speeches, he should have a variety of skills. Recreation workers should be able to accept responsibility and exercise judgment since they usually work alone.

To increase their leadership skills and understanding of people, students should obtain related work experience in high school and college. They may do volunteer, part-time, or summer work in recreation departments, camps, youth-serving organizations, institutions, and community centers.

Most college graduates entering the recreation field begin as leaders or specialists, although each year a small number of college graduates enter trainee programs that lead directly to recreation administration. A few large cities and organizations offer these programs which generally last 1 year.

The National Recreation and Park Association administers a national internship program to give advanced training and experience to graduates of recreation curriculums. Stipends varying from $6,000 to $8,000 a year are available.

Recreation leaders work directly with groups and individuals to organize and teach diversified activities, such as athletics and social recreation in indoor and outdoor centers. They also supervise nonprofessional workers and assist in administering recreation programs. Recreation specialists organize and develop one activity or several closely related activities. They sometimes oversee nonprofessional workers.

After a few years' experience, recreation leaders and specialists may become recreation directors; those having graduate training, however, may start at this level. Directors are responsible for the operation of the facilities, staff supervision, and the development and execution of programs at a particular recreation center, as well as the preparation of budgets and the analysis of recreation programs.

Opportunities for advancement to administrative positions often are limited for persons who have no graduate training. However, advancement is sometimes possible through a combination of education and experience. Administrative jobs require varying years of experience in full-time recreation work, depending upon the size of the community or organization and the program.

Employment Outlook

Employment of recreation workers is expected to increase very rapidly, through the 1970's. Several thousand recreation workers will be needed annually for growth and to replace personnel who leave the field because of retirements, deaths, or transfers to other occupations. In recent years, the number of college graduates having a major in recreation has fallen far short of the demand, and this pattern is expected to continue. Thus, many new recreation workers will continue to be hired from the fields of social science, physical education, and health education. Persons having less than full professional training also will find employment opportunities. As a result of the great demand for recreation workers, part-time and volunteer personnel will be needed, particularly in social welfare agencies and at the local government level.

Factors that will contribute to growth include increased leisure time and rising levels of per capita income. As income levels rise, more persons will participate in a variety of competitive and noncompetitive sports and larger numbers will travel to parks and resorts for

camping, hiking, fishing, and other recreational pursuits. In addition, improvements in the national highway system will make many State parks and national forests more accessible to vacationing families. Population growth also will create a demand for more recreation workers to expand existing recreation programs and to aid larger numbers of mentally and physically handicapped persons. Longer life and earlier retirements will increase the number of clubs and organizations for retired persons, and thus increase the need for recreation workers.

Other reasons for the anticipated longrun expansion in the number of recreation workers include a growing interest and participation in recreation activities by the general population; the continued trend toward urban living; the rise in industrial recreation activities as more companies promote recreation programs for their employees; increased attention to physical fitness by government, educators, industry and others; and the initiation of programs to insure the preservation of outdoor recreation areas. A number of recent Federal laws also will contribute to the rising demand for recreation workers. Among these are the Elementary and Secondary Education Act of 1965, which includes provisions for grants to local educational agencies for improving and expanding recreation opportunities for the educationally deprived; and the Older Americans Act of 1965, which provides grants to States for programs, including recreation, for older persons.

Earnings and Working Conditions

Beginning recreation leaders having a bachelor's degree earned between $7,200 and $7,800 annually in 1970, according to the National Recreation and Park Association. In the same year, the salaries of recreation supervisors ranged from $8,500 to $10,000, depending upon their qualifications and the size of the community in which they were employed. Salaries of recreation directors or superintendents generally ranged from $12,000 in some small communities to over $22,000 in many large cities. Regions varied in their salary levels—higher salaries generally were paid in the West than in other areas of the country.

In 1970, the annual starting salary for inexperienced recreation workers in the Federal Government was $6,548 or $8,098, depending on their academic records or specialized training. Experienced recreation workers in Federal positions generally earned between $9,900 and $14,200 annually.

The average workweek for recreation workers is 40 hours, although some work upwards of 50 hours. A person entering the recreation field should expect some nightwork and irregular hours, for many recreation personnel work while other persons are enjoying their leisure time. Most public and private recreation agencies provide from 2 to 4 weeks' vacation and other fringe benefits, such as sick leave and hospital insurance.

Sources of Additional Information

Information about recreation as a career and about employment opportunities in the field may be obtained from:

National Industrial Recreation Association, 20 North Wacker Dr., Chicago, Ill. 60606.

National Recreation and Park Association, 1700 Pennsylvania Ave. NW., Washington, D.C. 20006.

Information about employment opportunities in Veterans Administration hospitals may be obtained directly from the hospitals or from the Department of Medicine and Surgery, Veterans Administration, Washington, D.C. 20421.

SOCIAL WORKERS

(D.O.T. 195.108, .118, .168, .208, and .228)

Nature of the Work

Development of a more complex urban society has greatly increased the need for organized social services. Social workers provide the link between these services, and individuals and families who are not able to provide for themselves or who need assistance in solving their problems.

The problems which concern social workers include poverty; broken homes; physical, mental, and emotional handicaps; antisocial behavior; racial tensions; and unsatisfactory community conditions such as inadequate housing and medical care, and lack of educational, recreational, and cultural opportunities. A variety of public and voluntary agencies have social work programs designed to meet specific needs in specific ways: for example, income maintenance programs; family and child welfare services; social services for the crippled, disabled, ill, and aging; and programs for the prevention of juvenile delinquency. Many social work agencies emphasize service to individuals or families; some place primary emphasis on

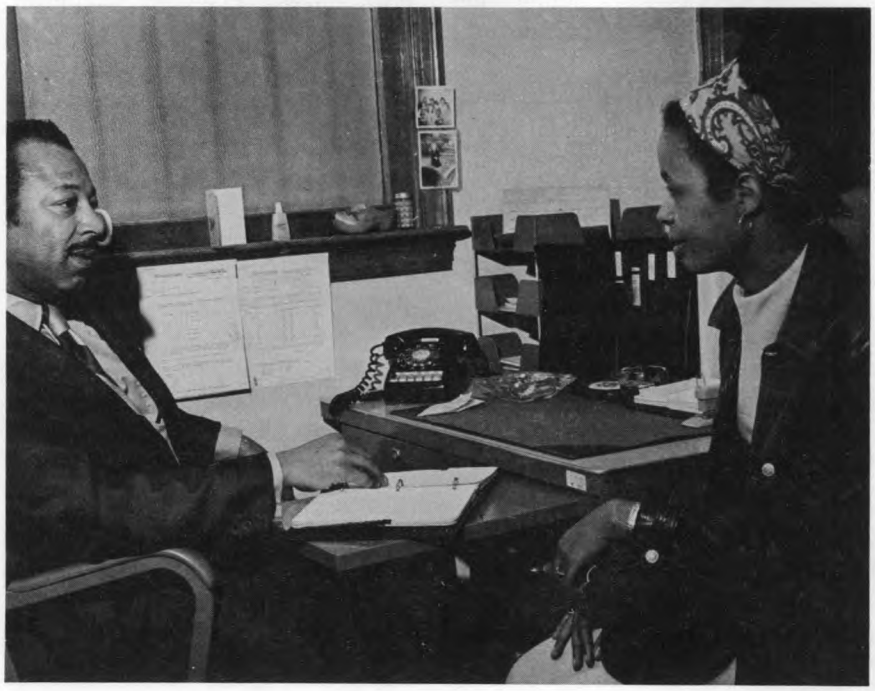
working with larger groups; and still others are concerned mainly with the community's social welfare.

Job titles may identify these three basic approaches as casework, group work, or community organization. The trend is for the social worker to use combinations of any two or all three approaches in problem-solving, however.

Caseworkers identify the social problems of individuals and families through interviews. They aid them in understanding their problems and in securing necessary services, including financial assistance, foster care, and homemaker service. Group workers help people through group activities to understand themselves and others better, and to work with others to achieve a common goal. They plan and conduct activities for children, adolescents, and older persons in a variety of settings, including settlement houses, hospitals, homes for the aged, and correctional institutions. Community organization workers help plan and develop health, housing, welfare, and recreation services for a neighborhood or larger area. They often coordinate existing social services and organize fund raising for community social welfare activities.

The majority of social workers provide social services directly to individuals, families, or groups. However, a substantial number perform executive, administrative, or supervisory duties. Others are college teachers, research workers, or consultants. The wide range of services provided by social workers is suggested by the descriptions of the principal areas of social work which follow:

Social workers in family service positions in State and local governments and voluntary agencies provide counseling and social services that strengthen family life and help clients to improve their social functioning. They also advise their clients on the constructive use of financial assistance and other social services.



Social workers in child welfare positions in government and voluntary agencies improve the physical and emotional well-being of deprived and troubled children and youth. They advise parents on child care and child rearing, counsel children and youth with social adjustment difficulties, arrange homemaker services during a mother's illness, institute legal action for the protection of neglected or mistreated children, provide services to unmarried parents, and counsel couples who wish to adopt children. They may place children in suitable adoption or foster homes or in specialized institutions.

Social workers employed by schools aid children whose unsatisfactory behavior or progress in school is related to their social problems. These workers consult and work with parents, teachers, counselors, and other school personnel in identifying and seeking a solution to the problems that hinder satisfactory adjustment.

Social workers employed by hospitals, clinics, health agencies, rehabilitation centers, and public welfare agencies aid patients and their families with social problems accompanying illness, recovery, and rehabilitation. They usually function as part of a medical team composed of physicians, therapists, and nurses.

Some social workers provide services for patients in mental health centers, hospitals, or clinics. As members of teams composed of psychiatrists, psychologists, and other professional personnel, they develop and report information on the patient's family and social background for use in diagnosis and treatment. They help patients respond to treatment and guide them in their social adjustment to their homes, jobs, and communities. They have particular

responsibility for helping the families of patients to understand the nature of the illness. Social workers also participate in community mental health programs concerned with the prevention of mental illness and readjustment of mental patients to normal home and community living. Some conduct research.

Social workers in rehabilitation services assist emotionally or physically disabled persons in adjusting to the demands of everyday living. As part of a rehabilitation team, which usually includes physical or occupational therapists, these social workers serve as a link with the community while patients are in the hospital; later, they help them adjust to home and community life. (Rehabilitation counselors, a related occupational group, are discussed in a separate statement.)

Probation and parole officers and other correctional workers assist persons on probation and parole and juvenile offenders in readjusting to society. They investigate the social history and background of the person under the jurisdiction of the court and make reports to the court to help the judge in his judicial decisions. They also counsel persons on probation or parole, may help them secure necessary education or employment, and direct them to other services in the community. They also seek to resolve problems in marital and parent-child relationships.

Places of Employment

About 170,000 social workers were employed in 1970; about 60 percent worked in Federal, State, county and city government agencies. Most of the remainder were in voluntary or private agencies. A small number of experienced social workers from the United States were serving in other parts of the world as consultants, teachers, or technicians engaged in setting up agencies, schools, or assistance programs. They were employed by the Federal Government, the United Nations or one of its affiliated agencies, national professional associations, or voluntary agencies.

Training, Other Qualifications, and Advancement

A bachelor's degree, preferably in social welfare, generally is the minimum educational requirement for beginning jobs in social work. In most fields of practice, certain specialized areas require a master's degree in social work. For teaching positions, a master's degree in social work is required, and a doctorate is preferred. In research work, training in social science research methods is required, in addition to a graduate degree and experience in social work. In most States, beginners must pass a written examination in social work for employment in a government agency.

A master's degree in social work is awarded on successful completion of 2 years of specialized study and supervised field instruction in an accredited school of social work.

Social workers who have a master's degree and belong to the National Association of Social Workers are eligible for certification as members of the Academy of Certified Social Workers (ACSW).

In 1970, 70 graduate schools of social work in the United States were accredited by the Council on Social Work Education. For admission to these schools, a student must have a bachelor's degree representing broad knowledge of the liberal arts, preferably including courses in economics, history, political science, psychology, sociology, and social anthropology.

Many scholarships and fellowships are available for graduate education. Nearly two-thirds of the full-time students in graduate schools receive some type of financial aid from either the schools or employing agencies. Some social welfare agencies, both voluntary and public, offer plans whereby workers are granted "educational leave" to obtain graduate education. The agency may pay the expenses or a salary, or both.

Personal qualities essential for social workers include emotional maturity, objectivity, sensitivity, a basic concern for people and their social problems, and the ability to form and sustain good working relationships and to encourage social adjustment in others. Students should try to obtain as much related experience as possible during high school and college to determine whether they have the interest and capacity for professional social work. They may do volunteer, part-time, or summer work in places such as camps, settlement houses, community centers, or social welfare agencies. Some social welfare agencies, both voluntary and public, hire college students and, in some cases, high school students for nonclerical jobs in which the students assist social workers.

Employment Outlook

Employment opportunities for social workers are expected to be very good through the 1970's. Despite the anticipated increase in the number of graduates of master's degree programs in social work, the demand for these highly trained social workers is expected to continue

to exceed the supply. The outlook for persons having a bachelor's degree in social welfare or in related fields will continue to be favorable. Qualified and experienced women who wish to work part time should have very good employment prospects.

Many factors will contribute to the need for more social workers to maintain existing programs and to staff new ones. The occupational structure of the economy is expected to continue to change and create severe problems for many unskilled workers and others whose jobs have been replaced by machines. In addition, family life will continue to be affected by social change. The increasing population of the very young and the very old, the age groups most in need of social work services, is expected to contribute to the demand for social workers. Many openings also will arise because of the need to replace workers who retire, die, or otherwise leave the profession.

Earnings and Working Conditions

According to an early 1971 survey of selected occupations by the Public Personnel Association, the average starting salary paid social caseworkers by various State agencies was about $6,600. This figure, however, reflects very large numbers of persons who do not have a master's degree in social work. Case work supervisors in State agencies had average annual salaries ranging from $8,900 for those having little experience to about $11,300 for those having considerable experience. Salaries of psychiatric social workers averaged from $8,900 to $11,300; those of probation and parole officers averaged from about $7,600 to $9,100.

Salaries of social workers in a cross-section of cities and urban counties were, on the average, above those paid by State agencies. For example, according to the survey cited above, the average starting salary of social case workers in selected urban areas was about $7,700. Salaries of casework supervisors averaged $10,600 for those with little experience to about $13,000 for those with considerable experience. Beginning psychiatric social workers had average salaries of about $10,200, probation and parole officers averaged about $8,500 a year.

In the Federal Government in 1970, graduates of accredited schools of social work received a starting salary of $9,881 a year. Those with 2 years of progressively responsible experience under professional supervision received a Federal Government starting salary of $11,905. Persons having a bachelor's degree or 3 years' experience in technical or investigative work in a welfare activity began at $6,548 and $8,098 a year.

The predominant scheduled workweek for social workers in 1970 was generally 40 hours; however, as many as one-third regularly worked 37½ hours or less a week. In some social work agencies, the nature of the work requires evening and/or weekend work, for which social workers usually receive compensatory time off. Virtually all social work agencies provide fringe benefits such as paid vacations and sick leave and retirement plans.

Sources of Additional Information

Information on admission requirements and scholarship in accredited graduate schools of social work and colleges offering courses in social work, as well as on social work as a career, may be obtained from:

National Association of Social Workers, 2 Park Ave., New York, N.Y. 10016.

SURVEYORS

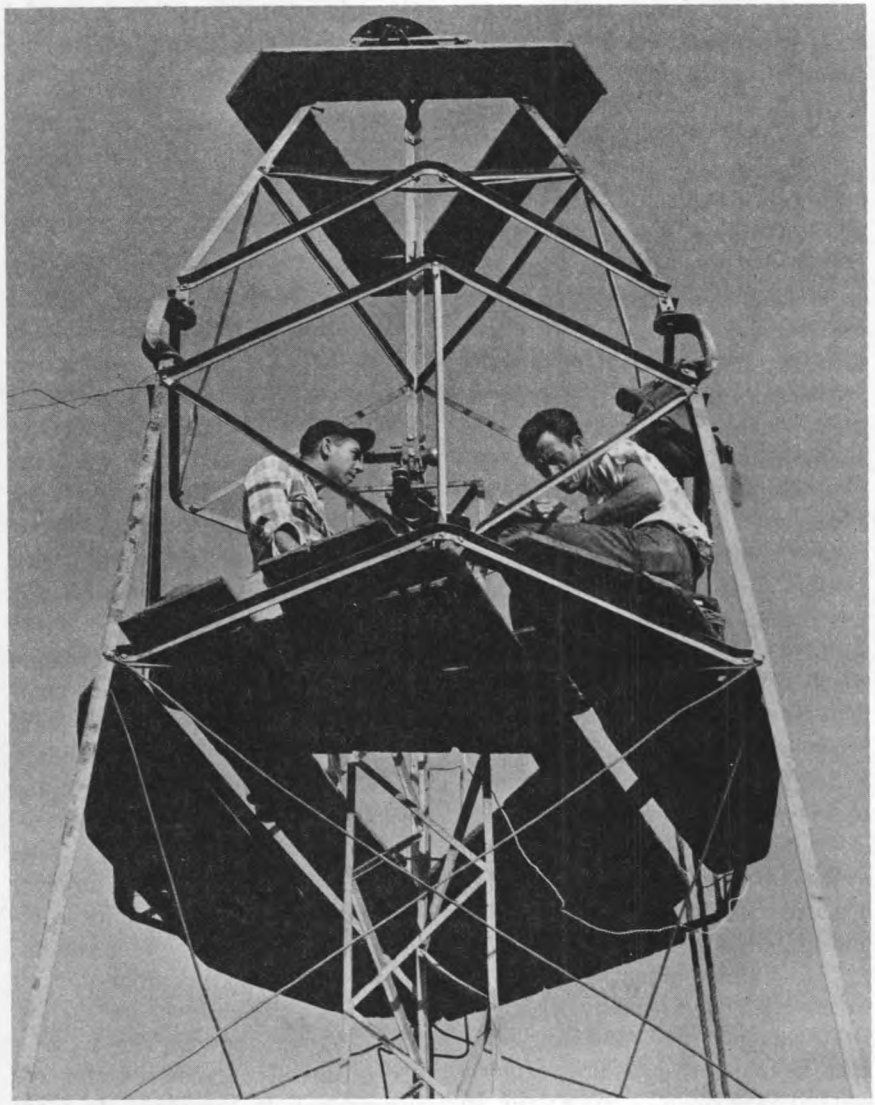
(D.O.T. 018.188)

Nature of the Work

Surveyors play an important part in the construction of highways, airfields, bridges, dams, and other structures, by providing information on measurements and physical characteristics of construction sites. They also locate land boundaries, assist in setting land valuations, and collect information for maps, charts, and plates.

The primary task of the surveyor is to determine the precise measurements and locations of elevations, points, lines, and contours on or near the earth's surface, and the distance between points. The supervisor is directly responsible for the survey and its accuracy. He plans the fieldwork, selects survey reference points, and determines the precise location of natural and manmade features of the survey region. He records information disclosed by the survey; makes mathematical calculations based on such information; verifies the accuracy of survey data; and prepares sketches, maps, and reports.

In making his detailed measurements in the field, the surveyor is assisted by workers in a field party which he directs. A typical field party is made up of three to six members in addition to the surveyor



Surveyors work on triangulation tower.

(sometimes called the party chief). Included in the typical field party are *instrumentmen* who set up, adjust, and operate surveying instruments (including the theodolite, transit, level, altimeter, and electronic measuring devices) at the points designated by the surveyor; *chainmen,* who measure distances between points, using a metal tape or surveyor's chain; and *rodmen,* who use a level rod, stadia board, or range pole to assist in measuring, between selected points, elevations, distance, and directions.

Surveyors often specialize in one particular type of survey. Those doing *highway surveys* are concerned with establishing the points, grades, and lines needed for highway locations. Those performing *land surveys* locate boundaries of a particular tract of land, prepare maps, record plats of the land, and prepare legal descriptions of it for deeds, leases, and other documents. Surveyors doing *topographic surveys* determine the elevations, depressions, and contours of an area, and indicate the location of distinguishing surface features such as farms, buildings, forests, roads, and rivers.

Several closely related occupations are geodesy and photogrammetry. Geodesists measure immense areas of land, sea, or space, taking into account the earth's curvature and its geophysical characteristics. (See statement on geophysicists.) Photogrammetrists apply analytical processes and mathematical techniques to photographs and imagery obtained by aerial or ground surveys to make topographic maps, and to measure and interpret the natural and manmade features of an area.

Places of Employment

It is estimated that about 50,000 surveyors were employed in 1970; less than 5 percent were women. They were located in all parts of the country—in small towns as well as in large cities.

About one-third of all surveyors work for Federal, State, and local government agencies. Among the Federal Government agencies utilizing these workers are the Interior Department's U.S. Geological Survey and Bureau of Land Management, the Army Corps of Engineers, and the Agriculture Department's Forest Service.

Surveyors in State and local government agencies are employed mainly by highway departments and by urban planning and redevelopment agencies.

A large number of surveyors work for construction companies and for engineering and architectural consulting firms. A sizable

number either work for surveying firms which conduct surveys on a fee or contract basis or else head such firms. Other significant numbers work for the crude petroleum and natural gas industries and for utilities.

Training, Other Qualifications, and Advancement

The most common method of preparing for work as a surveyor is through a combination of post-secondary school courses in surveying and extensive on-the-job training in survey techniques and in the use of survey instruments. Courses in surveying are offered in extension divisions of many post-secondary schools and by correspondence schools. Some junior colleges, technical institutes, and vocational schools offer 1, 2, and 3-year programs in surveying. The entrance requirement for most surveying programs is high school graduation (preferably including courses in algebra, geometry, trigonometry, calculus, drafting, and mechanical drawing).

For a professional career in photogrammetry, it is usually necessary to obtain a bachelor's degree in engineering or in the physical sciences.

High school graduates having no formal training in surveying also may enter the field, usually starting as rodmen. After several years of on-the-job experience and some formal courses in surveying, young persons may advance successively through the positions of chainman and instrumentman to that of party chief or surveyor.

With some post-secondary school courses in surveying, beginners may start as instrumentmen. In many instances, promotion to higher level positions is based on a written examination as well as on experience.

All 50 States require licensing or registration of land surveyors responsible for locating and describing land boundaries. In some of these States, applicants for licenses are expected to know other types of surveying in addition to land surveying. Requirements vary among the States but in general include a combination of 4 to 8 years' experience in surveying and successful completion of an examination. If an applicant has taken post-secondary school courses related to surveying most States reduce the length of experience needed for licensing. In 1970 approximately 17,000 land surveyors were registered. In addition, about 15,000 engineers were registered to do land surveying, primarily as part of their civil engineering duties; however, these workers are considered engineers rather than surveyors.

In addition to the necessary training and experience, qualifications for success as a surveyor include sound health and a strong liking for outdoor work. Because most surveyors must supervise and direct the work of others, leadership qualities also are important.

Employment Outlook

Employment opportunities for surveyors are expected to be good through the 1970's. It is anticipated that employment in the field will grow rapidly. In addition to new positions, many openings will result each year from the need to replace those who transfer to other occupations, retire, or die. Prospects will be best for people having post-secondary school training in surveying.

Among the factors expected to contribute to the favorable employment outlook is the rapid growth of urban areas, which will create requirements for additional surveyors to locate boundary lines, and to lay out streets, shopping centers, schools, and recreation areas. Construction and improvement of the Nation's roads and highways will also require many new surveyors.

Employment opportunities for women surveyors may be limited, primarily because much of the surveyor's work is strenuous.

Earnings and Working Conditions

In the Federal Government service, in 1970, surveyors employed as field party chiefs received starting salaries of $7,300 or $8,100 a year, depending on experience. The majority of party chiefs earned between $8,000 and $11,000 per year, whereas some surveyors in high level positions earned more than $12,000. In private industry, according to the limited data available, salaries for surveyors were generally comparable to those offered by the Federal Government but varied somewhat between different areas of the country.

Surveyors usually work an 8-hour day and 5-day week. However, they sometimes work longer hours during the summer months when weather conditions are most suitable for surveying activities.

The work of surveyors is active and sometimes strenuous. They may stand for long periods. They may also walk long distances or climb mountains with heavy packs of instruments and equipment. Because most of their work is done out of doors, surveyors may be exposed to all types of weather conditions. Some duties, such as planning surveys, preparing reports and compu-

tations, and drawing maps usually are performed in an office.

Sources of Additional Information

Specific questions concerning training and career opportunities in surveying may be directed to:

American Congress on Surveying and Mapping, Woodward Building, 733 15th St. NW., Washington, D.C. 20005.

General information on careers in photogrammetry may be obtained from:

American Society of Photogrammetry, 105 North Virginia Ave., Falls Church, Va. 22046.

URBAN PLANNERS

(D.O.T. 199.168)

Nature of the Work

Urban planners develop comprehensive plans and programs for the growth and overall revitalization of urban communities. They attempt to remedy urban problems such as deteriorating business and residential areas, traffic congestion, inadequate parks and recreation facilities, shortages of suitable space for industrial development, and air pollution.

In addition, the growth of the suburbs has added increased pressure on the urban center to provide more and better transportation and parking facilities. Urban planners visualize future conditions in the light of trends in population growth and social and economic change; they also estimate the community's long-range needs for land, housing, community facilities, transportation, recreation, business, and industry. The urban planner analyzes alternatives and proposes methods for achieving an efficient and attractive community within a framework determined by the community's governing body.

Before they can produce plans for long-range community development, however, urban planners must make detailed studies, including the preparation of maps and charts, which show the current use of land for residential, business, and community purposes; the arrangement of streets, highways, and water and sewer lines; and the location of such community facilities as schools, libraries, and playgrounds. These studies also provide information on the types of industry in the community, population densities and characteristics, social features, income levels, employment and economic trends, and other related information.

After they have analyzed and evaluated the facts, urban planners design the layout of recommended facilities and land use and supervise the preparation of illustrative materials. They also prepare plans to show how their proposed programs can best be carried out and what the cost is likely to be. Much of their time is spent conferring with private land developers, civic leaders, and officials of public agencies who do specialized planning. They also may prepare materials for community relations programs, speak at civic meetings, and appear before legislative councils and committees to explain and defend their recommendations or proposals.

In small planning organizations, planners must be able to handle several kinds of work. In large organizations, which may have several dozen planners, each may specialize in an area such as physical design, survey and research, or community relations work. Some specialize in

Urban planners discuss community renewal plans.

new town planning, the rehabilitation of city slum areas, or the reconstruction of rundown business districts.

Places of Employment

About 8,000 people were employed as professional urban planners in 1970. The majority of urban planners are employed by governmental agencies, mainly city, county, and metropolitan regional planning organizations; a growing number are employed by various State governments and by the Federal Government. About one-fifth of the planners do consulting work, either independently in addition to their full-time job, or as an employee or partner in a private consulting firm providing services for private developers or for government agencies. Urban planners also work for large land developers or private research organizations and teach in colleges or universities.

Training, Other Qualifications, and Advancement

Employers consider a master's degree in planning the most desirable educational background for professional work in this field. In Federal agencies and in a growing number of other government agencies, 2 years of graduate work in city planning, or its equivalent, are required for most entrance level positions. However, young people having bachelor's degrees in city planning, architecture, landscape architecture, engineering, public administration, and some other social science fields also may qualify for entrance level positions.

In 1970, more than 50 colleges and universities awarded the master's degree in urban planning. For entrance into the programs, most schools require that students have undergraduate degrees in fields such as architecture, landscape architecture, engineering, economics, statistics, sociology, public administration, or city and regional planning. Nearly all schools require students to spend considerable time in workshop, laboratory, or studio courses, learning to analyze and solve practical problems in urban planning. Most schools require candidates for the master's degree to take 2 years of graduate work and to prepare a thesis or take a final comprehensive examination. A few schools have recently adopted a 3-year master's degree program. Nearly half of the schools require some practical experience or internship. This latter requirement is usually fulfilled by regular paid employment during summer months in a planning office approved by the school's faculty. A very few schools which stress physical design grant a master's degree on completion of 1 year of graduate work to students who hold a bachelor's degree in architecture or engineering.

Planners must have the ability to think in terms of spatial relationships and to visualize the effects of their plans and designs.

Planners also must be able to cooperate with others, since they sometimes encounter differing attitudes and viewpoints which must be evaluated and accepted or rejected with tact to achieve the desired goal. On occasion, they face the discouragement of seeing carefully designed plans fall through because of conflicting political interests or apathy.

Beginners in urban planning offices are likely to spend some time doing routine work or making field surveys and compiling statistics required to make projections for future plans. As they become more experienced, workers may be assigned to outline proposed studies, write reports, design the physical layout of a large development, make statistical analyses and projections, or perform other duties which require a high degree of independent judgment. Senior planners and planning directors are likely to spend much time meeting with officials in other organizations, addressing civic groups, and supervising other professionals. Advancement often occurs through a transfer to a larger city, where the problems are more complex and the responsibilities are greater.

Candidates for the position of urban planner in Federal, State, and local government agencies frequently must pass civil service examinations to become eligible for appointment. These examinations are often advertised nationally and usually do not impose residence restrictions.

Employment Outlook

Employment opportunities for graduates having professional training in city and regional planning are expected to continue to be very good through the 1970's. Shortages of qualified planners have been reported in recent years, even though the number of graduates has been rising. In 1970, the American Society of Planning Officials estimated that there were about 1,300 vacancies in planning agencies because of the shortage of well-qualified planners. Although most openings will stem from new positions, some also will result from the need to replace planners who transfer to other fields of work, retire, die, or leave the field for other reasons.

This profession is expected to grow through the 1970's as more communities turn to professional planners for help in determining the most effective way to meet the rising requirements for physical facilities that result from urbanization and growth in population. As urban communities continue to spill into neighboring areas or merge with other urban areas, open spaces for recreation disappear, smog and traffic problems multiply, and the need for more and better planned facilities becomes acute.

The construction of new cities and towns also is expected to contribute to a rising need for planners. In addition, Federal assistance to communities for urban planning, slum clearance and urban renewal, and beautification and open space land improvement will continue to stimulate the demand for planners. Although many openings will be with the government, more and more private enterprises are employing urban planners.

Earnings and Working Conditions

Starting salaries of inexperienced planners having only a bachelor's degree were between $8,300 and $11,300 a year in 1970. Starting salaries for persons having a master's degree were generally higher, ranging from $9,300 to $12,300 a year. Planners having a master's degree and 2 to 5 years experience earned annual salaries of between $9,500 and $16,500 or more. Salaries of Directors of Planning depend to a great extent on the size of the city in which they are employed. In 1970, the average annual salary for a Planning Director in a city having between 10,000 and 25,000 people was $12,500. In cities of over 250,000 people, the average annual salary of Planning Directors was $22,000. Consultants are generally paid on a fee basis. Their earnings are often high and vary greatly according to their reputation and previous experience.

In 1970, the usual entrance salary for urban planners employed by the Federal Government was $9,881 a year. In a few cases, depending upon their academic records, individuals having less than 2 years of graduate work or its equivalent were hired as interns at yearly salaries of $6,548 or $8,098.

Since most planners work for government agencies, they usually have sick leave and vacation privileges, and are covered by retirement and health plans. Although most city planners have a scheduled workweek of 40 hours, they sometimes work in the evenings and on weekends because of the need to attend meetings with citizen's groups.

Sources of Additional Information

Additional information on planning and a list of schools offering training may be obtained from:

American Institute of Planners, 917 15th St., NW., Washington, D.C. 20005.

American Society of Planning Officials, 1313 East 60th St., Chicago, Ill. 60637.

MANAGERIAL OCCUPATIONS

The success or failure of business enterprises depends heavily on the way managers do their job. More than 6 million salaried workers—85 percent of them men—were employed in 1970 to manage the Nation's business enterprises. An additional 2.2 million managed all or part of their own businesses. Salaried business managers, one of the fastest growing occupational groups in the country, increased nearly four times as fast as all workers between 1960 and 1970. (See chart 18.)

This chapter describes salaried managers as a group and presents individual statements on three such occupations—city managers, industrial traffic managers, and purchasing agents. Statements on other occupations that frequently involve managerial functions are presented in the Business Administration and Related Professions section of the *Handbook*.

Nature of the Work

A manager's responsibilities depend on his level of management and type of employer. Although salaried managers direct or plan the work of others, some are chiefly policymakers.

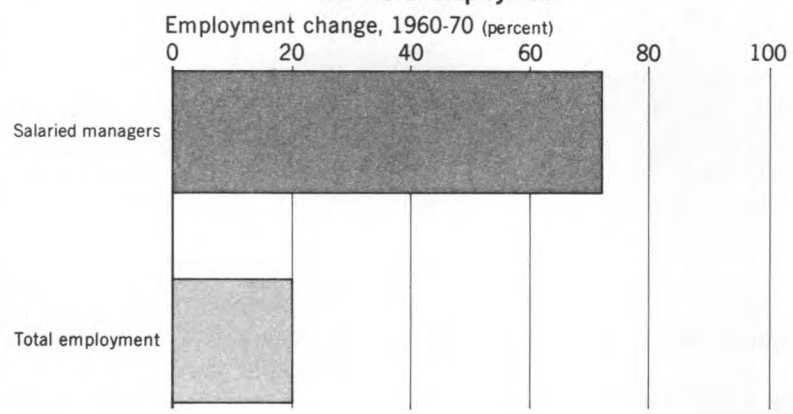
Entry-level management positions are either supervisory or trainee. Supervisors, the largest group, direct workers in activities such as sales, production, accounting, and purchasing. A department manager in a retail department store, for example, has a typical supervisory job. Responsible for merchandising in one department or more, he may supervise as many as 50 employees. Manager trainees are sometimes assigned to assist managers; or they may be placed in a number of different jobs for short periods to learn several phases of the business.

Higher in the managerial pyramid are the middle-level managers; they have the top posts in large and important departments such as sales, accounting, research and development, marketing, production, purchasing, data processing, and personnel. When faced with nonroutine business problems, they must make decisions promptly within the framework of company policy. For example, the manager of a manufacturing company's engineering department may (1) oversee the development of new products; (2) develop plans for making efficient use of the firm's space and facilities; (3) set up and manage support services such as equipment maintenance.

Top level managers make major decisions such as the goods their firms will produce, locations of new plants, or methods of financing new projects. This top group includes the board of directors, chairman of the board of directors, president, and vice presidents. Each vice president is a policymaker and administrator for one or more company departments (for example, finance, marketing, or production) and reports directly to the president. The president or chairman of the board has final responsibility for the company's success. He usually presides at meetings and confers with officers on policy matters and problems in their individual areas.

Management responsibilities in government are similar to those in private industry. However, public service is a major responsibility of many managers in government.

(18) **Employment of salaried managers is growing much faster than total employment**



SOURCE: BUREAU OF LABOR STATISTICS

Places of Employment

Although managers are employed throughout industry, more are required in some industries than in others. For example, in 1970, nearly one-third of all salaried managers worked in retail and wholesale trade. About one-fifth had jobs in

manufacturing firms. Considerable numbers also worked in finance, insurance, real estate, service, transportation, and Government. Women find their best opportunities in retail trade; one-third of all women managers are employed in this field.

Training

Employers increasingly require beginning managers to have completed college. Although a person who doesn't have a degree may work his way up through the ranks, his promotional opportunities are becoming limited.

For beginning management jobs, many employers look for individuals who have a college degree in business administration, with a major in accounting, economics, or finance. Other employers look for applicants who have technical training in engineering, science, or mathematics to deal with complex industrial processes. Still others hire liberal arts graduates and give them training on the job.

The number of companies that have formal management trainee programs is relatively small. As a result, entrance to many management jobs comes after several years of progressively more responsible work experience in jobs such as salesman or accountant.

The climb up the promotional ladder may be in one area of work, such as personnel, or in several areas, such as shifts from sales to marketing, or finance. Managerial skills usually can be applied as effectively in one firm or industry as another. For this reason, managers are able to change jobs with relative ease.

To increase their knowledge of management techniques, many experienced managers take advantage of training programs given by colleges and universities, companies, and various professional and trade organizations. For example, management associations conduct educational programs for experienced managers ranging from lectures and workshops of a few days duration to formal classroom courses lasting several weeks. These educational activities usually are led by experienced businessmen.

Employment Outlook

New career opportunities for managers are expected to increase moderately through the 1970's; moreover, many thousands of openings are likely to occur annually as managers retire, die, or leave the field for other reasons. The business world will need more managers as industry continues to expand, spurred by a growing population, rising living standards, and an increasing demand for goods and services. The employment of salaried managers is likely to continue to increase rapidly because large firms tend to depend more on trained management specialists as they further increase in size. Their problems of control and communication, their need for specialized services, and their complex machinery demand a higher ratio of managers to total employees than is required by smaller firms. Similar influences also will necessitate more managers in government agencies.

Earnings and Working Conditions

In 1970, starting salaries in private industry for management trainees having bachelor's degrees generally ranged from $7,500 to $10,500 a year. Trainees having master's degrees generally began at $10,800 to $14,000 a year.

In the Federal Government, management trainees usually began at $8,098 in 1970. New employees who had a master's degree or were well qualified entered managerial work at $9,881 a year.

At higher management levels, salaries are related to company size, scope of the job, and nature of the industry. Middle-management salaries ranged from $10,000 to $35,000 a year in 1970. Very large companies paid up to $50,000 a year for some middle-management positions. Earnings of the chief executive averaged about $45,000 a year in small companies but as high as $200,000 or more in large corporations.

In addition to their salaries, management officials receive other compensation, such as bonuses, stock options, and participation in profit sharing plans. Such additional compensation depends to a considerable extent on a company's profits. Bonuses are a common type of extra compensation and generally average about 30 percent of a top executive's earnings. Many companies also provide liberal life insurance, health benefits, club memberships, and various special privileges according to the individual's position in the firm. Social prestige attained in the upper business levels also may be rewarding.

Entry-level managers usually work the standard workweek of the company—from 35 to 40 hours. Managers in more responsible positions carry heavier workloads and may work longer hours. Nonroutine assignments carried out on their own time may involve travel, nightwork, speaking engagements, and other activities.

Sources of Additional Information

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

Society for Advancement of Management, 1412 Broadway, New York, N.Y. 10036.

CITY MANAGERS

(D.O.T. 188.118)

Nature of the Work

The country's growing population and expanding industry are placing increased pressures on the housing, transportation, recreational, and other facilities of our Nation's cities. Other problems associated with growing modern communities such as air and water pollution, and rising crime rates also demand attention. Coping with these problems effectively requires sophisticated management techniques. Thus, communities are turning to a specialist having such skills—the city manager.

The city manager is appointed by the community's elected officials and is directly responsible to the appointing body. The city manager's duties vary by city size, but generally include appointing department heads and their staffs; coordinating and administering the activities of the operating departments such as tax collection and disbursement, law enforcement, and public works; and preparing the annual budget for the council's approval. They also study problem areas such as unionization of government employees and urban renewal and report their findings to the council, identifying alternate solutions. City managers plan for future development of cities and the surrounding areas to provide for population growth and expansion of public services. They also frequently appear at civic meetings to advocate proposed programs or to inform citizens of current government operations.

City managers keep in close communication with the planning department to coordinate the introduction of new programs with the operations of existing ones. In smaller cities which have no permanent planning staff, that duty may be assumed entirely by the manager.

Support personnel, such as the assistant city manager, administrative assistants, and department head assistants, operate under direction of the city manager. Assistant city managers relieve the city manager of routine duties and act for him in his absence. In addition, they may assume responsibility for some projects, such as developing 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 perform administrative and staff work. The efforts of administrative assistants are not concentrated in one area, but are utilized in all departments at the direction of the city manager. For instance, they may compile operating statistics, review and analyze work procedures, and answer public inquiries.

Places of Employment

An estimated 2,600 city managers were employed in the United States in 1970. An additional three to four thousand persons were em-

City manager discusses urban renewal project with staff.

ployed as support personnel. About four-fifths of all city managers worked in cities which have a council-manager form of government. Most of the remainder were employed in municipalities which have another form of government such as mayor-council government in which the city manager is appointed by the mayor, and called "administrative assistant." A small number of managers are employed by metropolitan or regional planning organizations.

Over one-half of the cities which had a population of 10,000 to 500,000 had a city manager. Some city managers also worked for county governments. Although city managers are employed in 48 of the 50 States, nearly 45 percent are located in California, Maine, Michigan, Pennsylvania, and Texas.

Training, Other Qualifications, and Advancement

The minimum educational background needed for entrance into this profession is a bachelor's degree, preferably with a major concentration in political science or public administration. However, a master's degree in public or municipal administration is preferred.

In 1970, about 200 colleges and universities offered a master's degree program 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 government operations and performs research work under direct supervision of the city manager.

Some new graduates from bachelor's or master's degree programs enter the occupation by taking manager positions in small towns and then seek positions in large cities as they gain experience. However, some new graduates desire positions as interns or lower level assistants in large cities. Larger cities offer greater opportunities for experience in a wider range of problem-solving areas such as freeway planning, urban renewal, and crime control.

As the young professional gains additional skills and competence, he may advance to a position of greater responsibility such as department head assistant. In this position, he may gain the supervisory and planning skills necessary to oversee an entire department. Administrative experience in the departments of finance, public works, or public planning also may provide the necessary skills and experience for advancement to manager.

Certain personal qualifications or traits enhance the city manager's chances of success. He must be dedicated to public service, since he often must put in long hard hours in times of crises. Another important personal quality is the ability to understand and work well with people. The city manager, because he is the most accessible of government officials, must be able to satisfactorily deal with citizen's complaints and maintain good working relationships with his fellow officials.

Other desirable traits include: communication skills, sound judgment, tact, self-confidence, and the ability to perform well under stress.

The city manager may be called upon at any time to solve emergency situations and he must be able to quickly isolate the problem areas, identify the underlying causes, and provide alternate solutions.

Employment Outlook

Employment opportunities for city managers are expected to be excellent through the 1970's, especially for persons having a master's degree in public or municipal administration. In addition to openings resulting from the need to fill new positions, many openings will arise each year from the need to replace city managers who retire, die, or transfer to other fields of work.

The employment of city managers is expected to increase very rapidly through the 1970's as methods for dealing with the problems of our growing cities become more 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 need for city managers is expected to increase as cities convert to the council-manager form of government, currently the fastest growing form of local government. City managers also will be needed in places having other forms of government. Elected officials are expected to rely increasingly upon the city manager's skills to cope with the day-to-day operations of government.

Earnings and Working Conditions

Salaries of city managers and their assistants vary according to the amount and type of education and experience as well as job responsibility and size of city. The average salary earned by persons in beginning positions was about $7,500 in 1970 according to the International City Management Association. This figure is somewhat lower than starting salaries in business and industry,

according to survey reports. Salaries, however, generally tend to be lower in government, especially local government.

In 1970, the median salary for city managers varied from about $17,000 in cities of 10,000 to 25,000 inhabitants, to about $34,000 in cities with 250,000 inhabitants or more. Assistant city managers earned median salaries of over $14,000 a year.

A workweek of longer than 40 hours is common for most city managers. This may include work on weekends and evenings to settle emergency problems that may arise. Meetings with individuals and citizen's groups consume additional time.

Fringe benefits usually include health and life insurance programs, pension plans, sick leave, vacation benefits, and often the availability of 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.

INDUSTRIAL TRAFFIC MANAGERS

(D.O.T. 184.168)

Nature of the Work

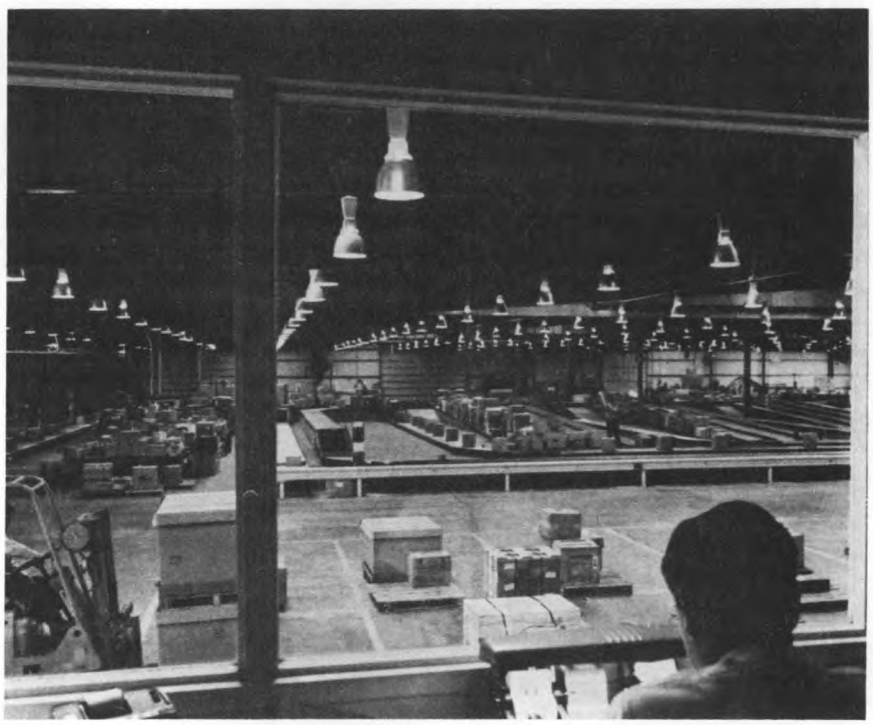
Industrial traffic managers and their assistants arrange transportation of raw materials and finished products for industrial firms.

After analyzing various transportation possibilities, industrial traffic managers choose the most efficient type of transportation—rail, air, road, water, pipeline, or some combination—the route and the particular carrier. They must consider factors such as freight classifications, rates, routes, and regulations; company time schedules; size of shipment; and loss and damage rates. This statement does not cover traffic managers employed by railroads, airlines, trucking firms, and other freight carriers who are chiefly concerned with attracting business to their firms.

Activities of industrial traffic managers range from routine checking of freight bills to major planning and policymaking. For example, they decide whether the company should buy and operate its own fleet of trucks. 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 maintain records of shipments, freight rates, commodity classifications, and applicable government regulations. Industrial traffic managers also must know about changing transportation concepts, such as piggyback freight or containerization.

Sometimes traffic managers are responsible for the packaging of shipments and for their companies' warehouse facilities and transportation equipment.

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 rate-making and regulatory bodies—such as the Interstate Commerce Commission, State Commissions, and local traffic bureaus.



Places of Employment

In 1970, most of the over 18,000 industrial traffic managers were employed by manufacturing firms; some worked for stores. A few were consultants in business for themselves or for firms that handle transportation problems for clients. Most traffic managers are men.

Training, Other Qualifications, and Advancement

Although persons having only a high school education can qualify for a traffic manager position on the basis of experience in traffic departments, a college education is becoming increasingly important for a career in this field. For some kinds of work, college training may be required. For example, in order to argue cases before the U.S. Government's Interstate Commerce Commission, a traffic manager must meet certain "qualification standards" which include at least 2 years of college. Some employers prefer graduates having a degree in traffic management, which is available at more than 100 colleges, universities, and junior colleges. Others prefer liberal arts majors who have had courses in transportation, management, economics, statistics, marketing, or commercial law.

New traffic department employees often complete shipping forms and calculate freight charges in shipping rooms or general traffic offices. After gaining routine experience, they may perform more technical work, such as analyzing transportation statistics. A competent worker may advance to a supervisory position, such as supervisor of rates and routes. The most competent may be promoted to assistant general traffic manager and eventually to general traffic manager.

Workers in traffic departments may advance by participating in company-sponsored training programs, taking courses in colleges and universities or schools specializing in traffic management, or attending seminars sponsored by private organizations. "Certified" membership in the American Society of Traffic and Transportation, Inc. can be acquired by successfully completing the Society's four examinations and meeting certain education and experience requirements. College credit may be substituted for three of the four examinations.

Employment Outlook

A moderate increase in employment in this occupation is expected through the 1970's. Many new industrial traffic manager positions will be created as corporations reorganize their shipping and receiving activities into separate traffic departments to centrally control their transportation functions.

Other factors expected to contribute to growth in this field are the increasing emphasis in many industries on efficient management of transportation activities, and the trend toward procuring raw materials and finished products from more distant places and distributing them to increasingly wider markets. As more companies realize that transportation costs can vary widely, they will become more concerned with the economics of shipping. Thus, a strong demand is expected for specialists who know how to classify products so as to obtain the lowest possible freight rates, or choose the carriers that are best able to handle each shipment, and otherwise protect their companies from excessive shipping expenses.

Earnings and Working Conditions

Young men having college degrees who started as business trainees in the traffic departments of large industrial firms often received annual salaries of more than $8,000 in 1970 according to the limited data available. Beginners having less schooling, however, usually received lower salaries.

Earnings of experienced traffic managers are related generally to their companies' sales volume and transportation costs. The average (median) salary of traffic managers in companies with transportation costs totaling less than $1 million annually was about $15,000 in 1970 according to the limited information available. In companies where transportation costs ranged between $4 million and $10 million, annual salaries ranged between $25,000 and $30,000. In firms whose costs were still higher, some traffic executives earned $40,000 or more a year.

Traffic department employees usually work the standard workweek of their companies—generally from 35 to 40 hours. 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

For information on the requirements for certification write to:

American Society of Traffic and Transportation, Inc., 22 West Madison St., Chicago, Ill. 60602.

PURCHASING AGENTS

(D.O.T. 162.158)

Nature of the Work

Purchasing agents buy the materials, supplies, and equipment needed for their employer's firms to function. Purchasing agents and their assistants have two main responsibilities: Obtaining goods and services at the lowest cost consistent with required quality and seeing that adequate supplies are kept on hand. What the agents buy depends on the kind of organization employing them. For manufacturing firms, this may be largely machinery, raw materials, and product components; for government agencies, it may be office supplies, office furniture, and business machines.

A purchasing agent buys either when stocks on hand reach a predetermined re-order point or when he receives a requisition from a department in the organization for items it needs. These requisitions list and describe needed items and include information such as required quantities and delivery dates. Since the agent usually can purchase from many sources, his main job is to select the seller who offers the best value. To do this, the agent must consider many factors, such as the exact specifications for the required items, price, quality, quantity discounts, transportation cost, and delivery time.

To select among suppliers, the purchasing agent uses a variety of means. He obtains information by comparing listings in catalogs and trade journals and by telephoning various suppliers. He also meets with salesmen to examine sample goods, watch demonstrations of equipment, and discuss items to be purchased. Sometimes, the agent also invites suppliers to bid on large orders, and then selects the lowest bidder who meets the requirements regarding the specifications established for the goods and date of delivery.

It is important for purchasing agents to develop good working relations with their suppliers. These relations 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 company. For example, they frequently discuss product specifications with company engineers or shipment handling problems with employees in the shipping and receiving, storage, 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 important in preventing interruptions in the work flow 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. Although the head of the purchasing department usually is called a purchasing agent, he may have the title of vice president-purchasing, procurement or purchasing officer, director or manager of purchasing, or buyer. ("Buyers" in retail stores and others who are engaged in buying merchandise for resale in its original form are not included in this report.) In a large firm, the head of the purchasing department directs the work of a staff including assistant purchasing agents and clerical workers. Each purchasing assistant may be assigned to a broad area. One person may be responsible for buying raw materials; another, factory machinery; and another, office supplies. Others may specialize in buying certain items—for example, steel, lumber, cotton, or oil.

Purchasing agent discusses specifications of items with salesman.

Places of Employment

In 1970, half of the estimated 167,000 purchasing agents in the United States worked in manufacturing industries. Large numbers also were employed in government agencies, wholesale and retail trade, and service institutions.

Most purchasing agents work in firms that have fewer than 10 employees in the purchasing department. Some large firms, however, may have a hundred specialized buyers or more. About 90 percent of all purchasing agents are men.

Training, Other Qualifications, and Advancement

For beginning positions as purchasing agents, many employers prefer to hire graduates of schools of business administration or engineering who have had courses in accounting, economics, and purchasing. A few require graduate training in business administration. On the other hand, many 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 beginner in the purchasing field must spend considerable time learning about his company's operations and purchasing procedures. Some companies provide classroom instruction and on-the-job training. The beginner may be assigned to the storekeeper's section to learn about operations such as keeping inventory records, filling out forms for the purchase of goods, or providing proper storage facilities. He then may work with an experienced buyer to learn about types of goods purchased, prices, and sources of supply. Following the initial training period, the trainee may become 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. In large companies, purchasing agents or heads of purchasing departments may become vice presidents with overall responsibility for purchasing, warehousing, traffic, and related functions.

The purchasing agent must be able to accept the responsibility of spending large amounts of company money. He must also be tactful in his many dealings with salesmen and have a good memory for specifications.

Employment Outlook

Opportunities are expected to be good through the 1970's for young people to enter and advance in purchasing occupations. Demand is expected to be especially strong for graduates of schools of business administration who have taken courses in purchasing. Demand is expected to be excellent also for graduates having backgrounds in engineering and science, for jobs in purchasing departments of firms that manufacture complex machinery, chemicals, and other technical products. Liberal arts college graduates should be able to obtain trainee positions in many types of firms. On the other hand, although outstanding persons who do not have a college education will continue to be promoted to purchasing from clerical, sales, and other types of jobs, their opportunities for advancement to high-level purchasing jobs will be limited.

Employment of purchasing agents and their assistants is expected to grow moderately through the 1970's. Some major factors underlying this expected growth are the continuing increase in the size of business and manufacturing firms, the development of new products and new sources of supply (including foreign markets), and the ever-increasing complexity and specialization of business functions. Competition among manufacturers for new, improved, and less costly goods, raw materials, and services will further direct the attention of top management to the importance of purchasing functions. In addition to job openings resulting from growth, many job opportunities are expected annually because of the need to replace personnel who retire, transfer to other jobs, or leave the field for other reasons.

Earnings and Working Conditions

Beginning annual salaries of college graduates hired as trainees in purchasing departments of large private firms ranged from $6,300 to $7,500 in 1970, according to the limited data available. In the Federal Government, beginning purchasing agents who had college degrees started at $6,548 or $8,093 in 1970, depending on the individual's scholastic achievement and his performance on the Federal Civil Service entrance examination.

In 1970, the annual earnings of experienced buyers in private firms averaged more than $9,000; more experienced buyers, some having supervisory duties, averaged nearly $14,000. Some top purchasing executives earned between $35,000 and $75,000 a year.

CLERICAL AND RELATED OCCUPATIONS

More than 13 million people were employed in clerical and related work in 1970. A great many of these workers keep records and do other paperwork required in offices. Others handle communications, operate office machines of all types, attend to the shipping and receiving of merchandise, ring up sales on the cash registers of stores and restaurants, or do related work.

Clerical workers represent a wide variety of skills and experience. Included, for example, are highly skilled title searchers and examiners in real estate firms and executive secretaries in business offices, as well as workers in occupations which can be entered with little specialized training or experience—messengers, file clerks, and others. For women, clerical occupations are particularly important in terms of numbers employed. More than half of all girls who go to work after completing high school find jobs in clerical and related occupations. Also, 7 out of 10 clerical workers are women.

By far the largest single group of clerical workers—1 out of 5—work as secretaries or stenographers. Bookkeepers and accounting clerks, who represent a little less than one-tenth of the total, make up the next largest group. Chart 19 shows employment in these and in other major clerical occupations discussed in this chapter or elsewhere in the *Handbook*.

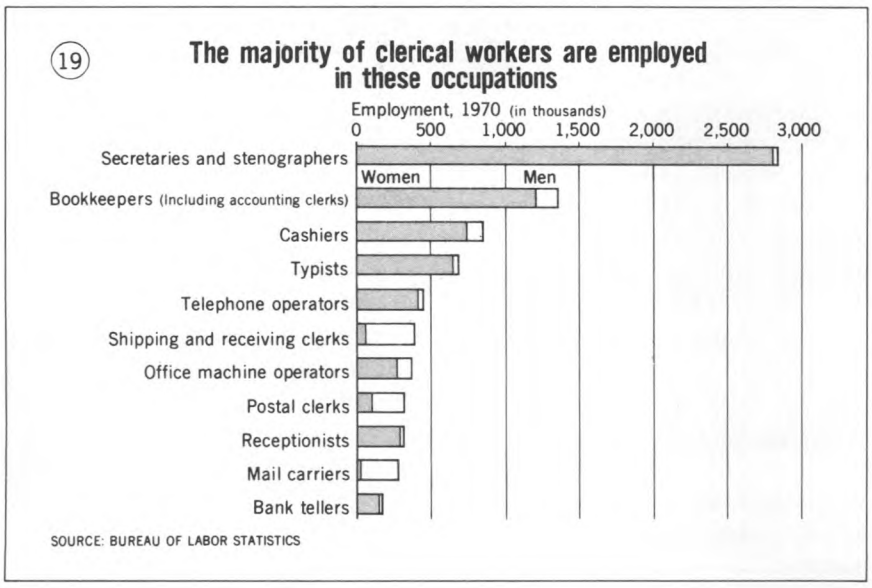
Training, Other Qualifications, and Advancement

For all but the most routine clerical positions, the minimum educational requirement is usually graduation from high school. High school graduates who have had instruction in business subjects are regarded by most employers as particularly well qualified. Some companies cooperate with local high schools and business schools in office education programs which provide opportunities for students to work part time, under trained supervision, while still attending school. This experience is useful to beginners seeking office jobs after graduation. The Federal Government also sponsors training for some clerical occupations under provisions of the Manpower Development and Training Act.

Qualifications for many types of clerical work include reading comprehension, a knowledge of spelling and grammar, and ability in arithmetic. Some employers test applicants for clerical aptitude to determine their qualifications for work in this field.

Practically all beginning clerical workers receive some on-the-job training. They learn, for example, how their employer keeps the firm's records, and what kinds of business forms are used. They also may learn to operate adding and duplicating machines and other equipment which they will use occasionally. If they are to operate tabulating machines or other specialized equipment, their employers may have them attend a school to receive the necessary training.

Advancement prospects are good in many types of clerical work. Some of the better paid positions—insurance claim adjuster and executive secretary, for example—require a general knowledge of company policies and procedures, and very often are filled by promotion from within. In other instances, the worker may be promoted to more difficult and higher paid assignments in a related type of work. For example, a keypunch operator is selected and trained to operate a tabulating machine. In large busi-



ness offices, promotion sometimes may lead to supervisory or managerial positions.

Experience within an organization is often an important consideration in selecting employees for promotion. Emphasis also is placed on the individual's learning ability and personal qualifications. For workers without a good educational background, opportunities for advancement are likely to be limited. Many people in clerical occupations are high school graduates who have had some additional education in colleges, junior colleges, private business schools, or other post-secondary institutions. Some are college graduates who start as office workers to gain experience which will later qualify them for professional or administrative positions.

Employment Outlook

Employment in clerical occupations is expected to increase rapidly through the 1970's. As employment rises to meet the needs of an expanding economy, more than 350,000 new clerical and related positions will be added each year. An even greater number of clerical workers will be needed each year to replace those who retire or leave their jobs for other reasons. Employee turnover is especially high among clerical workers because many of the women who do this kind of work leave their jobs to care for their families.

Employment opportunities will be best for secretaries and stenographers, typists, bookkeeping and accounting clerks, and other workers who handle paperwork in offices. These workers will be needed particularly in banks and insurance companies; in manufacturing establishments and in wholesale and retail trade; and in government offices, educational institutions, and professional service organizations.

The growth in the number of clerical workers is expected to result primarily from the increasing amount of paperwork which will accompany the growth of large and complex organizations. However, more and more mechanical equipment will speed the process of keeping business records, and in some offices, the number of clerical employees may be reduced. For the economy as a whole, however, the new positions created by growth are expected to far outnumber the clerical jobs eliminated by mechanization. Furthermore, many types of clerical workers are in jobs unlikely to be materially affected by mechanization—for example, secretaries, receptionists, persons responsible for collecting bills and handling complaints, and others whose duties bring them into contact with the public and require them to exercise initiative and judgment.

Nevertheless, the increased use of computers and other mechanical devices to process routine, repetitive work will probably restrict growth in the number of clerks employed to prepare payrolls, keep inventories, sort checks in banks, and do other routine work. As work of this kind is transferred from clerks to machines, new positions for various kinds of machine operators will be created. This shift in type of clerical personnel will occur chiefly in large business firms and in the metropolitan areas where such firms tend to be concentrated.

Earnings and Working Conditions

The average salaries of women office workers in metropolitan areas surveyed by the Bureau of Labor Statistics in 1968–69 ranged from about $70 a week for file clerks doing the most routine kind of work to nearly $160 a week for skilled secretaries. Within each of the office occupations, the differences in the salaries paid some individuals were considerable; for example, a few payroll clerks earned less than $60 a week; a few others whose work was complex earned $190 or more.

Men generally were paid higher salaries than women employed in the same localities. For example, the average for office boys was $5 a week more than for office girls, and men employed as accounting clerks averaged about $20 a week more than women in the same kinds of jobs. To some extent, these variations were due to differences in the industries where employed. Minor differences in the duties and responsibilities assigned to men and women also may affect the pay level.

Office employees worked a 40-hour week in most of the cities included in the survey. In some, especially in the northeastern part of the country, the scheduled workweek was 37½ hours.

Most office workers in large cities receive pay for 7 holidays or more a year and 2 weeks of annual vacation after working 1 year. Longer vacations, granted on the basis of additional years of service, may range up to 4 weeks or more with pay. Life insurance; hospitalization; surgical and medical insurance; and sick benefits are also generally available, as are retirement pension plans supplementing benefits paid under the Federal Social Security program.

Sources of Additional Information

Many State employment service offices maintain occupational guides

giving local information about earnings, hours, and employment opportunities in clerical occupations.

Teachers may obtain information concerning training for office occupations from:

Division of Vocational and Technical Education, Bureau of Adult Vocational and Library Programs, U.S. Office of Education, Washington, D.C. 20202.

Or by contacting their:

State Supervisor of Office Occupations Education, State Department of Education, State Capitol.

A directory of private business schools located in 300 cities throughout the country may be obtained from:

United Business Schools Association, 1730 M Street, NW., Washington, D.C. 20036.

Information of wages and related benefits for office workers in 88 metropolitan areas is given in the following publication:

Area Wage Surveys: Selected Metropolitan Areas 1968–69 (BLS Bulletin 1625–90), 1970. Superintendent of Documents, Washington, D.C. 20402.

Information on wages and related benefit earnings in 229 metropolitan area is summarized for the northeastern, southern, north central, and western regions, and for the United States as a whole, in the following publication:

Area Wage Surveys: Metropolitan Areas, United States and Regional Summaries, 1968–69 (BLS Bulletin 1650–91), 1970. Superintendent of Documents, Washington, D.C. 20402.

BOOKKEEPING WORKERS

(D.O.T. 210.368 through .588; 216.388; and 219.388 and .488)

Nature of the Work

Every business must have systematic and up-to-date financial records. Bookkeeping workers record day-to-day business transactions in journals, ledgers, and on other accounting forms. At regular intervals they also prepare income statements which show all money received and from whom and money paid and to whom.

Bookkeeping worker checks business transaction records.

In many small firms, one *general bookkeeper* (D.O.T. 210.388) does all of the analysis, recording, and other necessary bookkeeping work. Although employees may use simple office equipment, such as adding machines, they most often work by hand. Often they file, answer the telephone, prepare and mail customers' bills, and do other office work.

Large business organizations usually have many workers under the direction of a head bookkeeper. *Bookkeepers* (D.O.T. 210.388) and *bookkeeping* and *accounting clerks* (D.O.T. 219.488) each specialize in one or two kinds of bookkeeping work. Some workers may enter items in accounts payable or receivable ledgers and others may take trial balances, prepare income statements, or do additional bookkeeping.

Places of Employment

Of the more than 1.34 million bookkeeping workers in 1970, 9 out of 10 were women. Most bookkeeping workers do general bookkeeping or accounting. Large numbers work in retail stores, banks, insurance companies, and manufacturing and service firms.

Training, Other Qualifications, and Advancement

In selecting bookkeeping workers, most employers prefer high school graduates who have taken business arithmetic and bookkeeping. Some prefer applicants who have completed post-high school business training or junior college. Training which includes typewriting and the use of office machines is often helpful since many bookkeeping workers perform a variety of duties. An increasing number of large companies offer new accounting clerks on-the-job training. In some localities, companies cooperate with business schools and high schools in work-study programs to give students practical part-time ex-

perience that may be helpful in obtaining work after graduation.

Bookkeeping and accounting clerks should have above-average aptitude for working with numbers and the ability to concentrate on details.

Beginning bookkeeping workers usually start recording routine transactions and then advance to more responsible assignments. For example, experienced bookkeepers prepare income statements and operate complex bookkeeping machines. Some workers may be promoted to supervisors. Bookkeepers who complete college accounting may become accountants. (The occupation of Accountant is discussed elsewhere in the *Handbook*.)

Employment Outlook

Employment in this occupation is expected to increase slowly through the 1970's. Tens of thousands of workers will be needed each year as positions are created and replacements are needed for employees who retire, stop working, or transfer to other types of employment.

Growth in this field is expected to stem mainly from the increase in recordkeeping resulting from population expansion and economic prosperity. The increasing use of electronic data processing and other bookkeeping machines, is expected to limit somewhat the growth of employment requirements for bookkeeping workers. Many types of machines, such as posting machines, punchcard machines, and electronic computers, can process accounting and bookkeeping data more accurately, rapidly, and economically than can be done by hand. Nevertheless, the need for bookkeeping workers will probably outpace the laborsaving impact of office machines over the next 10 years.

Earnings and Working Conditions

According to a Bureau of Labor Statistics (BLS) survey of clerical occupations in private industry, beginning accounting clerks averaged $439 a month in 1970. More experienced clerks earned $568 a month.

Salaries of accounting clerks varied by location, size of firm, and type of employment. Highest salaries were usually paid to accounting clerks working in metropolitan areas for firms which employ at least 2,500 workers, or for public utilities.

Working conditions for bookkeeper employees 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, and .488 and 299.468)

Nature of the Work

Although cashiers usually receive payments made by customers for goods and services, their duties and job titles vary according to their work. In a theater, for example, the cashier may be called *box office cashier* or *ticket seller;* in a supermarket, *checkout clerk* or *grocery checker;* in an electric light and power company, *teller* or *bill clerk;* and in a cafeteria, *cashier-checker*. Very large business firms that have several cashiers sometimes use other special job titles such as *disbursement clerk, cash accounting clerk,* or *credit cashier*. (The occupation of bank cashier, which is different from other kinds of cashier jobs, is discussed elsewhere in the *Handbook*.)

Regardless of job title or employer, most cashiers accept money paid by customers, make change when necessary, and give some kind of receipt for the payment. They also keep records of the amount of money involved in each transaction so that cash accounts can be balanced at the end of the day. Many cashiers prepare cash and checks for deposit at the bank. Some pay out cash or write company checks to cover expenses such as the purchase of supplies and equipment; some prepare pay envelopes or paychecks, make out sales tax reports, and do related work.

In receiving payment for goods or services most cashiers use cash registers which print a record of the amount of the sale on a paper tape and release a money drawer. On some registers, cashiers list and total individual items purchased by each customer and record other details relating to the transaction. Other machines, somewhat like accounting machines, are used by cashiers in hotels and hospitals to record the charges for telephone, medical, and other services which are incurred and to prepare the itemized bills which cashiers present to guests or patients as they check out. Cashiers also may use adding machines, change-dispensing machines, and other special equipment.

Many cashiers have additional duties peculiar to the nature of their employers' businesses. In a theater, for example, the cashier may oper-

ate a ticket-dispensing machine and answer telephone inquiries. A restaurant cashier may handle reservations for meals and special parties, type menus, or be responsible for a candy and cigaretter counter. In supermarkets and other self-service stores, cashiers often wrap or bag each customer's purchases and, during slack periods, restock shelves, mark prices on articles, and perform other work. In a hotel or motel the cashier's special duties usually include recording charges for telephone, valet, and other services used by each guest, and notifying the room clerk when guests check out.

Places of Employment

In 1970, about 90 percent of the 850,000 cashiers in the United States were women. They work for business firms of all types and sizes. Nearly three-fourths worked in grocery, drug, and other retail stores; large numbers also were employed in restaurants and theaters. Most of these establishments and other businesses which employ cashiers are located in cities and in the shopping centers of heavily populated suburban areas; however, many also are found in small towns.

Training, Other Qualifications, and Advancement

Employers hiring beginners to fill jobs as cashiers prefer high school graduates. Courses in business arithmetic, bookkeeping, typing, and other business subjects are good preparation. In some large cities, business organizations and schools offer brief courses through which students learn to operate a cash register and perform other duties of a cashier. Cashier training also may be offered as part of public school distributive education programs which include courses in retail selling or food service work.

For some kinds of cashier jobs, employers want persons who have special skills or business experience; for example, cashiers who know how to type or have had selling experience. Sometimes cashier jobs are filled by promoting clerk-typists in offices, bag boys in supermarkets, and other qualified people already employed by the firm.

Beginners usually are trained informally on the job under the supervision of an experienced employee. Sometimes, particularly in large firms, trainees attend a brief period of classroom instruction. Some firms train all newly-hired cashiers regardless of previous experience.

Cashiers should have an aptitude for working with figures, finger dexterity, and a high degree of eye-hand coordination. Accuracy is particularly important. Since cashiers deal with the public, they also should be tactful, neat in appearance, and able to deal with their customers in a pleasant and courteous manner.

Promotional opportunities for cashiers are likely to be limited, particularly in small firms. The cashier's job, nevertheless, affords a young person a good opportunity to learn how his employer's business affairs are conducted and so may serve as a steppingstone to a more responsible clerical job or to some types of managerial positions.

In chainstores and other large retailing enterprises, for example, cashiers eventually may advance to department or store managers.

Employment Outlook

Employment in this large occupation is expected to increase rapidly through the 1970's. Tens of thousands of workers will be needed each year to fill new positions and to replace cashiers who retire or stop working for other reasons. Still other workers will be needed to replace cashiers who transfer to other types of employment.

Employment is expected to increase mainly because of the anticipated expansion in business activity. In addition, more retail stores will undoubtedly adopt self-service and other merchandising techniques which create jobs for cashiers. The increase in employment due to changes of this kind, however, probably will be somewhat less marked than during the 1960's when conversion to self-service on the part of some kinds of retailers was widespread. The continued use of vending machines, changemaking machines, and other mechanical equipment which replaces cashiers or speeds up their work also will tend to limit the expansion in employment during the 1970's.

Opportunities probably will continue to be best for cashiers having typing, bookkeeping, or other special skills. There also should be many opportunities for cashiers who wish to work part time.

Earnings and Working Conditions

The salaries earned by beginning cashiers in routine jobs are often at or near the minimum wage required by State and Federal laws. In several States and in establishments covered by the Federal law, the minimum was $1.60 an hour in 1970; elsewhere, starting salaries were somewhat lower. Unionized cashiers, as well as some others in jobs which involve a considerable degree of responsibility or require specialized training, may earn considerably more than the legal minimum; often more than $2 an hour. Grocery checkers employed by supermarkets may earn more than $3 an hour.

Cashiers' hours may differ from those of many other clerical workers because they 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. Cashiers employed full time in supermarkets and other large retail establishments usually work a 5-day, 40-hour week but, since Saturday is a busy day in retailing, most cashiers usually work on that day and have another day off during the week.

Most cashiers work indoors, often in small booths or behind counters near the entrances of stores, theaters, and other establishments. In some cases, their quarters may be uncomfortable because 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.)

ELECTRONIC COMPUTER OPERATING PERSONNEL

(D.O.T. 213.138, .382, .582, .588, and .885; and 223.387)

Nature of the Work

An electronic computer may require many specialized operators. First, the "input" must be coded. Then someone must operate the computer console; finally, the "output" must be translated back into words and numbers to be read. These procedures vary among computer systems; often they are more involved and difficult to learn than operating the equipment itself. The number and kinds of employees needed also vary. A computer no larger than an office desk may need one or two employees. A large system, on the other hand, requires several specialized workers.

"Input" consists of the data to be processed and step-by-step instructions prepared by programers. (Information about the occupation of Programer is given elsewhere in the *Handbook*.) In many systems, the input consists of punched cards prepared by *keypunch operators* (D.O.T. 213.582) or of paper tapes prepared by *data typists* (D.O.T. 213.588). Keypunch operators use machines similar to typewriters that punch holes in cards to represent specific items of information. Less frequently, input may be prepared by adding or bookkeeping machine operators using machines with special attachments to perforate tapes.

In some computer systems, punched cards or paper tapes feed information directly into the central computer. In other systems, small computers or terminals, linked to the central computer by telephone lines, supply the information. Faster

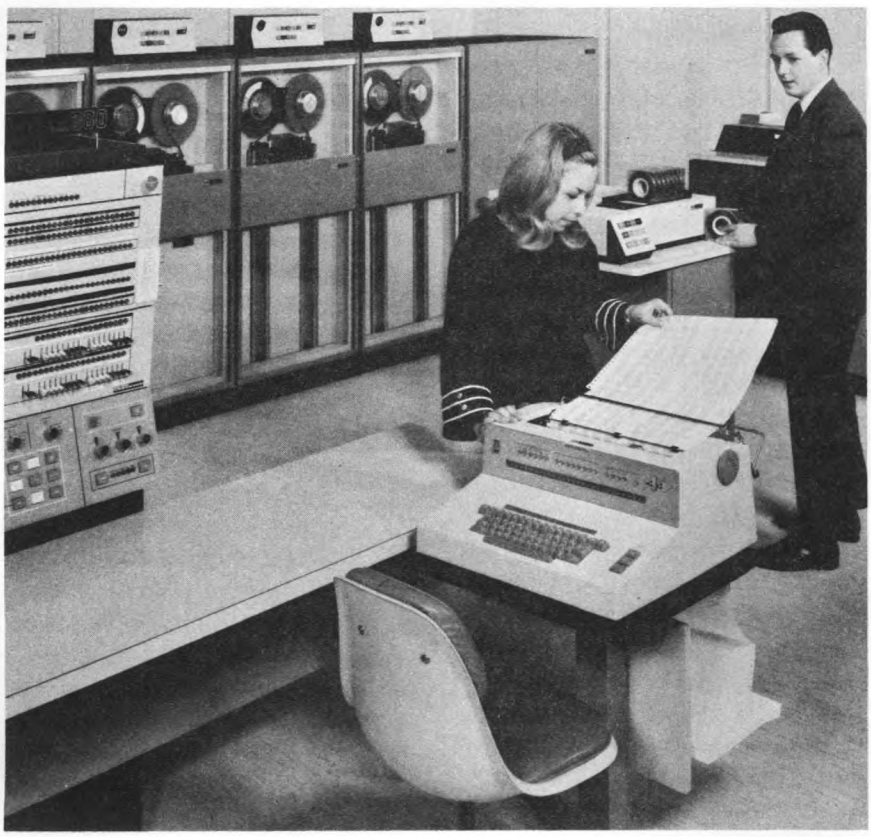
computer systems obtain their input from "direct access" devices featuring magnetic surfaces on which data are recorded by spots. Such devices include magnetic tapes, discs, data cells, and data drums. These systems include auxiliary equipment that records directly on magnetic surfaces or transfers data from punched cards or paper tapes to the magnetic surface.

Small computers transfer data in some systems. Other machines, used for the same purpose, are called converters and are run by *card-to-tape converter operators* (D.O.T. 213.382). Converter operators may be required to wire a fairly simple plugboard and must know how to interpret signals from a panel of lights on the machine. They also should understand the whole system to recognize any errors in input and to identify other situations that prevent proper operation.

Once facts and figures have been coded, data are ready for the "run" —that is, to be processed. A *console operator* (D.O.T. 213.382) or computer operator operates the computer after examining the programer's instructions to ascertain procedures. He then makes sure the computer is loaded with tape, discs, or cards, and starts the run. He may manipulate dozens of switches and observe numerous lights. If the computer stops or lights signal an error, he must locate the difficulty.

To be read, output must be translated from machine language to words and numbers. In some systems this is done by machines directly connected to the computer. In many large systems, however, this work is done on converters, high-speed printers, and other machines run by auxiliary equipment operators—*tape-to-card converter operators* (D.O.T. 213.382), *high-speed printer operators* (D.O.T. 213.382), and others.

Computer data on tape, discs, or cards are stored by a *tape librarian* (D.O.T. 223.387) or a console operator or auxiliary equipment operator and often are used again and again—as in making up a payroll at the end of every pay period. Telephone lines which transmit data from computers have expanded the range of tasks of an auxiliary equipment operator. Many operators run communications as well as computing equipment. Two or three shifts of workers, under a chief supervisor, operate many computers for 16 to 24 hours a day.



Places of Employment

The number of console and auxiliary equipment operators employed in 1970 is estimated at 200,000. Jobs for operating personnel are found chiefly in government agencies and in insurance companies, banks, wholesale and retail businesses, transportation and public utility companies, and manufacturing firms. Many operators also are employed in independent service organizations that process data for other firms.

Training, Other Qualifications, and Advancement

Employers often transfer operators of tabulating and bookkeeping machines to newly installed electronic computers. Many other computer operators are recruited from the outside.

In hiring outsiders, private em-

ployers usually require at least a high school education. For console operators, some college training may be preferred. The Federal Government requires applicants for auxiliary equipment operator jobs to be high school graduates unless they have had specialized training or previous experience in related work. Console operators should have a high school education and some work experience. They also may qualify for appointment on the basis of previous experience in computer work and a general aptitude for it, as demonstrated by special tests. Many private employers also give tests to measure an applicant's aptitude, especially his ability to reason logically.

Beginners usually receive training after they are hired. The training of auxiliary equipment operators may require a few weeks, that of console operators somewhat longer. Console operators usually attend classes to learn to mount tapes and operate the console. They must become sufficiently familiar with the equipment to trace mechanical failures. This training is supplemented by further instruction on the job.

As they gain experience, operators may be assigned to more complex equipment and eventually promoted to supervisors or jobs that combine supervisory duties and console operation. Through on-the-job experience and additional study, console operators may qualify as programers.

Employment Outlook

The use of electronic data-processing equipment will continue to increase very rapidly through the 1970's as the economy grows. Computers are being adapted to new uses almost daily and, as they perform more varied tasks, many more business firms will be utilizing them. Although the size of the staff required to operate a computer installation may be reduced somewhat as new types of equipment are developed, the total number of computer and auxiliary equipment operators is expected to increase very rapidly.

Thousands of operators will be needed to fill new jobs, both in firms having their own computer installations and service centers that rent computer time to businessmen. Many operators also will be needed to replace operators of computer systems who transfer to other kinds of work or stop working.

The equipment changes that are expected in computers also may produce changes in job requirements for console and auxiliary equipment operators. Because of advances in technology, much of the equipment in use today is far less complex to operate than computers of the early 1950's and 1960's; and future changes may bring further simplification. As a consequence, newcomers to this field may find it easier to qualify for the openings available than have applicants in the past.

Earnings and Working Conditions

Information about the salaries of computer operating personnel is available from a nationwide private survey conducted in 1970. The average salary for beginning console operators was $122 a week. Some experienced console operators averaged up to $200 a week. The weekly salary of experienced keypunch operators averaged $112. The difference between the salary of the lowest and highest paid employees in each of the job classifications surveyed was much greater than these figures suggest, however. For example, the highest salary reported for a skilled console operator was $365 a week—more than 4 times the lowest salary reported for a comparable job. Many variations of this kind were due to differences in salary levels in various parts of the country and among individual companies and industries; to some extent, they also reflect differences in the complexity of the work performed by operators having the same job titles.

Salaries of computer personnel in the Federal Government are roughly comparable to those in private industry. In late 1970, beginning console operators started at about $113 a week. The maximum salary paid to experienced console operators in the Federal Government was about $190 a week; a few in supervisory positions may earn up to $273 a week, usually after several years of experience.

Operators of electronic computer systems generally work the same number of weekly hours and are allowed the same holidays, vacations, and other benefits as most office employees. Since many computers are operated on a two- or three-shift basis, scheduled hours for some console and auxiliary equipment operators include late evening or nightwork. Tape librarians usually work only when day shifts are on duty.

Because electronic computers must be housed where temperature is carefully controlled, operators work in air-conditioned rooms. A disadvantage of their working environment, however, is the high level of noise generated by the operation of computer consoles and some auxiliary equipment. (See introduction to this chapter for additional information on Working Conditions.)

Sources of Additional Information

Information on careers in electronic data processing may be obtained from:

Data Processing Management Association, 505 Busse Highway, Park Ridge, Ill. 60068.

A list of reading materials giving information about computer operating personnel may be obtained from:

Association for Computing Machinery, 1133 Avenue of the Americas, New York, N.Y. 10036.

FILE CLERKS

(D.O.T. 206.388)

Nature of the Work

Most establishments arrange their records in some order to prevent loss of time and money that often results when needed information can't be located. This creates opportunities for file clerks, who keep such records accurate, up to date, and properly placed. Their specific duties, however, depend on the size and type of establishment that employs them.

File clerks read the material to be filed and arrange it by number, alphabet, subject matter, or by some other filing system. The kinds of information filed vary by type of organization. File clerks employed by banks might file deposit or withdrawal slips, loan records, and correspondence; file clerks working for magazine publishers might file news items, subscriptions, and pictures.

Aside from inserting new data into files, file clerks usually perform duties related to existing files, such as entering additional information on materials in the files, investigating file records, and tracing missing file data.

Much of the file clerk's time is spent retrieving information stored in the files. In such instances, file clerks maintain records of materials removed from the files and see that materials given out are returned.

Some other file clerk functions are not carried out as often as those related to the storage and retrieval of data. Periodically, for example, obsolete file materials may be destroyed or transferred to inactive storage. From time to time, files may be checked to insure that materials are correctly placed; and folders, labels, and index cards may be prepared for use in the files. As changes take place in the characteristics of information filed, some file clerks establish new, or modify existing, filing systems.

In large organizations, the functions of file clerks may be so specialized that they perform only one duty. In small organizations, on the other hand, file clerks may also handle tasks closely related to their regular job, such as typing, sorting mail, or operating an office machine.

Places of Employment

Almost 170,000 workers—mostly women—were employed as file clerks in 1970. In addition, hundreds of thousands of workers in other kinds of clerical occupations also do filing in connection with their work.

Finance, insurance, real estate, and manufacturing establishments employed the largest number of file clerks in 1970, accounting for three-fourths of these workers.

Training, Other Qualifications, and Advancement

Most employers prefer high school graduates for beginning positions as file clerks. Business courses offered by public and private school are helpful—particularly typewriting, which is increasingly required. Other useful business subjects include bookkeeping or recordkeeping, clerical or office practice, and general business.

Some on-the-job training is usually necessary because each organization has its own filing system and office procedures with which the clerk must become familiar. In large establishments having specialized filing procedures, a clerk may learn her job in a few weeks. In small establishments that require file clerks to perform various duties, on-the-job training may last up to 3 months.

The ability to read accurately and rapidly and to spell correctly is important for this type of work. Other desirable traits include a sense of orderliness and a liking for detail.

Advancement for file clerks usually consists of performing more dif-

ficult filing work or supervising other file clerks. With additional training, these workers may advance to other clerical positions such as information clerk or office machine operator. (See statement on office machine operators elsewhere in the *Handbook*.)

Employment Outlook

Employment opportunities for file clerks are expected to be good through the 1970's, with several thousand openings expected yearly during this period. Most of these openings will be for workers to replace file clerks who retire or stop working for other reasons. Employee turnover is especially high among file clerks because many of the women who perform this work are young and leave the field to get married and care for a family.

Employment of file clerks is expected to rise rapidly through the 1970's as a result of the long-term growth of business and the need for more and better recordkeeping. New positions for file clerks are expected to open up as the businesses employing large numbers of file clerks—such as banks, insurance companies, and manufacturing firms —continue to expand. However, the increasing use of mechanical devices to arrange, store, and transmit records can be expected to limit employment growth for clerks of this type.

Earnings and Working Conditions

Beginning file clerks performing routine duties earned average weekly salaries of $80, according to a 1970 Bureau of Labor Statistics survey. Salaries of file clerks having some experience averaged $88.00 a week, and the most experienced file clerks performing more difficult duties averaged $106 a week. The survey indicated, however, that salary levels of files clerks varied considerably by location and size of firm.

The starting salary for beginning file clerks in the Federal Government in 1970 was about $80.00 a week ($4,125 a year); experienced file clerks earned about $105 a week ($5,212 a year).

Office employees, including file clerks, generally work a 40-hour week. In some cities, especially in the northeastern part of the country, the scheduled workweek is 37½ hours.

Most office workers in large cities receive pay for 7 or more holidays a year and for 2 weeks of vacation after working 1 year. Life and health insurance, sick benefits, and retirement pension plans supplementing benefits paid under the Federal Social Security program also are generally available.

Working conditions for file clerks are usually similar to those of other office workers in the same organization. File clerk work requires little heavy lifting but usually involves some bending and reaching. (See Clerical and Related Occupations, this chapter for Sources of Additional Information).

OFFICE MACHINE OPERATORS

(D.O.T. 207.782, .884 and .885; 208.782; 214.488; 215.388; 216.488; 234.582 and .885)

Nature of the Work

The types of machines used to speed paperwork in modern business offices are so varied that it would be almost impossible to list all of them. They range from simple mechanical devices that open letters to electronic equipment capable of performing highly involved computations. This statement is concerned with the work done by people whose main job is to operate some of the more common types of office machines. Many, such as the bookkeeping machine operator and billing machine operator, have job titles related to the kinds of equipment they use. (Typists, operators of transcribing machines, and operators of electronic computers are not included in this statement, but are discussed in other sections of this chapter. Others not included are clerical workers who occasionally use equipment such as copying machines, adding machines, and other mechanical devices; and statistical clerks who use calculating machines extensively in connection with their regular duties.)

Billing machine operators (D.O.T. 214.488) use machines that both type and add, in preparing statements relating to customers' purchases. By striking lettered and numbered keys on the machine, the operator enters on each bill such information as the customer's name and address, the items bought, and the amounts of money involved in each transaction. Then, when the operator presses other keys, the machine calculates and prints totals, discounts, and other items.

Bookkeeping machine operators (D.O.T. 215.388) use office machines that record all the financial transactions of a business. As the operator presses the necessary keys, the machine enters totals and net amounts on bookkeeping forms. Through the use of bookkeeping machines, operators also prepare periodic trial balances, summary re-

ports, and other statistical information.

Adding and calculating machine operators (D.O.T. 216.488) use electrically and manually operated machines to make the computations needed in preparing payrolls and invoices, and in doing other statistical work. By striking numbered keys, operators "put into" these machines the numbers involved in each calculation. Then, when other keys are pressed, the machines compute the desired totals, and some may record the results automatically. *Adding machine operators* use their machines to add and subtract numbers, and sometimes to multiply. The calculator is more complex than the adding machine and usually has a much larger keyboard. *Calculating machine operators* and *Comptometer operators* use their machines not only to add, subtract, multiply, and divide, but also to get square roots, figure percentage distributions, and do other computations. Many office workers who operate adding machines and calculators part time also perform other office duties. However, operators of the most complex calculating machines—i.e., key-driven calculators which require considerable skill and knowledge—usually are occupied full time in this job.

Mail preparing and mail handling machine operators (D.O.T. 234.582 and .885) run automatic equipment which handles incoming and outgoing mail. Only in offices which handle a very large volume of mail does this work require a full-time operator. Some operators feed incoming mail into machines which open the envelopes. Other operators place outgoing mail on the loading racks of machines which fold enclosures and/or insert them in envelopes or address, seal, or stamp envelopes. Operators of addressing machines run machines which print addresses and related information either from stencils which have been cut by typists or from plates prepared by *embossing machine operators* (D.O.T. 208.782) on a special kind of typing machine.

Operators of duplicating machines handle equipment which produces copies of typewritten, printed, and handwritten documents more quickly and/or inexpensively than is possible by typing. Although some equipment of this kind can be operated by almost any office employee, the more complicated duplicating machines, which are capable of producing thousands of copies of typewritten and handwritten documents in a single "run," are usually operated by trained *duplicating machine operators* (D.O.T. 207.782, .884 and .885) who spend most of their time doing this work. The operators who use these machines insert in the machine a "master" copy of the document and reproduce it. Each operator must see that the machine is kept properly adjusted so that it produces legible copies. On some machines, the operator also feeds in the paper used for making copies and removes finished batches of work manually; on other machines, feeding and offbearing are done automatically.

Operators of tabulating machines and related equipment (D.O.T. 213.782) run machines designed to sort and count large quantities of accounting and statistical information. Information to be processed in a tabulating machine is inserted through punched cards into machines which count the various items punched on each card, multiply and make other calculations, and print the results on accounting records and other business forms.

Places of Employment

About 365,000 people were employed as office machine operators in 1970. (This total does not include 200,000 electronic computer operators. This occupation is discussed elsewhere in this chapter.) About three-fourths of all office machine operators are women.

Office machine operators are employed chiefly in firms handling a large volume of recordkeeping and other paperwork. Consequently, a great many operators work in large cities where such firms are usually located. Approximately one-third of all office machine operators work for manufacturing companies. Others work for banks and insurance companies, government agencies, and wholesale and retail firms. Some office machine operators are employed in "service centers"—agencies equipped with various kinds of office machines which contract to handle—for other firms without this equipment—tasks such as preparing monthly bills and mailing circulars to lists of prospective customers.

Training, Other Qualifications, and Advancement

Graduation from high school or business school is the minimum educational requirement for all but the most routine office machine operator jobs. For work such as operating key driven calculators and some kinds of tabulating and duplicating equipment, specialized training is usually necessary. For many beginning positions, however, a general knowledge of the equipment used is usually sufficient. Public and private school courses in the operation of office machines are helpful, and business arithmetic is valuable for the many jobs involving work with figures. It is helpful also for office machine operators to have some knowledge of typing, or to be able to operate more than one type of office equipment, since many office positions entail varied assignments.

Employers usually give newly hired office machine operators some on-the-job training. Even employees who have training or experience in office machine operation need to become familiar with the particular equipment they will be using on the job; differences exist between the calculating machines produced by one manufacturer and by another, and new models sometimes differ considerably from older models.

The amount of instruction and on-the-job experience needed by a beginner varies, depending chiefly on the type of machine. A few days may be sufficient to train operators of some duplicating machines; however, a few weeks may be needed for training calculating machine operators. Operators of calculating machines are often trained at company expense in special schools established by equipment manufacturers.

Finger dexterity, coordination of eye and hand movements, and good vision are important for most office machine operator jobs. It is helpful for billing and calculating machine operators to have a sufficient sense of mathematical relationships to enable them to quickly detect obvious errors in computations. Some mechanical ability is advantageous, especially for duplicating and tabulating machine operators.

Most employers follow a promotion-from-within policy, taking into consideration seniority and on-the-job performance as shown by supervisors' ratings and recommendations. Promotion may be from a beginning, routine machine job to a more complex one, or the promotion may be to a related clerical job. Often, employers provide the additional training required in such cases. Advancement for office machine operators employed in firms which have large clerical staffs may be to positions in which they are responsible for training beginners and for the accuracy of their work, or else to supervisory positions as section or department heads.

Employment Outlook

Thousands of job openings for office machine operators are expected each year through the 1970's. Most will result from the need to replace workers who retire or stop working for other reasons. Many machine operators are young women who stop working to care for their families. Other openings are expected to result from the introduction of new types of mechanical office equipment which speed recording, copying, and related office work. Still other openings will occur as business organizations continue to grow in size and number, and the volume of billing, computing, duplicating, and other work continues to mount.

Employment of office machine operators is expected to increase moderately through the 1970's. In some offices, however, the number of workers needed to operate tabulating, billing, and other types of machines may be reduced by the spread of automated recordkeeping systems and further advances in office automation. Also, advances in interoffice communications devices for transmitting data and electronic computer technology should enable many large firms and government agencies to centralize recordkeeping

functions. Thus, the requirements for office machine operators in small branch offices will be reduced. Any reductions in employment however, are expected to be more than offset by the new jobs created as the volume of paperwork continues to increase in business establishments of all kinds.

Earnings and Working Conditions

A 1970 Bureau of Labor Statistics survey, covering firms in metropolitan areas, provides salary information for several office machine operator occupations. For bookkeeping machine operators, the averages are given separately for different skill groups. Operators in Class A were generally experienced employees who performed comparatively difficult work, while Class B operators worked on more routine assignments and used simpler types of equipment. The average weekly salaries reported by this survey are shown in the accompanying tabulation.

Average weekly salaries, 1970	*Women*	*Men*
Billing machine operators	$ 92.00	$127.00
Bookkeeping machine operators		
Class A	105.50	113.50
Class B	89.00	102.00
Comptometer operators	97.00	.....

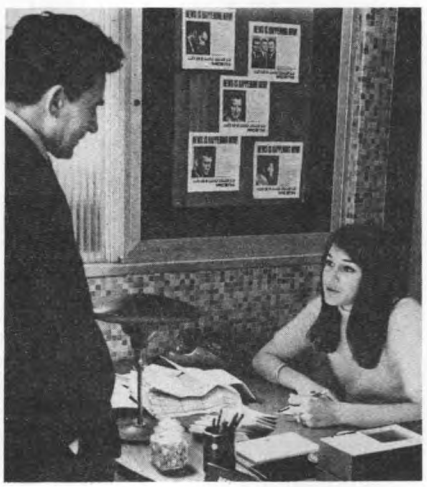
Because of the noise created by their machines, groups of operators often work in areas which are apart from other company offices. In other respects, working conditions for office machine operators usually are similar to those of other office workers in the same firms. (See introductory section to this chapter for further information on Working Conditions and for Sources of Additional Information.)

RECEPTIONISTS

(D.O.T. 237.368)

Nature of the Work

Most large organizations—and many small ones—employ receptionists to greet customers and others with whom they deal, and give them information. It is the receptionist's job to determine the nature of each caller's business, and then to direct him to those in the office who may be able to help him.



Receptionists usually refer each caller to the appropriate person in the organization, or else contact his office by telephone and arrange an appointment. Because of differences in the types of organizations where they work, receptionists may have somewhat different duties. In a hospital clinic, for example, the receptionist may direct each patient to the proper waiting room; in a beauty shop, she may arrange an appointment and accompany the customer to the operator's booth; and in a large defense plant, it may be part of the receptionist's job to provide the caller with an identification card and see that an escort is available to accompany him to the office of the official with whom he has business. In connection with these duties, many receptionists also keep records showing the name of each caller, the nature of his business, the time of his call, and the person to whom he was referred.

Most receptionists, particularly in small offices, have some time when they are not occupied with callers; as a result, they may handle other office tasks. Many receive and route telephone inquiries to the proper company officials. Typing, sorting and opening mail, filing, keeping books or petty cash accounts, or operating an office telephone switchboard may be among their additional responsibilities.

Places of Employment

It is estimated that almost 300,000 receptionists were working in the United States in 1970. About one out of four was a part-time worker who spent fewer than 35 hours a week on the job. More than 95 percent were women.

Although jobs for receptionists exist in practically all kinds of establishments, over half of the people in this occupation are employed in the offices of physicians, attorneys, and other professional people. Many others are employed by hospitals and educational institutions, and still others by banks, insurance companies, real estate offices, manufacturing concerns, and beauty shops. The relatively small number of men who are employed as receptionists work principally in medical service and hospital jobs, in manufacturing, and in banking and credit agencies.

Training, Other Qualifications, and Advancement

When hiring receptionists, employers seldom specify any formal educational requirements beyond a high school diploma. Nevertheless, about 1 receptionist out of 5 has some college training. Courses in English, spelling, typewriting, elementary bookkeeping, and business practices are assets for a beginner. The ability to operate an office telephone switchboard also may be desirable, although this skill often is acquired through on-the-job training. (See statement on Telephone Operators.)

Because the receptionist's job is to act as her employer's public representative, personal characteristics, such as a pleasant manner and an even disposition, are very important. An attractive personal appearance, pleasant speaking voice, good judgment, punctuality, and the ability to communicate information accurately also are necessary qualities. To perform her job effectively, the receptionist should acquire a thorough understanding of how her employer's business is organized.

The receptionist's job generally offers limited opportunities for promotion and advancement. However, work as a receptionist, plus business training, may lead to a better paying position as a secretary or an administrative assistant.

Employment Outlook

The number of receptionists is expected to increase moderately during the 1970's. Thousands of workers will be needed annually because of employment growth and the need to replace receptionists who retire or stop working for other reasons. Additional openings will arise as receptionists transfer to other types of employment. However, young applicants probably will meet strong competition, since many older and more experienced workers also seek this type of work. A few opportunities will continue to be available for men.

The chief factor affecting employment growth in this occupation is the expected general business expansion associated with population increase and economic prosperity. In addition, more business firms are realizing the importance of the receptionist in promoting good public relations. Since the receptionist's work is of a person-to-person nature, it is unlikely to be affected by office automation.

Earnings and Working Conditions

Switchboard-receptionists earned average salaries of $92 a week in 1970, according to a Bureau of Labor Statistics survey of 229 metropolitan areas. However, salary levels of these workers varied considerably by type and location of employer. For example, receptionists employed in the western United States averaged $98 a week while those in the South averaged $85 a week.

In the Federal Government, workers employed as information receptionists started at about $90 a week ($4,621 a year) in 1970. For experienced workers, starting salaries were higher—about $100 or $110 a week ($5,212 or $5,853 a year), depending on the nature of their previous experience.

Particularly in large business offices, receptionists usually work in well-furnished front offices, free from noise and overcrowding. In hospitals, beauty shops, and some other types of businesses, scheduled hours may include some weekend and evening work. (See introductory section to this chapter for further information on Working Conditions and for Sources of Additional Information.)

SHIPPING AND RECEIVING CLERKS

(D.O.T. 222.138 through .687)

Nature of the Work

Shipping and receiving clerks keep track of goods transferred from one place to another by business firms. Their specific duties depend on the size and type of establishment which employs them. In many small companies, one clerk keeps records of all shipments sent out and received by his employer. In larger companies, however, shipping and receiving clerks may be employed in separate departments under supervisors called head shipping clerks or head receiving clerks —or sometimes warehouse managers.

Before a shipment is sent from a business establishment to a customer, shipping clerks check to be sure the order has been correctly filled. They prepare the invoices and other shipping forms needed, look up freight and postal rates, record the weight and cost of each shipment, and check to see that the shipment is properly addressed. They also keep records of the date and other details associated with each shipment. Sometimes shipping clerks requisition the needed merchandise from the firm's stockroom, wrap and pack the shipment, and direct its loading on company

trucks. They also may ensure that the weight is evenly distributed and fragile items are safely placed.

Receiving clerks do similar work when shipments reach their destination. They find out 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, and they check to see whether the merchandise in each shipment has arrived in good condition. Receiving clerks record all incoming shipments, their condition, and do clerical work related to damaged or lost shipments. Routing shipments to the proper department of the company or section of the warehouse or to the stockroom also may be part of their job.

Places of Employment

The number of shipping and receiving clerks employed in 1970 is estimated at 380,000. About two out of every three worked in manufacturing firms and another fairly large group worked for wholesale houses or retail stores. More than 85 percent of all shipping clerks are men. Establishments employing shipping and receiving clerks tend to be concentrated in metropolitan 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 in preparing for the work. The ability to write legibly is important. Dependability and an interest in learning about the firm's business activities are also qualities which employers seek.

New employees usually are given on-the-job training under the supervision of an experienced worker. This training covers the special care and skill required when the shipments include merchandise such as garments or scientific instruments; and a knowledge of the regulations which apply to shipments received from or forwarded to other countries.

In some firms, stockroom workers help beginners acquire a knowledge of the firm's products and business transactions. In shipping and receiving rooms, newly hired clerks often start by doing routine work such as filing; checking addresses; attaching labels to shipments; and checking the items included in shipments. As clerks acquire experience, they may be assigned tasks requiring a good deal of independent judgment—for example, handling problems that arise because of damaged merchandise, or supervising other shipping or receiving room workers.

Work as a shipping or receiving clerk provides an excellent opportunity for an ambitious young man to learn about his company's products and business connections. Some clerks, particularly those who acquire post high school training or take courses in transportation, may eventually advance to warehouse managers, industrial traffic managers, or purchasing agents. (The work of industrial traffic managers and purchasing agents is discussed elsewhere in the *Handbook*.)

Employment Outlook

Several thousand openings for shipping and receiving clerks are expected annually during the 1970's as employment rises and as workers retire, stop working for other reasons, or transfer to other types of employment.

As the quantity of goods distributed increases with population growth, rising income levels, and business expansion, the number of shipping and receiving clerks is likely to rise slowly. Employment probably will not increase as fast as the volume of goods distributed. Shipping and receiving departments in firms handling large quantities of merchandise will undoubtedly be able to handle a greater volume of work with fewer clerks, as they continue to increase efficiency by streamlining recordkeeping and modernizing warehouses through installation of moving belts and other laborsaving equipment.

Earnings and Working Conditions

Shipping and receiving clerks averaged $3.07 an hour according to a 1970 Bureau of Labor Statistics survey covering 229 metropolitan

areas. Average earnings were lowest in the Southern region, $2.79 an hour, and highest in the North Central region, $3.22 an hour.

Salary levels of shipping and receiving clerks in comparable jobs varied also, due to differences in the industries in which they were employed.

Shipping and receiving clerks generally work a 40-hour week. Many receive time and a half for work over 40 hours. Nightwork and overtime, including work on Saturdays, Sundays, and holidays, may be necessary when raw materials are needed immediately on factory production lines, when shipments have been unduly delayed in arriving, or in other emergencies. Shipping and receiving clerks do much of their work in warehouses and shipping and receiving rooms; they may do some of it on outside loading platforms. Work places are often large, unpartitioned areas which may be drafty and cold, and littered with packing materials and containers.

Some of the work done by shipping and receiving clerks requires physical stamina and strength. Most clerks must stand for long periods while they check quantities of 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 this chapter for Sources of Additional Information.)

STOCK CLERKS

(D.O.T. 223.387)

Nature of the Work

Most employers recognize the importance of keeping well-balanced inventories in order to prevent losses in sales or slowdowns in production. Stock clerks help protect against such losses by controlling the flow of goods received, stored, and issued. Their basic duties are similar in all establishments, but their specific responsibilities vary greatly by size and type of firm and the number of items handled.

In small firms, stock clerks may perform the varied duties of receiving clerks, shipping clerks, and inventory clerks; whereas in large firms stock clerks may be responsible for only one of these functions.

The duties of stock clerks also depend on the items they handle. For example, stock clerks working with a wide variety of foods and drugs must maintain proper temperature and humidity conditions. Stock clerks responsible for large construction items may be required to do much walking and climbing to note the condition and quantity of that stock.

Stock clerks usually receive and unpack incoming merchandise or material. They may check the items 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.

Stock clerks store materials in bins, on the floor, or on shelves, according to the plan of the stockroom. They may organize and mark items with identifying codes, letters, figures, or prices so that inventories may be located quickly and easily. Stock clerks always maintain a record of items entering or leaving the stockroom. They may also prepare inventory reports showing stock balances resulting from a perpetual inventory system or from taking periodic physical inventories. In addition, stock clerks sometimes order supplies and also may label, pack, crate, or address goods for delivery.

Many stock clerks, such as film library clerk, tool clerk, and parts clerk have job titles related to the items they handle.

Places of Employment

About 500,000 stock clerks were employed in 1970; 80 percent were men. Most worked in manufacturing and in wholesale and retail trade. Large numbers of stock clerks were also employed by mail-

order houses, airlines, government agencies, hospitals, transportation companies, and other establishments that keep large quantities of goods on hand. The majority of stock clerks work in metropolitan areas where large factories, warehouses, stores, and other large goods-handling organizations are concentrated.

Training, Other Qualifications, and Advancement

Although there are no specific educational requirements for becoming a stock clerk, most employers prefer high school graduates. Employers look for proficiency in reading, writing, mathematics, typing, and filing. Good health, especially good eyesight, is important. As with most jobs, attentiveness, honesty, and the ability to get along with people, also are important. Stock clerks handling jewelry, liquor, or drugs are often bonded.

Stock clerks usually receive on-the-job training. New workers are first given simple tasks such as counting and marking stock. Basic responsibilities of the job are usually learned within several weeks. As they progress, stock clerks learn to keep records of incoming and outgoing materials, take inventories, and order supplies.

Advancement opportunities vary and often depend on the size of the establishment. In a small firm, the stock clerk may advance to a sales position or become an assistant buyer or purchasing agent. In a large establishment, the stock clerk may also advance to more responsible stock clerk positions such as invoice clerk, stock control clerk, or merchandise supply man. Advancement to the position of supervisor or manager of the stockroom is possible, but usually additional education and a knowledge of marketing are required.

Employment Outlook

Continuing population growth, rising income, and business expansion will result in a moderate employment increase for stock clerks through the 1970's. Many job openings will arise annually because of this employment growth, as well as the need to replace those who retire or stop working for other reasons. The increased use of electronic computers and other mechanical devices to control inventories and other closely related work, however, can be expected to limit growth in this occupation.

Because entrance into this occupation is relatively easy, and since many young people seek this work as a first job, some competition for openings is likely.

Earnings and Working Conditions

Earnings of men and women doing stock clerk type work in metropolitan areas averaged about $125 and $92 a week respectively in 1970, according to a Bureau of Labor Statistics survey. Differences in pay between men and women are explained in part by differences in the industries where they are employed, length of service, and minor variations in job duties. The earnings of stock clerks employed by the Federal Government generally ranged between $110 and $140 a week in 1970.

Stock clerks usually work a 40-hour week and receive the same fringe benefits as office employees in the same establishment. Those working in metropolitan areas usually have at least 7 paid holidays a year and 2 weeks of vacation after working 1 year. Life and health insurance and sick benefits also are generally available, as are retirement pension plans supplementing benefits paid under the Federal Social Security program.

The working conditions of stock clerks vary by type of employer. 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 spend much of their working day on their feet, often on a concrete floor. The work often involves considerable bending, lifting, and climbing. (See introductory section of this chapter for Sources of Additional Information).

STENOGRAPHERS AND SECRETARIES

(D.O.T. 201.268 and .368 and 202.388)

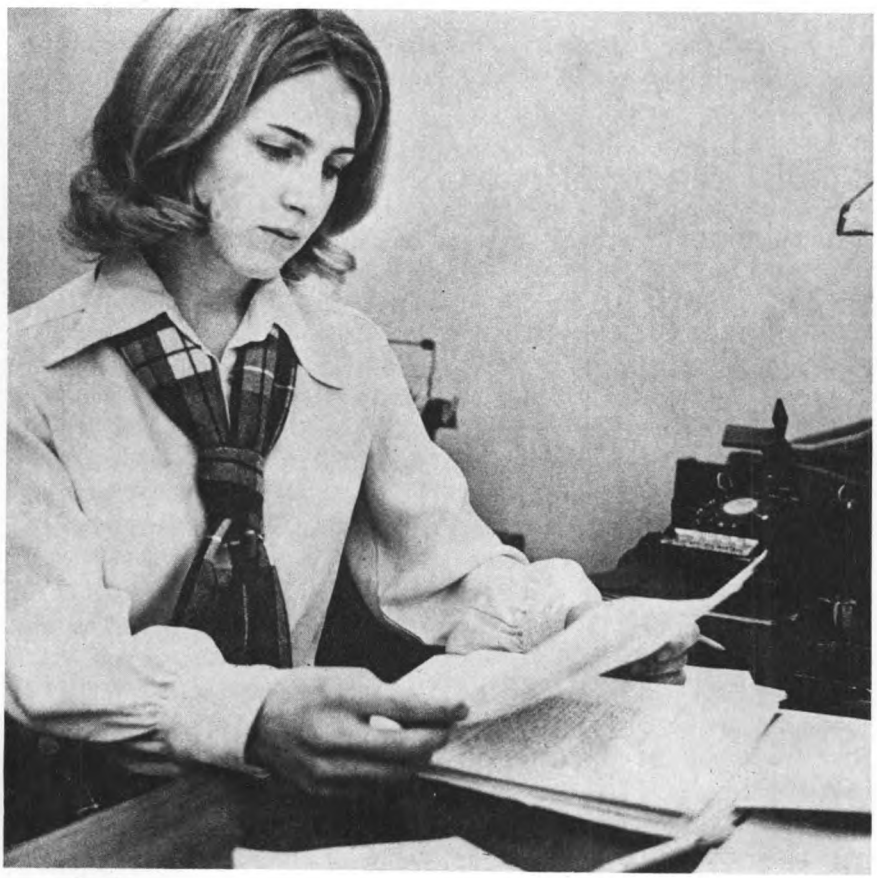
Nature of the Work

About 2.8 million persons were employed in occupations requiring stenographic skills in 1970. More than 95 percent were women. Practically all stenographers and secretaries take dictation and transcribe it on a typewriter. They usually have additional duties related to the nature of their employer's business; they sometimes have special job titles which reflect their skill levels or work specialties.

Stenographers (D.O.T. 202.388) take dictation from one or more persons and then transcribe their notes on a typewriter. Most stenog-

raphers record their notes in shorthand; some use machines which print symbols as different keys are pressed. In addition to taking and transcribing dictation, many stenographers also do other kinds of typing, answer telephones, operate various office machines, and perform other clerical duties. Some stenographers, including most beginners, are classified as *general stenographers;* they take fairly routine dictation and perform routine office tasks. More experienced *senior stenographers* have a higher degree of stenographic speed and accuracy, and perform more responsible clerical work. Some senior stenographers, called *technical stenographers,* take dictation in medical, legal, or scientific terms; others take dictation in a foreign language; and still others work as *public stenographers.*

Some stenographers specialize in shorthand reporting. Included in this group are *court reporters,* who record proceedings in law courts. Other *reporting stenographers* record proceedings at conventions and other meetings; report statements made at press conferences and before Government legislative committees; and do other kinds of word for word reporting. Reporting stenographers take their notes by machine or, less frequently, in written shorthand. Then, they either transcribe them on a typewriter or dictate them onto sound-producing records which are later transcribed by typists. Stenographers who do this kind of work must be exceptionally rapid and accurate—sometimes taking notes in technical language from many speakers and for extended periods of time.



In addition to stenographic work, *Secretaries* (D.O.T. 201.268) relieve employers of routine duties and business details.

Duties vary and depend on the employer's business and the secretary's experience and capabilities. Secretaries often arrange airline and hotel reservations, and take care of some kinds of correspondence. Some times they supervise other personnel. Some secretaries specialize in legal, medical, and other technical work. *Social secretaries* (D.O.T. 201.268) arrange social functions and attend to personal and social matters for employers.

Places of Employment

Although organizations of every size and type employ stenographers and secretaries, more than half work for service; finance, insurance, and real estate; and government organizations. Many technical stenographers and secretaries work for physicians, attorneys, and other professional people. A few—chiefly public stenographers and some reporting stenographers—are self-employed. Stenographic and secretarial jobs for men tend to be concentrated in educational and other professional services, and in manufacturing and public administration. Many of the nearly 15,000 stenographers who specialize in shorthand reporting are men.

Training, Other Qualifications, and Advancement

Adequate performance as a stenographer or secretary requires a good basic education and technical training. Graduation from high school is essential for practically all positions. Graduates whose high school courses have included short-

hand, typing, and other business subjects meet the requirements of many employers. Some employers prefer a background of academic high school subjects, supplemented by technical training taken after graduation.

Daytime and evening courses that prepare students for stenographic and secretarial work are offered by hundreds of public schools, private business schools, and colleges throughout the country. In connection with high school courses in business subjects, some public schools conduct cooperative programs which enable students to acquire practical work experience under trained supervision. Also, the Federal Government sponsors training programs for unemployed and underemployed workers for entry positions as stenographers under provisions of the Manpower Development and Training Act. Associate degrees in the field of secretarial studies are conferred by a great number of junior and community colleges. Bachelor's degrees in the field of executive secretary are conferred by the schools of business and commerce in many universities; a few confer the master's degree.

Some courses which train for stenographic work are limited to shorthand and typing and can be completed in a few months. In other courses which usually last longer, students also may be taught additional office skills and receive instruction in general business practices and office conduct. Some courses provide intensive training to prepare students for stenographic reporting or for legal, technical, or medical-dental secretarial work.

Many different shorthand systems are used, some of which are faster than others. Employers seldom have strong preferences about the system a stenographer uses, but they usually regard the rate of speed as an important factor. To qualify for positions in the Federal Government—and for employment in many private firms—stenographers must be able to take dictation at a rate of at least 80 words a minute and type 40 words or more a minute. Although speed requirements in some positions may be less than this, in others—especially shorthand reporting—they are much greater. Many shorthand reporting jobs require dictation speeds of 200 words or more a minute. For beginning shorthand reporters in the Federal Government, the minimum is 160 words a minute.

Good hearing and a working knowledge of spelling, punctuation, grammar, and vocabulary are essential in stenographic and secretarial positions. Employers seek workers who are poised, alert, and have pleasant personalities. Discretion, good judgment, and initiative are also important, particularly for the more responsible secretarial positions.

Capable and well-trained stenographers and secretaries have excellent opportunities for advancement. Many stenographers advance to better paying positions as secretaries; others, who acquire the necessary speed through experience or additional training, may become reporting stenographers. Both stenographers and secretaries may eventually be promoted to jobs such as administrative assistant, office supervisor, executive secretary, or some other responsible position requiring specialized knowledge of the employer's industry or business.

Employment Outlook

As modern businesses continue to expand in size and complexity, the increased paperwork will lead to a rapid expansion in the employment of secretaries and stenographers. The increasing use of dictating, duplicating, and other office machines will undoubtedly continue, but technological changes of this kind are not expected to greatly affect the growth of employment in these occupations.

Thus, employment opportunities for workers who have stenographic skills are expected to be favorable through the 1970's. About one hundred thousand workers will be hired annually to fill new jobs, and an even greater number will be needed to replace stenographers and secretaries who retire or stop working for other reasons. Turnover among stenographic workers is high because many young women leave to care for their families. Some openings also will occur as stenographers and secretaries leave their jobs to enter other types of employment.

Earnings and Working Conditions

In 1970, persons employed as general stenographers in metropolitan areas surveyed by the Bureau of Labor Statistics earned average salaries of $461 a month. Salaries earned by senior and technical stenographers working in metropolitan areas averaged $526 a month.

The salaries earned by individuals included in the survey varied considerably, partly because of differences in the location and industry where they were employed, but also because of differences in experience. The earnings of reporting stenographers generally are considerably higher than those of other stenographic workers.

Salaries of secretaries to supervisors in small organizational units or

nonsupervisory staff specialists averaged $522 a month throughout the United States, according to the same survey.

Secretaries to officers in small companies and to middle management executives in large companies earned average monthly salaries of $582 and $625 respectively. Secretaries having even greater responsibilities earned average salaries of $679 a month.

The entrance salary for beginning stenographers in the Federal Government in 1970 was $5,212 a year. (See introductory section of this chapter for additional information on working conditions.)

Sources of Additional Information

Additional information on careers in secretarial work, as well as a directory of business schools, may be obtained from:

United Business Schools Association, 1730 M Street, NW., Washington, D.C. 20036.

Information regarding shorthand reporting may be obtained from:

National Shorthand Reporters Association, 25 West Main St., Madison, Wis. 53703.

For information on becoming a certified professional secretary, write to:

The Institute for Certifying Secretaries, 616 East 63rd St., Kansas City, Mo. 64110.

See introductory section of this chapter for additional sources of information.

TYPISTS

(D.O.T. 203.138 through .588; 208.588; and 209.388 through .588)

Nature of the Work

Typists operate the one machine found in practically every business office—the typewriter. Their main job assignment is to produce typed copies of printed and handwritten materials; in this respect, their work differs from that of many other office employees, who also do some typing but whose principal job assignment is different.

Practically all typewriters, including the electric machines being used in an increasing number of offices, have the same type keyboard and are operated in much the same way. Some typing jobs are considerably more difficult than others, however. Beginners, sometimes called *junior typists,* often address envelopes, type headings on form letters, copy directly from handwritten or typed drafts, and do other routine work. Experienced, or *senior typists,* generally perform work requiring a particularly high degree of accuracy or independent judgment; they may work from rough drafts which are difficult to read and which contain technical material, or they may plan and type complicated statistical tables, combine and rearrange materials from several different sources, or prepare master copies of material to be reproduced by photographic processes. A few specially trained typists operate teletypewriters, proportional spacing typewriters, and

other special kinds of typewriting machines.

Because many typists use special equipment or have jobs involving special duties, they also have special job titles. Thousands who combine typing with filing, sorting mail, answering the phone, and other general office work are called *clerk typists* (D.O.T. 209.588). Other much smaller groups of typists include *transcribing machine operators* (D.O.T. 208.588), who type letters and other documents as they listen to dictation recorded on tape or on sound-producing records; and *data typists* (D.O.T. 213.588) and *tape perforator operators* (D.O.T. 203.588), who use specially equipped electric typewriters to transfer coded instructions to magnetic or paper tapes for use in electronic computers. Still other typists having special duties and job titles include *policy writers* (D.O.T. 202.388) in insurance companies, *waybill clerks* (D.O.T. 209.588) in railroad offices, and *mortgage clerks* (D.O.T. 203.588) in banks.

Places of Employment

Almost 700,000 workers were employed as typists in 1970; over 95 percent were women. In addition, hundreds of thousands of workers in other kinds of clerical occupations also use typing skills in connection with their main job assignments.

Typists are employed in private and public enterprises of practically every kind—particularly in manufacturing firms, banks, insurance companies, and Federal, State, and local government agencies. Over one-half of all typists worked in such establishments in 1970.

Training, Other Qualifications, and Advancement

Many employers require applicants for typing positions to take a test to show their speed and accuracy. For most jobs, 40 to 50 words a minute is required. Typists also should have a good understanding of spelling, vocabulary, punctuation, and grammar.

Employers generally prefer to hire high school graduates. Business training, including the operation of office equipment, such as copying and adding machines, may be helpful. Also, the Federal Government sponsors training programs for unemployed and underemployed workers for entry positions as typists under provisions of the Manpower Development and Training Act.

Important aptitudes and personality traits for this occupation include finger dexterity, accuracy, neatness, a friendly personality, and the ability to concentrate in the midst of distractions. Transcribing machine operators should have good hearing.

A typist may be promoted from junior to senior typist or to other clerical work involving greater responsibility and higher pay. Typists who know shorthand may be promoted to stenographer or secretary.

Employment Outlook

Employment opportunities for typists are expected to be favorable through the 1970's. In addition to an anticipated rapid growth in employment, many thousands of additional openings will become available for workers to replace typists who retire or stop working for other reasons. Turnover in this field is high because many young women leave to care for their families.

As modern businesses continue to expand in size and complexity, more typists will be needed. However, duplicators increasingly will be used for routine typing and will limit demand for junior typists. The greatest demand will be for senior typists and for typists who can do other office work.

Earnings and Working Conditions

In 1970, the average monthly salary for beginning typists in metropolitan areas surveyed by the Bureau of Labor Statistics was $396 compared with $457 for experienced typists. Salaries varied considerably because of location, industry, and experience.

In the Federal Government, the entrance salary for beginning typists was $4,620 a year. Working conditions for typists usually are similar to those of other office workers in the firms where they are employed. (See introductory section of this chapter for information on Working Conditions and Sources of Additional Information.)

TELEPHONE OPERATORS

(D.O.T. 235.862)

Nature of the Work

Although millions of telephone calls are dialed each day without assistance, practically every telephone user sometimes makes a call that cannot be completed without help from the operator. Often the operator is asked to reverse charges on a

long distance call, locate an individual, or indicate the cost of the call. Frequently the caller needs a correct number. The operator also may be needed to call the police in an emergency, assist a blind person who is unable to dial for himself, or arrange a conference which will enable business executives in different locations to confer by telephone.

These and many other services are provided by two groups of operators—those at switchboards in central offices of telephone companies; and those at private branch exchange (PBX) switchboards. Usually both operators insert and remove plugs attached to cords by manipulating keys and dials, and by listening and speaking into their headsets. Some switchboards are operated by pushbuttons or dials.

Central office operators are often contacted only when callers need assistance which is usually for long distance calls; for this reason, most central office operators are long distance operators. They obtain the information needed to complete the call, make the necessary connections and record the details of each call for billing. Many directory assistance operators (D.O.T. 235.862) also work in telephone companies; they provide telephone numbers by searching in telephone directories for numbers and addresses of new subscribers. Central office supervisors train new operators; they also aid in completing difficult calls. In each central office, all operators work under the direction of a chief operator.

PBX operators (D.O.T. 235-862) run switchboards which serve business offices and other establishments. In addition to connecting interoffice or house calls, they answer and relay outside calls, assist company employees in making outgoing calls, supply information to callers and record charges for switchboard calls. Duties of operators of PBX switchboards which serve dial telephones are similar to those of central office operators. In many small establishments, PBX operators work at switchboards which serve only a limited number of telephones. These operators do other office work such as typing or sorting mail. Many act as receptionists or information clerks. (The receptionist is described elsewhere in this chapter.)

Telephone operators use new equipment to handle long-distance calls.

Places of Employment

About 420,000 people were employed as telephone operators in 1970, approximately three-fifths as central office operators in telephone companies, and two-fifths as PBX operators in other types of establishments. Although employed in establishments of all kinds, a particularly large number of PBX operators worked in manufacturing plants, hospitals, schools, and department stores. Central office 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 area. Practically all operators were women.

Training, Other Qualifications, and Advancement

In hiring beginners, employers prefer persons who have at least a high school education. English and business arithmetic provide good preparation. Since many jobs combine the switchboard and other office work, typing and commercial subjects also are helpful.

Young persons planning to become telephone operators should like to serve the public, be pleasant and courteous under all circumstances, and able to sit in a confined area. Rapid reading, a good memory, a pleasing voice, a good vocabulary, and good diction are important qualifications.

Although some schools have brief courses in switchboard operation, practically all new operators receive some on-the-job training to become familiar with the equipment, records, and work. In telephone company central offices 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 the regular operating force in a central office for further instructions in handling special types of calls not learned earlier.

PBX operators handling routine calls may have a somewhat shorter training period than central office operators. In a large business, a supervisor in the company's employ or an instructor from the local telephone company may train new employees. In a small establishment, an experienced operator usually supervises the training. The telephone operator's job is becoming less repetitive, largely because of the increasing use of direct dialing. Thus, public contacts make up an increasing proportion of their work. A high degree of eye-hand coordination and normal eyesight and hearing are helpful. Most telephone companies and many large business firms require applicants to pass physical examinations and general intelligence tests.

An experienced central office operator may be promoted to central office supervisor and, eventually, to chief operator. Promotion also may be to a clerical job or some other position within the telephone company. Similar opportunities exist for PBX operators in large firms; in many small businesses, however, opportunities for advancement are limited.

Employment Outlook

Employment of telephone operators is expected to rise slowly through the 1970's. An estimated 22,000 openings each year will be needed to replace central office and PBX operators who retire or stop working. Turnover is high, because most operators are young women who work a few years and then leave to care for families. Additional operators also will be needed to replace workers who transfer to other work.

Direct dialing and other changes have been under way for some years and have restricted growth in employment. At the same time, however, further increases are anticipated in the volume of calls. Consequently, little or no growth in employment is expected through the 1970's.

The number of PBX operators, on the other hand, is expected to rise throughout the 1970's. Employment in many PBX installations is expected to be relatively unaffected by further technological change. In some large PBX systems modern laborsaving equipment may be installed but its effect on employment should be more than offset by the number of new jobs created as more businesses require PBX services.

Earnings and Working Conditions

Central office operators in training averaged $2.16 an hour in December 1969, according to a Bureau of Labor Statistics survey: Experienced operators, $2.25; service assistants (central office supervisors), $3.15; and chief operators, $4.24. Salary levels varied in different sections of the country; they were highest in the Pacific States, where experienced operators averaged $2.66 an hour. Contracts between unions and telephone companies generally provide for periodic increases to operators. Central office operators usually receive extra pay for work on evenings, Sundays, and holidays.

The median weekly earning of Class A, PBX operators in metropolitan areas in February 1970 was $113; for Class B, PBX operators, the average was $91.

Earnings varied according to the industry in which PBX operators were employed and the section of the country. Average earnings were highest in public utilities and lowest in retail trade and services. By areas, earnings were highest in the West and lowest in the South.

The workweek for most central office and PBX operators averaged between 35 and 40 hours. 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 establishments where telephone service is maintained on a 24-hour basis, operators usually work on shifts and on holidays and

weekends. Some central office operators work split shifts—that is, they are on duty during the peak calling periods which occur in the late morning and early evening, and have time off between these two periods.

Operators in most telephone companies and other large establishments usually work in well-lighted and pleasant surroundings. Attractive lounges often are provided for relaxation during "breaks" in their scheduled hours. Insurance, pension, tuition plans and practices relating to paid holidays and vacations 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 and the Alliance of Independent Telephone Unions.

See the telephone industry chapter and introductory section of this chapter for sources of additional information.

SALES OCCUPATIONS

Saleswork offers career opportunities for young people who have not completed high school, as well as for those who have a college degree; for men and women who like to travel and those who do not; and for people who want salaried employment, as well as those who aspire to run their own businesses.

Workers in this occupational group may sell for manufacturers, insurance companies, and other producers of goods and services; for wholesalers who stock large quantities of goods so that smaller lots may be purchased and resold by retail stores; and for drugstores, dress shops, and other retailers who deal directly with the public.

About 4.9 million workers were employed in sales occupations in 1970. Approximately one-fourth were part-time employees who usually worked fewer than 35 hours a week. Two out of five were women, employed mainly in retail stores. In insurance, real estate, and other saleswork outside retail stores, the great majority of employees were men. Chart 20 shows employment in the major sales occupations discussed in this chapter. This chapter also includes individual statements for automotive salesworkers.

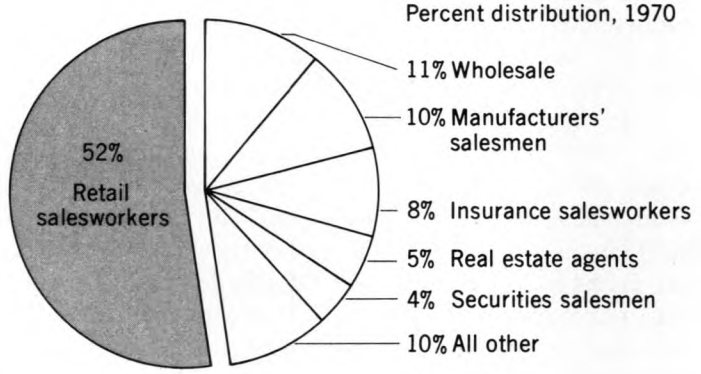
Training, Other Qualifications, and Advancement

Training requirements for different kinds of saleswork are as varied as the work itself. Thousands of salespersons have routine jobs selling standardized merchandise such as magazines, candy, cigarettes, and cosmetics. In such cases, the salesworker needs to do little more than "wait on" people who already have made their selections from the stock displayed. Employers seldom require salespeople in such jobs to have specialized training. They usually learn their duties on the job as they work with experienced salesclerks; in some large stores, they may attend brief training courses. Even in the most routine kinds of selling, however, a high school diploma is an asset to a beginner seeking a job. High school courses in business subjects, as well as specialized courses in distributive education offered in some school systems, are regarded by most employers as particularly good preparation for saleswork. The Federal Government also sponsors training for some salesworkers under provisions of the Manpower Development and Training Act.

The salesman who sells complex products or services—electronic equipment or liability insurance, for example—has a job which is altogether different from that of most retail salesclerks. Beginners on jobs of this kind sometimes receive training which lasts many months. For some positions, salesmen must be college graduates who have majored in engineering or some other field. Other salesmen dealing in specialized services and products may acquire the necessary technical knowledge through courses offered by universities or manufacturers. Still others gain knowledge through years of on-the-job experience, often supplemented by home study. Thus, a real estate salesman may qualify better for his job by taking university extension courses; a beauty counselor in a department store may participate in an industry-sponsored training program before beginning her sales duties; or a salesman of fine jewelry may acquire his knowledge of gems during years of observation and study as he works on the job.

Successful salespeople must have the ability to understand the needs and viewpoints of their customers, and a readiness to be of assistance to them. Saleswork also requires people with poise who are at ease in

(20) **Nearly 4.9 million workers are in sales occupations, about half in retail trade**



SOURCE: BUREAU OF LABOR STATISTICS

dealing with strangers. Other important attributes in many types of selling are energy, self-confidence, imagination, the ability to communicate, and self-discipline. Because salesworkers frequently are required to make price computations or give customers change, arithmetic skills are an asset. In almost all saleswork, except retail stores, the salesman must have the initiative to locate his own prospective customers and plan his own work schedule.

Employment Outlook

During the 1970's, employment in sales occupations is expected to rise slowly. Openings created by employment growth as well as vacancies that arise as salesworkers retire, or stop working for other reasons, are expected to result in a need for a few hundred thousand workers each year. Additional workers will be needed to replace people now employed in saleswork who transfer to other types of employment.

As employment rises, the proportion of part-time workers—already higher than in most occupational groups—also is likely to increase. In the growing number of suburban shopping centers, where many retail stores remain open several nights a week, a larger-than-average proportion of the sales force is likely to be made up of part-time workers.

The main reason for the anticipated rise in employment is the prospect of increased sales resulting from population growth, business expansion and rising income levels. Within retail stores, however, special circumstances which have restricted employment growth in the recent past probably will continue to do so. Information about these special circumstances and the employment prospects for salesworkers in retail stores and other major fields is given in the sections which 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 automobile parts wholesale stores and automobile dealerships, where they sell directly over the counter and take telephone orders for various 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, self-employed mechanics, service station operators, and "do-it-yourselfers." Parts countermen employed by dealers usually sell parts only for the particular makes of automobiles and trucks sold by the dealers. They may spend most of their time supplying parts to mechanics employed by the dealer.

A parts counterman identifies the item the customer needs—often only from general description—and locates it in the stockroom. By knowing parts catalogs and the layout of the stockroom he readily can find any one of several thousand items. If a customer needs a part that is not stocked, the parts counterman may suggest one that is interchangeable, place a special order, or refer the customer elsewhere.

The parts counterman determines the prices of parts from price lists, receives cash payment or charges the customer's account, fills out sales receipts and, when necessary, packages the item sold.

In addition to selling, parts countermen keep catalogs and price lists up to date, order parts to replenish stock, unpack and distribute incoming shipments in the stockroom, maintain sales records, and take inventories. In many large firms some of these nonselling duties are performed by other workers such as stock clerks and receiving clerks.

Parts countermen use micrometers, calipers, fan belt measurers, and other devices to measure parts for interchangeability. They also may use coil condenser testers, spark plug testers, and other testing equipment to determine if parts are defective. In some firms—particularly in 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 68,000 automobile parts countermen employed in 1970 worked for automobile dealers and parts wholesalers. Most dealers employed 1 to 4 parts countermen; many wholesalers employed more than four. Other employers include truck dealers, retail automotive parts stores, automotive parts and accessories departments of department stores, and warehouse distributors of automotive parts. Trucking companies and buslines employ parts countermen to maintain stockrooms and dispense parts to the mechanics who repair their fleets.

Parts countermen work throughout the country in dealerships and automobile parts wholesale stores. Those who work for warehouse distributors, department stores, trucking companies, and buslines are employed mainly in large towns and cities.

Parts counterman identifies item in catalog.

Training, Other Qualifications, and Advancement

Automobile parts countermen should know the different types and functions of motor vehicle parts and have an aptitude for working with numbers. They should be neat, friendly, and tactful since they deal with many different types of customers. A good memory and the ability to write legibly and concentrate on details also are desirable qualifications. High school or vocational school courses in automobile mechanics, commercial arithmetic, salesmanship, and bookkeeping 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 to hire high school graduates for entry jobs.

Most parts countermen learn the trade through informal on-the-job training. 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 to become a qualified parts counterman.

Training programs for unemployed and underemployed workers for entry jobs as parts countermen are in operation 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. These salesmen call on automobile repair shops, service stations, trucking companies, and other businesses that buy parts and accessories in large quantities. Some parts countermen establish their own automobile parts stores.

Employment Outlook

Employment of automobile parts countermen is expected to increase moderately through the 1970's. In addition to the job opportunities resulting from employment growth, more than a thousand job openings are expected annually to replace experienced workers who retire or die. Job openings also will occur as some parts countermen transfer to other occupations.

Employment is expected to increase to maintain the increasing number of motor vehicles in use. Moreover, the variety of parts is growing because automobile manufacturers are producing a greater selection of makes, models, and optional equipment. As a result, automobile dealers and parts wholesalers are selling a larger variety of parts, although many parts are interchangeable.

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 cities had average straight-time hourly earnings of $3.40, based on a survey in late 1969. Averages ranged from $2.48 in Richmond, Va., to $4.66 in San Francisco–Oakland, Calif.

Most parts countermen work between 40 and 48 hours a week. In many firms, they work half a day on Saturday.

Many employers provide paid holidays and vacations, and pay part or all of additional benefits such as life, health, and accident 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 of their time

standing or walking. They frequently have to work rapidly when waiting on more than one customer and simultaneously answering telephone calls.

Many parts countermen belong to the following unions: 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

For further information on employment opportunities, inquiries should be directed to 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 SALESMEN

(D.O.T. 280.358)

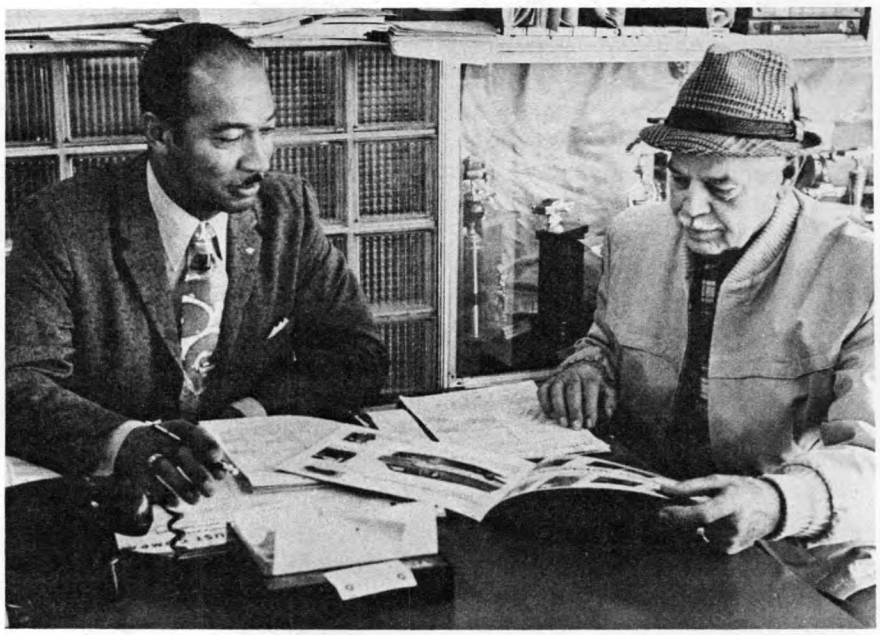
Nature of the Work

Automobile salesmen are important links between dealers and car buyers. Many salesmen 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.)

The automobile salesman spends much of his time waiting on customers in the showroom or used-car lot. After greeting a customer, he determines 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 and ease of operation, but another may be more impressed with styling and performance. The salesman emphasizes the points that satisfy the customer's desires and stimulate his willingness to buy. To illustrate features such as smoothness of ride and ease of operation, he invites the customer to test drive the car.

Because the purchase of a car involves a considerable sum of money, many customers must be convinced that they are making a wise decision. Successful salesmen have ability to overcome the customer's hesitancy to buy, and get the order (called closing the sale). Since closing the sale frequently is difficult for beginning salesmen, experienced salesmen or sales managers often lend assistance. Salesmen may quote tentative prices and trade-in allowances when conferring with customers, but these figures usually are subject to the approval of sales managers. Salesmen may arrange financing and insurance for the cars they sell. They also register cars and obtain license plates.

Before the salesman approves delivery, he makes sure the car has been serviced properly and has the accessories specified by the customer. He answers the customer's questions on subjects such as the car's controls and the maintenance warranty. Following delivery of the car, he may contact the customer by phone or mail to express apprecia-



Automobile salesman discusses new car features with customer.

tion for his business and to inquire about his satisfaction with the car. From time to time, he also may send brochures on new-car models and other literature. By keeping in contact with his customers, the salesman builds 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. A salesman also can obtain leads from gasoline service station operators, parking lot attendants, and others whose work brings them into frequent contact with people. He may contact prospects by phone or mail.

Places of Employment

An estimated 120,000 automobile salesmen were employed in 1970. More than four out of every five were employed by new-car dealers, many of whom also sell used cars. The remainder worked for used-car dealers. Although many used-car dealers employ only 1 salesman, a few new-car dealers employ more than 50 salesmen. Some used-car dealers do not employ full-time salesmen.

Automobile salesmen are employed throughout the country, although most work in large urban areas and in the most populous States.

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. Beginners frequently are given training manuals and other educational material published by automobile manufacturers. 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.

Most sales managers regard a high school diploma as the minimum educational requirement for beginning automobile salesmen. Many automobile salesmen have additional education. Courses in public speaking, commercial arithmetic, English, business law, psychology, and salesmanship provide a good background for selling. Previous sales experience or work requiring contact with the public is helpful. Many automobile salesmen previously have been furniture salesmen, route salesmen, door-to-door salesmen, automobile parts countermen, or gasoline service station attendants. However, many sales managers will hire inexperienced applicants 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. Age requirements may be waived if the employer considers the applicant to be mature. However, most employers consider 21 the minimum age for beginning salesmen.

Automobile salesmen must be tactful, well-groomed, able to express themselves well, and have other personal qualities that make a good impression on customers. Initiative and aggressiveness also are important because the volume of sales usually is related to 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

The number of automobile salesmen is expected to increase moderately through the 1970's. In addition to openings resulting from employment growth, a few thousand openings will occur each year to replace salesmen who retire or die. Many openings also will arise as salesmen transfer to other occupations. Although selling cars is rewarding for many people, others leave to seek new jobs because they are not suited for the work.

Employment of automobile salesmen will increase primarily because car sales will grow as population, multicar ownership, and personal income increase. Car sales generally fluctuate from year to year as a result of changes in general business conditions, consumer preferences, and the availability of credit. Employment of automobile salesmen also fluctuates, but tends to be more stable than sales.

Earnings and Working Conditions

Most automobile salesmen are paid a commission based on the selling price of a car or the gross 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 their commissions) vary from month to month. To provide commissioned salesmen with a steady income, many dealers pay a modest weekly or monthly base 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.

Automobile salesmen had average weekly earnings of $193 in 1969, according to information from the National Automobile Dealers Association. Earnings varied considerably, depending on individual ability and experience, geographic location, dealership size, and other factors. For example, salesmen employed by dealers that sold between 100 and 149 vehicles annually had average weekly earnings of $143, while those employed by dealers that sold 1,000 or more had average weekly earnings of $234.

A large number of employers furnish salesmen with demonstrator cars free of charge. Others allow salesmen to buy or lease them at a discount, often at dealer's cost. Salesmen also receive discounts on cars bought for their personal use. Most dealers provide paid vacations. Many provide life insurance, hospitalization, and surgical and medical insurance.

Because most customers find shopping after work convenient, salesmen frequently work during the 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 be scheduled to work on the showroom floor 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 floor, salesmen may spend a few hours each day delivering cars to customers and looking for new customers.

Sources of Additional Information

Information 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 the customer to determine his service requirements and arranges for a mechanic to perform the work.

When a routine checkup is requested, the advisor merely writes the customer's requests on a repair order. However, when the customer complains of mechanical or electrical trouble, the service advisor asks about the nature of the trouble and may test drive the automobile. For example, if the customer says his automobile is difficult to start, the service advisor may try to determine if this occurs when the engine is cold or after it has warmed up. He writes a brief description of these symptoms on the repair order to help the mechanic locate the cause of the trouble. The advisor also records other information on the repair order, including identification of the customer and his automobile. If the repairs are covered by a factory warranty, he records the automobile engine and body numbers, and the automobile's mileage and purchase date.

The service advisor tells customers what repairs are needed, their approximate cost, and how long the work will take. He 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, he may sell accessories such as air-conditioners or radios.

If the service advisor is unable to tell the customer what repairs are needed until a mechanic has inspected the automobile, he records the customer's phone number and contacts him later to obtain permission to perform the repairs.

The service advisor gives the repair order to the shop dispatcher who in turn usually computes the cost of repairs and assigns the work to a mechanic. In some shops, service advisors may compute the cost of repairs. If the mechanic has questions about the repair order, he contacts the service advisor. After the mechanic has completed the repair work, the service advisor may test drive the automobile to be

Automobile service advisor listens to customer's description of automobile trouble.

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 service advisor usually must obtain the authorization of his supervisor, the service manager. In some dealerships, the most experienced service advisor substitutes for the service manager when he is absent.

Places of Employment

An estimated 20,000 automobile service advisors were employed in 1970. Most of them worked for large automobile dealers that employed from one to four service advisors. Few small automobile dealers employ service advisors. Some service advisors are employed by 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, the trainee's first assignment is to assist the service department dispatcher or cashier. By working with the dispatcher, he learns how repair orders are routed through the shop, how long it takes to complete different types of repairs, and how to compute repair costs. At the cashier's counter he learns the cost of different types of repairs. He also learns how experienced service advisors handle customer complaints. The beginner usually can become a qualified service advisor in 1 to 2 years, although it may take longer if his duties include estimating automobile body repairs. In addition to on-the-job training, some service advisor trainees attend formal training programs conducted by automobile manufacturers.

For service advisor trainees, employers prefer high school graduates who are over 21 years of age and have work experience in automobile repair or related activities. Employers usually promote young persons from within their own organizations when vacancies for service advisor trainees arise. For example, a young person may apply for a job as service advisor trainee after he has gained experience in the firm as an automobile mechanic trainee or parts counterman trainee. Some firms, however, prefer to hire individuals who are qualified automobile mechanics.

Because he is likely to be the only employee who deals directly with customers, the manner in which the service advisor does his job is very important in establishing customer satisfaction. Therefore, 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 to young persons interested in becoming service advisors.

Service advisors with supervisory ability may advance to shop fore-

men or to service managers. Some service advisors open their own automobile repair shops.

Employment Outlook

Employment of automobile service advisors is expected to increase moderately through the 1970's as a result of the increasing number of automobiles in operation. In addition to the job opportunities resulting from employment growth, a few hundred job openings are expected each year from the need to replace experienced service advisors who retire, die, or transfer to other occupations.

The number of automobiles registered in the United States is expected to grow because of increases in driving age population, consumer purchasing power, and multicar ownership. The growing number of automobiles and their increasing complexity will result in additional repair work; consequently, many automobile dealers will need additional service advisors. Also, some small dealers who presently do not employ service advisors are expected to hire them as the volume of service work increases.

Earnings and Working Conditions

Service advisors employed by automobile dealers in 34 cities had average straight-time hourly earnings of $4.38, based on a survey made in late 1969. Average hourly earnings in individual cities ranged from $3.06 in Richmond, Va., to $5.59 in Los Angeles, Calif.

Many service advisors are paid a salary plus a commission. The commission usually is based on both the cost of repairs and the price of accessories sold. Some service advisors are paid on a straight commission basis. Commission earnings may vary as a result of fluctuations in the volume of repair work.

Many employers provide paid holidays and vacations, and pay all or part of the cost of life insurance, and health and accident insurance. Others also contribute to retirement plans. Laundered uniforms are furnished free of charge by many employers.

Most service advisors work from 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, some advisors may be rushed when waiting on customers.

Service advisors stand much of the time and may be outdoors in all kinds of weather. 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, Chauffeurs, Warehousemen and Helpers of America (Ind.).

Sources of Additional Information

Further information 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.

Independent Garage Owners of America, Inc., 624 South Michigan Ave., Chicago, Ill. 60605.

INSURANCE AGENTS AND BROKERS

(D.O.T. 250.258)

Nature of the Work

Insurance agents and brokers sell policies which protect individuals and businesses against future losses and financial pressures. They also provide their customers with many services related to the insurance they sell. They may, for example, assist in planning the financial protection which best meets the special needs of a customer's family; advise about the types of insurance best suited for the protection of an automobile, home, business establishment, or other property; or help a policyholder in obtaining settlement of an insurance claim.

Three basic types of insurance are available—life, property and liability, and health. Agents and brokers usually sell one or more of these types of insurance. Some agents also sell equity products, such as mutual fund shares. Life insurance policies pay survivors in the event of the policyholder's death; they also may provide annuities, funds for the education of children when they reach college age, and other benefits which the policyholder has arranged in anticipation of a future need for these funds. Property and liability insurance policies protect policyholders from financial losses which they might otherwise incur because 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 an illness or injury.

An insurance agent may be either an insurance company employee or an independent businessman who is under contract to act as the authorized representative of one insurance company or more. A broker occupies a somewhat different position; he is not under contract to any particular company but places the policies he sells with whatever insurance company he feels best meets his clients' needs. In other respects, agents and brokers do much the same kind of work.

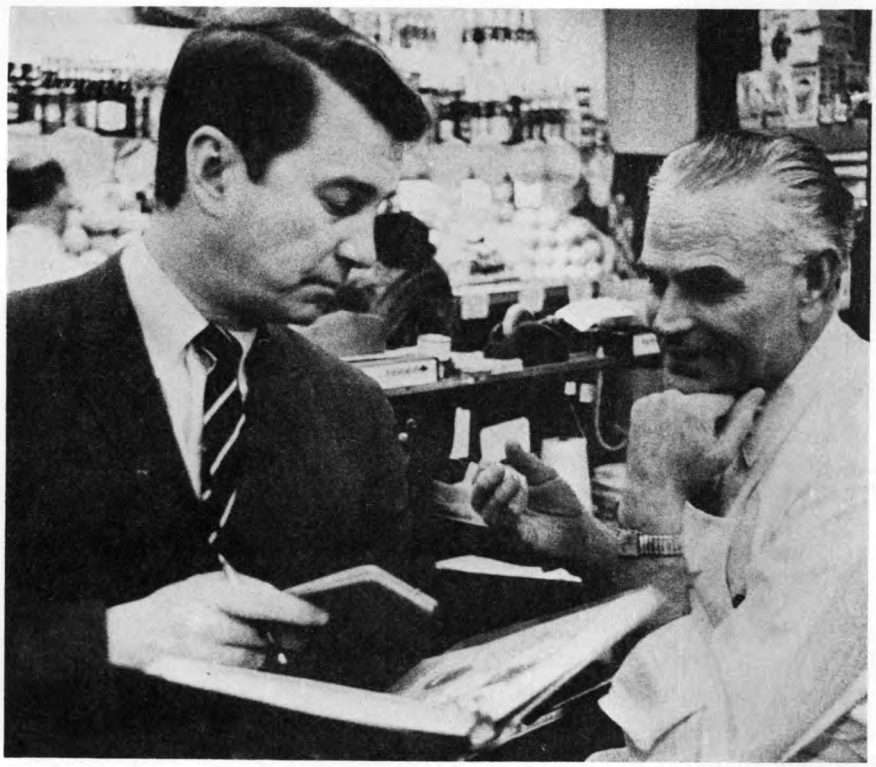
Agents and brokers spend most of their time discussing insurance policies with prospective customers. Some time must be spent in office work—planning insurance programs that are tailored to prospects' needs, preparing reports, maintaining records, and drawing up lists of prospective customers. Salesmen who specialize in group policies may help to incorporate an insurance program into a company's bookkeeping system.

(See chapter on Insurance Occupations for additional information about life and property and liability insurance companies.)

Places of Employment

Of the 350,000 agents and brokers who sold insurance in 1970, about half specialized in life insurance; the remainder, in property and liability insurance. Both groups also sold health insurance. Nine out of ten agents and brokers were men. Many additional agents—both men and women—sold insurance on a part-time basis.

Insurance agents and brokers are employed in all parts of the country, but the greatest number work in large cities.



Training, Other Qualifications, and Advancement

Although employers seldom specify age limits or formal educational requirements, practically all agents hired in recent years have been at least 21 years of age, and more than half of them have had some college training. Many were college graduates. College training, although not essential, may be an aid to the agent in grasping insurance fundamentals and in establishing good personal relationships with prospective clients. Courses in accounting, economics, finance, and business law, as well as courses in insurance subjects, are considered helpful. A liberal arts curriculum is equally desirable in preparing the prospective agent.

Because an agent's or broker's success depends on his sales ability, he must have the initiative to locate new prospects. He also must know insurance fundamentals and be able to explain policy terms clearly. Enthusiasm, self-confidence, and a cheerful personality are valuable.

All insurance agents and most brokers must obtain licenses 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.

Before new agents sell they usually receive training at insurance company home offices or at the agencies and brokerage firms where they will be working. Some insurance companies sponsor classes in sales problems and insurance principles. This instruction may be given over a period of several weeks or a

few months. In other cases, training takes the form of working on the job under the supervision of experienced sales personnel.

Agents and brokers have opportunities to broaden their knowledge of the insurance business by enrolling in intermediate and advanced courses available at many colleges and universities and by attending institutes, conferences, and seminars sponsored by insurance organizations. The Life Underwriter Training Council (LUTC) offers courses in life and health insurance for experienced life agents. A diploma in life insurance marketing is awarded to graduates who successfully complete the Council's 2-year life program. As an agent or broker acquires experience and broadens his knowledge of the life insurance business, he can qualify for the designation Chartered Life Underwriter (CLU) by passing a series of examinations given by the American Society of Chartered Life Underwriters. In much the same way, a property and liability agent, by passing an examination given by the American Institute for Property and Liability Underwriters, Inc., will qualify for the Chartered Property Casualty Underwriter (CPCU) designation. The CLU and CPCU designations are recognized marks of achievement in their respective fields.

Insurance agents who demonstrate sales ability and leadership may be promoted to sales manager positions in district offices or to managerial positions in home offices. A few may advance to top positions as agency superintendents or company vice-presidents or presidents. Many agents who have built up a good clientele prefer to remain in sales work. Some, particularly in the property and liability field, eventually establish their own independent agencies or brokerage firms.

Employment Outlook

Several thousand openings for insurance agents and brokers are expected to arise each year through the 1970's. Some will be new jobs created as employment expands; others will become available as agents and brokers retire or stop working for other reasons. Because the rate of turnover is high among beginners in this occupation, many workers also will be needed to replace insurance agents who enter other types of employment.

During the 1970's, the number of insurance agents and brokers is expected to grow moderately. As population and incomes rise and life expectancy increases, more families will depend on life insurance and on policies that provide protection in the form of retirement income, medical care, and funds for a college education. Expansion in industrial plant and equipment and growth in the number of major consumer purchases, such as homes or automobiles, will contribute to increased sales of property and liability insurance. Despite the expected increase in the number of policies issued, however, insurance selling will remain keenly competitive as more insurance is sold to groups or by mail and as electronic data processing relieves agents of 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 up a clientele. Thereafter, most agents are paid on a commission basis. The size of the commission varies, depending on the type and amount of insurance sold, and on whether the transaction involves a new policy or the renewal of a policy already in force. After a few years, an agent's commissions on new policies sold and on renewals may range from $8,000 to $20,000 annually. A number of established and highly successful agents and brokers earn $30,000 a year or more.

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 spend more than the customary 40 hours a week on the job.

Sources of Additional Information

General occupational information about insurance agents and brokers may be obtained from the home office of many life insurance and property and 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 may be obtained from:

Institute of Life Insurance, 277 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 and 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., 96 Fulton St., New York, N.Y. 10038.

MANUFACTURERS' SALESMEN

(D.O.T. 260. through 289.458)

Nature of the Work

Practically all manufacturers—whether they make electronic computers or can openers—employ salesmen. Manufacturers' salesmen sell mainly to other businesses—factories, railroads, banks, wholesalers, and retailers. They also sell to hospitals, schools, and other institutions.

Most manufacturers' salesmen sell nontechnical products. Salesmen in this kind of work must be well informed about their firms' products and also about the special requirements of their customers. When a salesman visits firms in his territory, he uses an approach adapted to his particular line of merchandise. Thus, a salesman of crackers or cookies emphasizes the wholesomeness of his products, their attractive packaging, and the variety. Sometimes salesmen promote their products by displays in hotels and conferences with wholesalers and other customers.

A salesman of highly technical products, such as electronic equipment, often is called a *sales engineer* or an *industrial salesman*. In addition to having a thorough knowledge of his firm's products, he must be able to help prospective buyers with technical problems. For example, he may spend days or weeks analyzing a firm's manufacturing problems to determine the kinds of equipment and materials best suited to its operation. He then presents his solution to company officials and tries to negotiate the sale. Often, sales engineers work with the research and development departments of their own companies in devising ways to adapt products to a customer's specialized needs. Salesmen of 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' salesmen spend most of their time visiting prospective customers, they also do some paperwork including reports on sales prospects in their territories or customers' credit ratings. In addition they must plan their work schedules, compile lists of prospects, make appointments, conduct some sales correspondence, and study literature relating to their products.

Places of Employment

Over 500,000 manufacturers' salesmen were employed in 1970; about 45,000 were sales engineers. Some manufacturers' salesmen 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 salesmen work for companies that produce food products than for any other industry. Other industries that employ large numbers of salesmen include printing and publishing, chemicals, fabricated metal products, and electrical and other machinery. The largest employers of sales engineers produce heavy machinery, transportation equipment, fabricated metal products, and professional and scientific instruments. About 10 percent of all manufacturers' salespeople are women, most of whom are employed in industries producing food products.

Training, Other Qualifications, and Advancement

Although high school graduates can be successful manufacturers' salesmen, college graduates increasingly are preferred as trainees.

Manufacturers of nontechnical products often prefer college graduates who have a degree in liberal arts or business administration. Training at a college of pharmacy usually is required for jobs as drug salesmen. A salesman of complicated equipment needs a technical education. For example, 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 presented elsewhere in the *Handbook*.)

Although many prospective salesmen are hired at the sales offices of manufacturing concerns, representatives of manufacturers sometimes recruit college seniors who are well qualified academically and have participated in extra-curricular activities. A pleasing personality and appearance and the ability to meet and get along well with many types of people are important. Since salesmen may have to walk or stand for long periods of time or carry product samples, physical stamina is necessary. As in most selling jobs, arithmetic skills are an asset.

Beginning salesmen are given specialized training before they start on the job. Some companies, especially those manufacturing complex technical products, have formal training programs lasting 2 years or longer. In some of these programs, trainees are rotated among jobs in several departments of the plant and office to learn all phases of production, installation, and distribution of the product. Other trainees receive formal class instruction at the plant, followed by intensive on-the-job training in a branch office under the supervision of field sales managers.

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 industry are filled by men who started as salesmen.

Because of frequent contact with businessmen in other firms, salesmen often transfer to better jobs. Some salesmen go into business for themselves as manufacturers' agents selling similar products of several manufacturers. Experienced salesmen often find opportunities in advertising, market research, and other fields related to selling.

Employment Outlook

Employment opportunities for manufacturers' salesmen are expected to be favorable during the 1970's. Several thousand openings will occur annually as employment in this occupation rises and as existing jobs become vacant because of retirements or deaths. Still other vacancies will occur as salesmen leave their jobs to enter other types of employment.

The number of manufacturers' salesmen is expected to rise moderately due to general economic growth and the greater emphasis manufacturers will be placing on their sales activities. The development of new products and improved marketing techniques probably will heighten competition among the manufacturers. Because of the increase in the volume of business transacted with some customers—modern industrial complexes, chain store organizations, and large institutions of many kinds—competition among the manufacturers supplying these organizations will intensify the need for effective sales organizations. Despite the filling of thousands of sales jobs each year, manufacturers are expected to be selective in hiring. They will look for ambitious young people who are both well trained and temperamentally suited for their jobs. As markets for technical products expand, demand for trained salesmen is likely to be particularly strong.

Earnings and Working Conditions

According to limited data, starting salaries for beginning salesmen averaged about $8,500 a year in 1970. By including commissions and bonuses most salesmen earned more than this amount annually. 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 salesmen a straight commission, based on their dollar amount of sales; others pay a fixed salary. The majority, however, use a combination plan: salary and commission, salary and bonus, or salary-commission and bonus. Commissions vary according to the salesman's efforts and ability, the commission rate, location of his sales territory, and the type of product sold. Bonus payments may be contingent upon the individual salesman's performance, that of all salesmen in his group or district, or upon

the company's sales performance. Some firms pay annual bonuses; others offer them as incentive payments on a quarterly or monthly basis. In 1970, many experienced salesmen earned between $16,000 and $32,000 annually; some earned considerably more.

Some manufacturers' salesmen have large territories and do considerable traveling. Others usually work in the neighborhood of their "home base." For example, a salesman of heavy industrial equipment may be assigned a territory covering several States and often may be away from home for days or weeks at a time. On the other hand, a salesman of food products may work in a small area and commute from home.

When on business trips, salesmen are reimbursed for expenses such as transportation and hotels. Some companies provide a car or pay a mileage allowance to salesmen who use their own cars.

Salesmen call at the time most convenient to customers and may have to travel at night or on weekends. Frequently, they spend evenings writing reports and planning itineraries. However, some salesmen plan their schedules for time off when they want it. Most salesmen 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' salesman, write to:

Sales and Marketing Executives International, Student Education Division, 630 Third Ave., New York, N.Y. 10017.

REAL ESTATE SALESMEN AND BROKERS

(D.O.T. 250.358)

Nature of the Work

Real estate salesmen and brokers are at the center of most property transactions. They represent property owners who want to sell and find potential buyers for residential and commercial properties. Salesmen and brokers also may be called *real estate agents,* or if they are members of the National Association of Real Estate Boards, *"Realtors."*

Salesmen are employed by brokers to show and sell real estate; some handle rental properties. Brokers are independent businessmen who not only sell real estate but sometimes rent and manage properties, make appraisals, arrange for loans to finance purchases, and develop new building projects. In addition, brokers manage their offices, advertise properties, and handle other business operations. Some combine other work, such as selling insurance or practicing law, with their real estate business.

Most real estate salesmen and brokers sell residential property, and sometimes specialize in homes within a certain price range or in a particular area of the city. A few, usually those in large real estate firms, specialize in commercial, industrial, or other types of real estate. Each specialty requires knowledge of the particular type of property. For example, salesmen who specialize in commercial sales or leasing must understand leasing practices, business trends, and location needs. Salesmen selling or leasing industrial properties must be able to supply information on transportation, utilities, and labor supply. Salesmen who handle farm properties must have considerable knowledge of soil types, water supply, drainage, and transportation facilities.

An important duty of a real estate salesman is obtaining "listings" (getting owners to place properties for sale with the firm). A salesman spends much time on the telephone, seeking such listings and answering inquiries about properties. He obtains leads for listings through advertising and personal contact.

A real estate salesman spends much time away from his office showing and discussing properties with prospective buyers. When a

number of houses are for sale in a new development, the salesman may operate from a model home. He explains special features which meet particular needs of the prospective buyer (or renter) such as location of schools and churches and public transportation. For business property, he may discuss the income potential, zoning, and community facilities. He also must be familiar with tax rates and insurance. He must try to meet the buyer's needs at the same time that he follows the seller's instructions. In closing the sale, the broker often arranges for a loan, title search, and a meeting when details of the transaction are agreed upon and the new owner takes possession of the property.

Places of Employment

The number of people whose main occupation was selling real estate in 1970 is estimated at about 225,000; about three-fifths were men. A large number of people also sold real estate part time. The total number of men and women licensed to sell was more than 900,000 in 1969, according to the National Association of Real Estate License Law Officials.

Most real estate salesmen work for small business establishments; a few, in metropolitan areas, work for firms having large sales staffs. Brokers generally are self-employed. Although salesmen and brokers are found in every part of the country, they are concentrated in large urban areas and in smaller but rapidly growing communities.

Training, Other Qualifications, and Advancement

A license is required to work as a real estate salesman or broker in every State and in the District of Columbia. All States require prospective agents to pass written examinations that generally include questions on the fundamentals of real estate transactions and on laws affecting the sale of real estate. The examination is more comprehensive for brokers than for salesmen. In more than three-fifths of the States, candidates for the broker's license also must have a specified amount of experience as a real estate salesman or the equivalent in related experience or education (generally from 1 to 3 years). State licenses usually can be renewed annually without reexamination.

Although a specified amount of education seldom is required, employers prefer to hire persons who have at least a high school education. A broad academic program in high school including courses such as English, mathematics, salesmanship, architectural drawing, business law, economics, and public speaking is helpful for those planning a career in real estate. Most real estate 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.

Characteristics important for success in selling real estate include a pleasing personality, honesty, and a neat appearance. Dealing with prospective customers requires maturity and tact as well as enthusiasm for the job. Agents also should have a good memory for names and faces and business details such as prices and zoning regulations.

Young men and women interested in beginning jobs as real estate salesmen often apply to brokers in their own communities, where their knowledge of local neighborhoods is an advantage. The beginner usually works under the direction of an experienced salesman or broker to learn the practical aspects of his job.

Training opportunities are available for beginners and experienced agents; many firms offer formal training programs for salesmen. At some of the more than 360 universities, colleges, and junior colleges which offer courses in real estate, a student can earn an associate's or bachelor's degree with a major in real estate; some offer advanced degrees. Many local real estate boards that are members of the National Association of Real Estate Boards (NAREB) sponsor courses in subjects such as real estate fundamentals and legal aspects of real estate. Advanced courses in appraisal, mortgage financing, and property development and management also are available through various NAREB affiliates.

Salesmen who have experience and training can advance in many large firms to sales or general manager. Licensed brokers may open their own offices. Training and experience in estimating the value of property can lead to work as a real estate appraiser. Persons familiar with operating and maintaining rental properties may specialize in property management. Those who gain wide 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

Several thousand openings for real estate salesmen are expected to arise each year during the 1970's. Some will be new positions created

by the need for more salesmen to serve a growing population. Most, however, will be openings resulting from turnover. Because the average age of real estate salesmen and brokers is considerably higher than that of workers in most occupations, death and retirement losses are high. In addition, a relatively large number of agents—many of them beginners—transfer to other types of work.

Many openings are likely to be filled by mature workers, including persons who transfer from other kinds of sales work. The proportion of salesmen employed part time may decline, as State licensing requirements change and more specialized knowledge is necessary for the agent who handles real estate transactions.

Employment of real estate salesmen and brokers is expected to rise moderately during the 1970's, when the many young people born after World War II will be purchasing or renting their own homes. Among other factors contributing to a growing need for agents are the expected expansion in residential and commercial construction due to an increasing population, migration to metropolitan areas, and urban renewal. Although this field is likely to remain highly competitive, it should offer many career opportunities to persons with an aptitude for selling.

Earnings and Working Conditions

Commissions on sales are the usual source of earnings for most real estate salesmen and brokers. A few are paid on a straight salary basis, although this is the exception rather than the rule. Commissions paid on the sale of farm and commercial properties and unimproved land usually are higher than those on the sale of a home.

Commissions on the sale of properties may be shared by several employees of a real estate firm. Often, when a sale is made, a commission is paid to the salesman who obtained the listing of the property. The rest of the commission either is retained by the broker who made the sale, or shared by the broker and the agent who handled the transaction. An agent's share of the commission varies greatly from one real estate firm to another; frequently it is about half of the commission.

Many full-time real estate agents earn between $7,000 and $12,000 a year, according to the limited data available. Beginners usually earn less. At the other extreme, many experienced salesmen earn $20,000 or more a year.

Income usually increases as an agent gains experience, but earnings also are affected by factors such as individual ability, economic conditions, and the type and location of property. Salesmen 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. A few weeks or even months may go by without a sale. For this reason, some firms pay salesmen a "draw" against future commissions. However, because this practice is not usual with beginners, most new salesmen should have money to support themselves until their commissions increase.

Brokers provide office space, but salesmen are expected to furnish their own automobiles. Although salesmen and brokers have much independence in planning their schedules, often they work in the evenings and during weekends to meet the convenience of customers.

Some salesmen, especially those who work for large firms, are furnished group life, health, and accident insurance.

Sources of Additional Information

Information on licensing requirements for real estate salesmen and brokers is available from the real estate commission or board located in each State capital. This information also can be obtained from most local real estate organizations. Many States can furnish manuals that help applicants prepare for the required written examinations.

Additional information on opportunities in the real estate field, and a list of colleges and universities offering real estate courses may be obtained by writing to:

National Association of Real Estate Boards, Department of Education, 155 East Superior St., Chicago, Ill. 60611.

RETAIL TRADE SALESWORKERS

(D.O.T. 260. through 298.877)

Nature of the Work

The success of any retail business depends largely on its salespeople. Courteous and efficient service from behind the counter or on the sales floor does much to satsify customers and to build a store's reputation. Although contact with customers is a part of all sales jobs, the duties, skills, and responsibilities of salespeople are as different as the kinds of merchandise they sell.

In selling items such as furniture,

electrical appliances, or some types of wearing apparel, the salesworker's primary job is to create an interest in the merchandise the store has to offer. The salesman or saleswoman may answer questions about the construction of an article, demonstrate its use, explain how it is cared for, show various models and colors, and otherwise help the customer make a selection. In some stores, special knowledge or skills may be needed to sell the merchandise carried.

In a pet shop, for example, the salesworker should know about the care and feeding of animals. People who sell standardized articles, such as many of the items in hardware and drugstores, are called upon less frequently to give customers this kind of assistance. Often, they do little more than assemble and wrap the items purchased by each customer. (In supermarkets and some drugstores cashiers wrap or bag purchases, receive payments, and make change. See statement on Cashiers.)

In addition to selling, most retail salespeople make out sales or charge slips, receive cash payments, and give change and receipts. They also handle returns and exchanges of merchandise for the customer. Salespersons usually are responsible for keeping their work areas neat and presentable. In small stores, they may assist in ordering merchandise, stocking shelves or racks, marking price tags, taking inventories, preparing attractive merchandise displays, and promoting sales in other ways. (Route salesmen, who sell bread, milk, and other products directly to customers on a regular route, are discussed in the chapter on Driving Occupations.)

Places of Employment

In 1970, about 2.5 million salespersons—three-fifths of them women—were employed in retail businesses. They worked in stores that range in size from the small drug or grocery store, employing only one part-time salesclerk, to the giant department store having hundreds of salesworkers. They also worked for door to door sales companies and mail-order houses. The largest employers of retail salesworkers are department and general merchandise, food, and apparel and accessories stores. Men predominate in stores selling furniture, household appliances, hardware, farm equipment, shoes, and lumber, and in automobile dealerships. (See statement on Automobile Salesmen elsewhere in the *Handbook*.) Women outnumber men in department and general merchandise, variety, apparel and accessories, and in drugstores.

Sales jobs are found in practically every community in all parts of the country. Most salespersons, however, work in large cities and in heavily populated suburban areas.

Training, Other Qualifications, and Advancement

Employers generally prefer to hire high school graduates for sales jobs. Subjects such as salesmanship, commercial arithmetic, and home economics help to give the student a good background for many selling positions. Some high schools have

distributive education programs including courses in merchandising and principles of retailing and retail selling. Many programs also provide an opportunity for students to gain practical experience under trained supervision by working part time in local stores. Such part-time selling experience may be helpful in obtaining full-time employment.

Young people interested in obtaining sales jobs may apply to the personnel offices of large retail establishments. Applicants are interviewed and sometimes given special tests that measure their aptitude for sales work. Employers prefer persons who enjoy working with people and have the tact to deal with different personalities. Among other desirable characteristics are a pleasing personality, an interest in sales work, a neat appearance, and the ability to communicate clearly. Prospective salespersons also should be in good general health and able to stand for long periods of time. Arithmetic skills are an asset for salesworkers who calculate prices and make change.

In many small stores, an experienced employee or the proprietor gives newly hired sales personnel on-the-job instructions in making out sales slips and operating the cash register. In large stores, training programs are likely to be more formal, and beginners may be given specialized training to sell certain products.

Executive positions in large retail businesses often are filled by promoting college graduates originally hired as trainees and assigned sales jobs to gain practical experience. However, retail selling is one of the few fields in which an employee who has initiative and ability may be selected for promotion, regardless of his education. Many stores offer opportunities for persons without a college degree to advance to executive positions. Some salespersons eventually become buyers, department managers, or store managers. Others, particularly in large stores, may transfer to office positions that afford opportunities for further promotion to administrative work in areas such as personnel or advertising. Opportunities for advancement are relatively limited in small stores where one person, often the owner, performs most managerial functions. Retail sales experience may be an asset in qualifying for jobs such as selling for wholesalers or manufacturers.

Employment Outlook

The number of salesworkers employed in retail trade is expected to increase slowly through the 1970's. However, openings created by growth and vacancies that must be filled as salespersons retire or stop working for other reasons are expected to number in the tens of thousands each year; additional thousands of jobs will become available as retail salesworkers transfer to other types of employment.

Among the major factors contributing to the anticipated rise in retail sales jobs are population and economic growth, and the resulting increase in the volume of sales. The trend for stores to remain open for longer hours, while the number of weekly hours worked by salespersons continues to decline, also will contribute to the need for more salespersons. In addition to full-time sales 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.

Changes in the way goods are sold are likely to limit the number of salesworkers in some types of stores, and affect the kinds of openings that occur in others. Because self-service—already the rule in most food stores—is being extended rapidly to drug, variety, and other kinds of stores, customers will purchase more articles without the help of salesworkers. On the other hand, rising income levels probably will increase the demand for some merchandise that requires the salesperson to spend a good deal of time with each customer. Two examples are electrical appliances and automobiles, which prospective customers may want demonstrated. In view of these developments, sales employment probably will increase more slowly than the volume of sales. Little of the increase is likely to be in routine sales jobs; much of the demand will be for workers who are skilled in salesmanship and well informed about the merchandise they sell.

Some retail salesworkers have more stable employment than workers in many other occupations. When retail sales are affected by downturns in the economy, employers—particularly in large stores—can reduce the number of employees by not filling vacancies that result from turnover or by eliminating some part-time jobs. Competition for sales jobs tends to increase when other jobs are scarce, however, because workers in other occupations often can qualify for sales work.

Earnings and Working Conditions

In 1970, young people starting in routine jobs where they were required to do little more than "wait on" customers generally were paid $1.60 an hour (in many establishments, the minimum wage required

by law). In stores where salesmanship is more important, starting salaries sometimes were higher than this; in small establishments not covered by the minimum wage law, they were somewhat lower. Salaries usually are lower in rural than in metropolitan areas.

Experienced salesworkers, including those whose pay scales are determined by union contracts, often earn $3 an hour or more. Many are paid on a straight salary basis; some also receive commissions—that is, a percentage of the sales they make; and still others are on a straight commission basis. 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.

Salespersons in many retail stores are allowed to purchase 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 employee benefits such as life insurance, retirement, hospitalization, and surgical and medical insurance.

Some full-time salespersons work a 5-day, 40-hour week, although in many stores, the standard workweek is longer. Some stores are required by law to pay overtime rates for more than 40 hours' work a week. Since 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 salespersons regularly work one evening a week or more, especially those employed by stores in suburban shopping centers.

Part-time salespersons generally work during the store's peak hours of business—daytime rush hours, evenings, and weekends.

Salespeople in retail trade usually work in clean, well-lighted places and many stores are air conditioned. Some sales positions, however, require work outside the store. A salesman of kitchen equipment may visit prospective customers at their homes, for example, to assist them in planning renovations, and a used-car salesman may spend much of his time working 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.

SECURITIES SALESMEN

(D.O.T. 251.258)

Nature of the Work

When an investor buys or sells stocks, bonds, or shares in mutual funds, he does so through a securities salesman who puts the "market machinery" into operation. A salesman's services are required both by the individual having a few hundred dollars to invest and by the large institution investing millions. Securities salesmen are often called *customers' brokers, registered representatives,* or *account executives.*

In executing a buy or sell transaction, a securities salesman relays the order through his firm's order room to the floor of a securities exchange. In the over-the-counter market, he sends the order to his firm's trading department and notifies the customer when the transaction is completed. He also provides many kinds of related services for his customers. To an inexperienced investor, for example, he may explain the meaning of stock market terms and trading practices. For customers having a variety of holdings, the salesman may offer suggestions about the purchase or sale of a particular security. Customers' investment objectives vary. An individual may prefer long-term investments designed to provide a steady income over the years or short-term investments which appear likely to rise in price quickly. Salesmen, therefore, may be called on to furnish information about the advantages and disadvantages of each type of investment. Salesmen often are expected to furnish the latest stock and bond quotations as well as information re-

garding the activities and financial positions of corporations.

Salesmen may serve all types of customers or specialize in only one type such as institutional investors. They also may specialize in certain kinds of securities. For example, a salesman may handle only transactions in municipal bonds or only shares in mutual funds. If his employer underwrites "new issues," such as the corporation securities issued for plant expansion funds, he may take part only in the initial sale of these new securities.

Establishing a clientele is very important to the new securities salesman's success. In the beginning, he may spend much of his time contacting potential investors and former customers of his firm, or seeking new customers in other ways. On the other hand, an experienced salesman may spend most of his time servicing the accounts of established customers.

Places of Employment

In 1970, about 200,000 men and women sold securities. Most were full-time employees of securities firms—salesmen, partners, and branch office managers. Others were regularly employed in jobs outside the securities business; most of these persons sold shares in mutual funds or variable annuities (contracts yielding periodic payments that fluctuate with the value of securities or other variable factors). Over one-third of all securities salesmen work part time; the majority are men.

Securities salesmen are employed by hundreds of brokerage firms, investment bankers, and mutual fund firms in all parts of the country. Many of these firms are very small. Most salesmen, however, work for a relatively small number of large firms that operate main offices located in big cities (especially in New York City), and approximately 7,000 branch offices in other areas.

Training, Other Qualifications, and Advancement

Because a securities salesman must be well informed about economic conditions and trends, a college education is becoming increasingly important for applicants in this field. Although employers seldom require specialized training, a degree in business administration, economics, or liberal arts is regarded as good preparation. Courses in finance and other subjects related to the securities business, available at colleges and universities throughout the country, also are helpful.

Almost all States require securities salesmen to be licensed. State licensing requirements vary. The applicant may have to furnish a personal bond or pass written examinations.

In addition, practically every salesman must be registered as a representative of his firm according to regulations of the securities exchange or exchanges where it transacts business, or the National Association of Securities Dealers, Inc. (NASD), or both. Before beginning salesmen can qualify as registered representatives, they must pass the Securities and Exchange Commission's General Securities Examination, or examinations prepared by the exchanges and/or the NASD. These test the prospective salesman's knowledge of the securities business. Character investigations also are required.

Most employers provide training to assist their salesmen in meeting the requirements for registration. In many firms, including all members of the New York Stock Exchange, the training period equals at least 6 months. In large firms, training programs are sometimes quite elaborate. Trainees may receive classroom instruction in subjects such as 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. Other training programs, particularly in small firms, may be relatively informal and brief. In programs of the latter type, the trainee may read assigned materials and observe other salesmen as they transact business.

Many employers consider personality traits as important as academic training in specialized fields. Employers seek applicants who are well groomed, who possess the ability to deal with people, and who are ambitious and have a sense of responsibility. Because maturity and the ability to work independently also are important, many employers prefer prospective salesmen to have previous experience in other jobs. Before being hired, applicants are sometimes given tests to determine their aptitude for this kind of sales work.

The principal form of advancement for securities salesmen is an increase in the number and the size of the accounts they handle. Although a beginner usually starts by servicing the accounts of individual investors, eventually he may handle very large accounts such as those of institutional investors. Some experienced salesmen may advance to positions as branch office managers, who supervise the work of other salesmen while executing buy and sell orders for their own customers. A few salesmen may become part-

ners in their firms or perform other administrative work.

Employment Outlook

Employment of securities salesmen is expected to increase moderately during the 1970's. Some new positions will be created to serve the growing number of individuals and institutions investing money in securities of all kinds. Most positions, however, will be vacancies that occur as salesmen retire or leave the occupation for other reasons. The number of beginners who leave the occupation tends to be high because of the difficulty new salesmen have in establishing a clientele.

Several factors should contribute to expanding employment opportunities for securities salesmen over the next decade. Both the number of individual investors and the funds they have to invest will continue to increase as a result of economic growth, rising personal incomes, and a number of other factors. The latter include interest stimulated by the activities of investment clubs and associations, plans enabling small investors to make minimum monthly payments toward the purchase of securities, and the increasing need for parents to set aside funds for their children's education and their own retirement. Institutional investors also can be expected to have more funds for investment in the future as more people purchase insurance; participate in pension plans; contribute to the endowment funds of colleges, universities and other nonprofit institutions; and deposit their savings in banks. Many more securities salesmen will be needed also to sell new securities issued by expanding corporations and by State and local governments financing construction of new roads and other public improvements.

Earnings and Working Conditions

Trainees are usually paid a salary until such time as they are able to meet licensing and registration requirements. After registration, a few firms continue to pay a salary until the new salesman's commissions increase to a minimum amount. The salaries paid during the training period usually range from $400 to $500 a month; brokers employed in large firms receive somewhat higher salaries. Factors which help determine salary during the training period include locality of the firm, the individual's educational background, and his experience.

Once the salesman has completed his training, earnings are usually in the form of commissions from customers' sale and purchase of securities. Size of the commission depends partly on the policies of the firm, partly on the type of security bought or sold, and also on whether it was traded on a stock exchange or in the over-the-counter market. Commission earnings may fluctuate because of extremes in market activity. Earnings are likely to be high when there is much buying and selling and lower when there is a severe slump in market activity. To provide their salesmen with a steady income, most firms pay a "draw against commission"—that is, a minimum salary based on the commissions which salesmen can be expected to earn—plus commissions from additional sales. A few firms pay salesmen only salary and bonuses, usually determined by company business.

Earnings of securities salesmen working full time generally ranged between $8,000 and $17,000 a year in 1970, according to the limited data available. Many successful

salesmen have incomes over $25,000 a year, however. Salesmen paid on a commission basis may receive annual bonuses when business is good.

A securities salesman works in an office which is the scene of much activity. In large offices, rows of salesmen generally sit at desks in front of "quote boards" and wall screens, which continually flash information on securities transactions and prices. Most offices provide seats so that customers and other persons may watch the latest market developments.

Although securities salesmen usually are not required to observe fixed hours of work, many work approximately the same hours as others in the business community. Some also must adjust their time to accommodate those customers who can meet with them only outside business hours—for example, at home in the evenings or on weekends.

Sources of Additional Information

Further information about the work of securities salesmen in firms that are members of the New York Stock Exchange and about the nature of the securities business is available from:

New York Stock Exchange, 11 Wall St., New York, N.Y. 10005.

Information about the investment banking business and sales positions with investment bankers may be obtained from:

Investment Bankers Association of America, 425 13th St. NW., Washington, D.C. 20004.

WHOLESALE TRADE SALESWORKERS

(D.O.T. 260. through 289.458)

Nature of the Work

Salesworkers in wholesale trade play an important part in moving goods from the factory to the consumer. Each salesman may represent a company 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 drug, variety, and other 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, the salesman visits buyers for retail, industrial, and commercial firms, as well as those for institutions such as schools and hospitals. He shows them samples, pictures, or catalogs listing the items his company stocks. The salesman seldom urges customers to purchase any particular product, since he handles a very large number of items; his objective is to persuade buyers to become regular customers. His success depends upon prompt and dependable service to keep customers well supplied.

Wholesale salesmen render a variety of special services that are becoming increasingly important. Retailers sometimes depend on them to check the store's stock and order items that will be needed before the next visit. Some wholesale salesmen assist store personnel in applying electronic data processing systems

to their ordering and inventory tasks.

In addition, they often advise retailers about advertising, pricing, and arranging window and counter displays. A salesman of specialized products, such as air-conditioning equipment, may give technical assistance on installation and maintenance.

Salesmen are responsible for some paperwork and other details. They must forward orders to the wholesale house, prepare reports and expense accounts, plan their work schedule, compile lists of prospects, make appointments, and study literature relating to their products. Some salesmen collect money for their companies.

Places of Employment

About 540,000 salespeople, mostly men, worked for wholesalers in 1970. Wholesale houses are located mainly in cities, but the territories assigned to salesmen may be in any part of the country. This territory may cover a small section of a city having many retail stores and industrial users; however, in less populated regions it may cover half a State or more.

Companies that sell foods and food products are leading employers of wholesale salesmen. Other large employers are wholesalers dealing in drugs, dry goods and apparel, motor vehicle equipment, and electrical appliances. Many salesmen also work for establishments selling machinery and building materials to industrial and business firms.

Training, Other Qualifications, and Advancement

In hiring trainees for sales work, most wholesalers seek young persons who are outgoing and neat in appearance. Other traits include self-confidence, enthusiasm for the job, and an 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 selling technical and scientific products prefer men who have specialized training beyond high school. In some cases, an engineering degree is required.

Prospective salesmen 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, for example, a new salesman 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 sales-work without further training.

The high school graduate may begin his career with a wholesale firm in a nonselling job, or he may be hired as a sales trainee. In either case, the beginner usually works in several kinds of nonselling jobs before being assigned as a salesman. He may begin in the stockroom or shipping department to become familiar with the thousands of items the wholesaler carries. Later he may learn the prices of articles and discount rates for goods sold in quantities. Next, he is likely to become an "inside salesman," writing telephone orders. In this job and later as he accompanies an experienced salesman on calls, the trainee comes to know some of the firm's customers. The time spent in these initial jobs varies among companies; usually it takes 2 years or longer to prepare the trainee for outside selling. After he has become familiar with the company's products and techniques of selling, he is assigned a territory.

Experienced salesmen who have leadership qualities and sales ability may advance to supervisor, sales manager, or another executive position.

Employment Outlook

Employment opportunities for salesworkers in wholesale trade are expected to be good through the 1970's. In addition to new positions created as a result of growth, thousands of openings will occur each year as salesmen retire, die, or transfer to other kinds of work; turnover among newly-hired salesworkers is high.

The number of wholesale salesworkers is expected to rise rapidly as business increases due to population expansion and economic growth. Although the computer will relieve wholesale salesmen of some duties, an increasing proportion of their time will be spent rendering special services to customers.

As chain stores and other large firms centralize their 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 salesmen earned around $9,000 a year in 1970. Experienced salesmen averaged $15,000 annually, and many earned considerably more.

Most employers pay a salary plus a percentage commission on sales; others pay a straight commission. Practically all wholesale salesmen have steady, year-round work. However, their sales (and their commissions) vary from month to month because demand for some products—for example, air conditioners—is greater during certain seasons. To provide salesmen with a steady income regardless of sales, many companies pay experienced salesmen a "draw" against the commissions they can expect to earn annually. Most companies furnish each salesman a car or allowance if he uses his own car, and reimbursement for certain expenses on the road.

The salesman often works long, irregular hours. Although he calls on customers during business hours, he may travel at night or on weekends to meet his schedule. However, most salesmen seldom are away from home for more than a few days at a time. They may spend many evenings writing reports and orders. Salesmen generally carry

heavy catalogs and sample cases and are on their feet long periods of time.

Depending on length of service with their employers, most salesmen 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-Distributors, 1725 K St. NW., Washington, D.C. 20006.

Sales and Marketing Executives International, Student Education Division, 630 Third Ave., New York, N.Y. 10017.

SERVICE OCCUPATIONS

Workers in service occupations police streets, serve food, put out fires, clean homes and buildings, and, in numerous other ways, provide services to the American people. The more than 9.7 million service workers who were employed in 1970 included a wide range of occupations such as babysitters, policemen, cooks, hospital attendants, golf caddies, theatre ushers, barbers, and cleaning women. The major groups of service workers are discussed below:

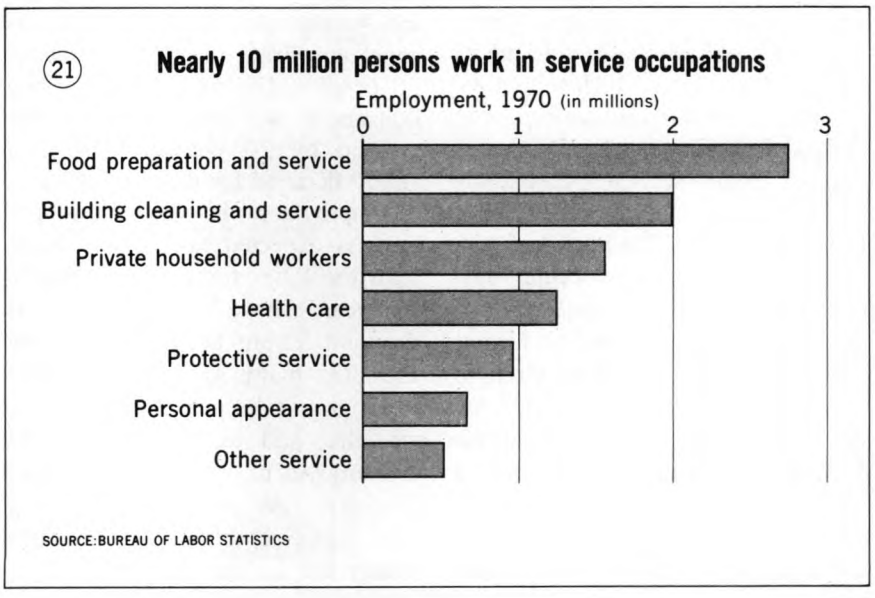
Occupations related to food preparation and service. In 1970, more than 2.7 million people, or approximately three-tenths of all service workers, were employed in this group which includes occupations such as cooks and chefs, kitchen workers, waiters and waitresses, counter and fountain workers, and bartenders. These workers are employed in hotels, restaurants, and other institutions, such as hospitals, schools, and plant cafeterias.

Building cleaning and servicing occupations. The nearly 2 million persons employed to clean and provide other services in buildings made up the second largest group of service workers in 1970. This group includes workers in occupations such as janitors, charwomen, chambermaids, and elevator operators.

Private household workers. About 1.5 million people were employed as private household workers in 1970. Altogether they made up the third largest group of service workers and constituted almost one-fifth of all service worker employment. Private household workers perform tasks that are familiar to all homemakers. They prepare and serve meals, make beds, do cleaning and laundering, take care of children, and perform other household duties as well. (This chapter includes a detailed statement covering private household workers.)

Protective service workers, another large group of service workers, are needed to help safeguard lives and property. More than 950,000 workers, or one-tenth of all service workers, were employed in protective service occupations in 1970. The majority of these workers are policemen, guards, or firemen. Policemen and detectives together account for more than one-third of the total number of protective service workers. 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 workers, are employed chiefly by private companies to protect their property and enforce company rules and regulations. Some guards and watchmen are employed in jails, prisons, and other government establishments. Firemen, also a significant group of protective service workers, are employed mainly by city governments. The remaining protective service workers are sheriffs and bailiffs, crossing watchmen and bridge tenders, and marshals and constables. This chapter includes separate statements for FBI special agents, police officers (local government), State police officers, firefighters, and guards and watchmen.

The remaining service workers —those concerned with providing health care, grooming and personal services, and people in occupations related to entertainment and leisure time activities—accounted for about 2.5 million workers. More than 1 million were employed in health service occupations, which include workers such as hospital attendants and nurse aides. Service occupations concerned with grooming and personal services, such as barbers and cosmetologists, provided employment for over 800,000 workers. Nearly 100,000 workers were em-



ployed in occupations related to entertainment. This group includes occupations such as ski instructors, ushers, and check room attendants. All other service workers, nearly 300,000, were in occupations such as airline stewardess and travel guide.

Some of the occupations mentioned briefly in this introduction are described in greater detail later in this chapter. They are cook and chef, waiter and waitress, bartender, hospital attendant, barber, and cosmetologist. Other personal service occupations, including the airline stewardess, hotel bellman, human services aide, and hotel housekeeper and assistant, are discussed 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.

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. Still other service workers, including store and hotel detectives and travel guides, should possess good judgment and 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. Advancement from service occupations that require little specialized training or skill may be difficult, however, particularly for young people without a good basic education and some knowledge of the business in which they are employed.

Employment Trends and Outlook

For many years, the number of workers in service occupations has been growing at about the same rate as the labor force as a whole. Between 1960 and 1970, both increased by about 20 percent. Among service workers, health service employment increased by nearly two-thirds since the early 1960's. Employment in food services has risen by about one-fourth; and entertainment services, food services, protective services, and personal appearance services by about 20 percent. Employment of private household workers, however, decreased by 20 percent, despite a strong demand for their services.

Employment in service occupations is expected to increase faster than the labor force as a whole in the years ahead as income levels rise and leisure time increases. By 1980, as many as 4 million more workers may be providing the services that add to people's comfort and enjoyment and protect life and property. As total employment rises, however, different occupations within the service group are likely to be affected quite 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 rendering professional and personal services; beauty operators; and cooks, waiters, and others who prepare and serve meals outside private homes. Some of the factors responsible for their growth are the added medical care related to the increase in population, especially the number of older people; the greater need to protect life and property as urbanization continues and cities become more crowded; and the more frequent use of restaurants, beauty parlors, and other services by families and individuals as income levels rise and as an increasing number of housewives take jobs outside the home.

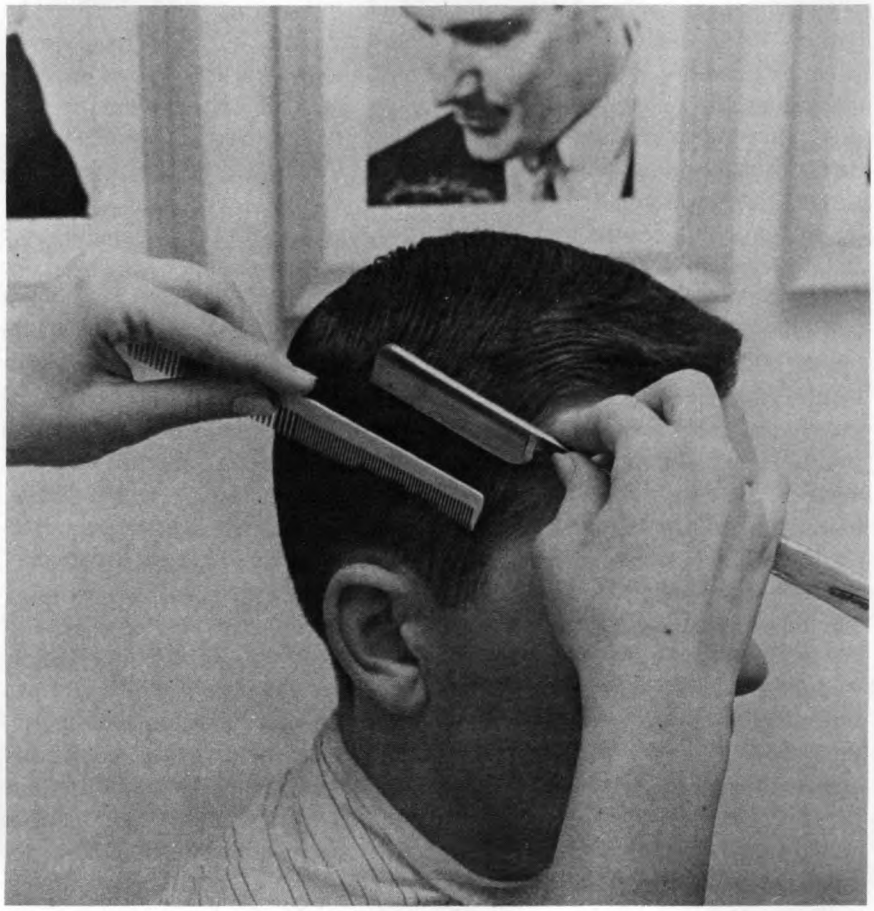
Although service workers are employed throughout the country, firefighters, hospital attendants, hotel service employees, and amusement and recreation attendants are found chiefly in the larger towns and cities.

BARBERS

(D.O.T. 330.371)

Nature of the Work

Barbers provide many services related to the care of hair, face, and scalp. They may give hair and scalp treatments, shaves, facial massages, and shampoos. Their main task,



however, is to cut hair to satisfy each customer.

In recent years, an increasing proportion of men have desired additional barbering services, such as hairstyling and coloring. Specially trained barbers, called "hairstylists," are providing these services in some barbershops and styling salons. These barbers shampoo, cut the hair with a razor, and style it. They also may color the hair and fit hair pieces.

A barber builds a steady clientele by giving good haircuts, putting customers at ease, giving them efficient, courteous service, and keeping a clean, attractive shop.

Barbers keep their barbering instruments sterilized and in good condition. They also clean their work areas and may sweep the shop. Those who own or manage a shop have additional responsibilities such as ordering supplies, paying bills, keeping records, and hiring employees.

Places of Employment

An estimated 180,000 barbers were employed in 1970; most of them were men. More than half of all barbers own and operate their own shops. Most barbers work in small shops, either as the owner or with one other barber. Many barbers also work in large shops in shopping centers, hotels, or office buildings. Some barbers work in combination barber-and-beauty shops; a few work for government agencies and hospitals.

All cities and towns and many very small communities have barbershops. However, employment is concentrated in large cities and in the most populous States.

Training, Other Qualifications, and Advancement

To obtain a license, which all States require, a candidate must have graduated from a State approved barber school.

In addition, he must meet certain health requirements, usually be at least 16 (in some States 18) years old, and have completed the eighth grade. All but a very few States require the beginner to take an examination for an apprentice license; then, usually after working 1 or 2 years as an apprentice, he takes a second examination for his license as a registered barber. The examinations usually include both a written test and a demonstration of the applicant's ability to cut hair. The fees charged for these examinations generally range from $5 to $25. A few States do not require a fee for their apprentice examination. Barbers who move to another State must meet the licensing requirements of that State.

Barber training is offered in many public and private schools and a few vocational schools. Courses usually last 6 to 11 months and include from 1,000 to 2,000 hours of instruction. The trainee customarily purchases his own tools which cost $100 or more. He studies the basic services—haircutting, shaving, massaging, and facial and scalp treatments—and, under supervision, practices these services on fellow students and customers in school "clinics." Besides attending lectures on barber services and the use and care of instruments, the student

takes courses in anatomy, sanitation, and hygiene, and learns how to recognize certain skin conditions. Instruction is also given in salesmanship and general business practices. Advanced courses are available in some localities for registered barbers who wish to specialize in hair styling and coloring.

A beginner may locate his first job through the barber school he 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, who meet the requirements, 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. The required capital differs, because some owners buy used equipment and fixtures at reduced prices, whereas others pay higher prices for new equipment. Equipping a one-chair shop with new equipment usually costs from $1,500 to $2,800.

Dealing with customers requires patience and a better-than-average disposition. Good health and stamina also are important because a barber must stand for long periods and work with both hands at shoulder level.

Employment Outlook

Employment of barbers is expected to grow slowly through the 1970's. Most job openings will result from the need to replace experienced barbers who retire, die, or transfer to other fields of work. Replacement needs in this occupation 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 to longer hair. In the future, however, the effect of this trend is expected to be more than offset by population increases. Employment also may be stimulated by the growing popularity of hair styling for men.

The small shop with only one or two barbers will probably remain the most common type of establishment; however, the continued growth of suburban communities should result in opportunities to open large shops and expand staffs in established shops in these areas.

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 $175 in 1970 according to limited information available. A few expert barbers, as well as some barbers who operated their own shops, earned more than $250 a week. Apprentice barbers usually earned about $85 to $125 a week.

Earnings depend on the size and location of the shop, customers' income levels and tipping habits, competition from other barbershops, the barber's skill at his trade, his ability to attract and hold regular customers, and the prices he charges for his services.

Most full-time barbers work more than 40 hours a week; a workweek of over 50 hours is not uncommon. A barber may have a steady stream of customers during peak hours and especially on Saturdays, but during slack periods he may have time off for personal matters. Some barbers, however, are now requiring appointments to regulate their working hours. 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 also be obtained from:

National Association of Barber Schools, Inc., 750 Third Ave., Huntington, W. Va. 25701.

Additional information on this occupation is also 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, 1141 North Delaware St., Indianapolis, Ind. 46207.

COSMETOLOGISTS

(D.O.T. 332.271 and .381; 331.878; and 339.371)

Nature of the Work

Cosmetologists shampoo, cut, set, style, straighten, bleach, and tint hair and give permanent waves. They also may give manicures and scalp and facial treatments, provide makeup analysis, shape eyebrows, and clean and style wigs and hair pieces. Other duties include making appointments with patrons, cleaning their equipment, and sanitizing implements. Cosmetologists are also called *beauty operators, hairdressers,* or *beauticians.*

Beauty operators may specialize in different phases of the work such as manicurist, tint specialist, or hair stylist. Many men employed as cosmetologists are hair stylists.

The owner-operator of a beauty salon, in addition to working as an operator, usually performs a number of managerial duties, such as recordkeeping, property maintenance, control of supplies, and supervision of employees.

Places of Employment

Approximately 485,000 people were employed as hairdressers and cosmetologists in 1970; about 10 percent were men. The proportion of part-time to full-time workers was relatively high.

Most cosmetologists are employed in salons which are operated as independent establishments or in conjunction with hotels and department and specialty stores. Smaller numbers work in a variety of other establishments—for example, in motion picture and television studios, in hospitals, and on ocean liners.

Although employment is concentrated in urban areas, many operators work in small towns and rural areas in all parts of the country. Most beauty salons are small and have fewer than four employees. More than half of all beauty salons 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 the theory and practice of cosmetology, they usually must be at least 16 years of age, present certificates of good health, and have completed at least 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, whereby operators licensed to work in one State can move to another and continue their work without taking an examination to qualify for another license.

About 3,500 public vocational schools and private schools offer training which meets State licensing requirements for cosmetologists. In many of them, instruction preparing students for a general 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 or 2 years. Many States issue special manicurists' licenses which require substantially fewer hours of training than general operator's licenses.

Both public and private school training programs include classroom study, lectures, demonstrations, and practical work. Beginning students usually practice by working on each other or on manikins and, when they have satisfactorily completed a period of preliminary training, they may practice on patrons in school "clinics." Practically all beauty schools help their students find jobs after graduation.

Some cosmetologists start as manicurists or shampooers, while others begin as all-round operators performing a variety of services. Advancement may come in higher earnings, as operators gain experience and build up a steady clientele, or as they become skilled specialists in one or more phases of the work. For those who wish to specialize, advanced courses in hair styling,

hair coloring, and other types of work are available in many localities, sometimes offered by public or private schools, and sometimes by manufacturers of beauty preparations or by other individuals and organizations. Experienced operators may also advance to positions in which they manage large salons or open salons of their own. Others advance to teaching positions in cosmetology schools, or use their knowledge and skills in some different type of employment—working as demonstrators for manufacturers of cosmetics, for example, or as beauty editors for newspapers and magazines, or inspectors for State cosmetology boards.

Cosmetologists must keep abreast of changing hair styles and beauty techniques. Ability to get along with people is also important, as are good grooming, dexterity, a sense of form and artistry, and willingness to follow patrons' instructions. An operator's job also calls for physical stamina, because much standing is normally required.

Operators usually furnish their own uniforms; a few salons require them to furnish brushes, combs, and clips.

Employment Outlook

Through the 1970's, job opportunities are expected to be very good for newcomers to this field, as well as for experienced cosmetologists and those who are seeking part-time work. Employment in this occupation is expected to continue to expand very rapidly. Among the factors responsible for this expected employment growth are the population increase and the more frequent use of beauty salons as income levels rise and more women take jobs outside the home.

In addition to new job opportunities created by growth, thousands of replacements will be needed as cosmetologists retire or stop working for other reasons. Still other openings will become available as jobs are vacated by workers leaving to enter other kinds of employment.

Earnings and Working Conditions

Many cosmetologists are paid on a straight commission basis. Others receive a salary plus commission and still others, a straight salary. Estimating total earnings is difficult because, in addition to salaries and commissions, most cosmetologists receive tips, and tipping practices vary in different localities. Earnings of cosmetologists also depend on experience, speed of performance, skill, location of the salon, and the ability to satisfy patrons and build up a clientele.

Many beginning operators earn between $65 and $90 a week, according to limited information available. A very few top stylists and others in highly specialized jobs may earn $300 or more a week.

Most full-time operators work 40 hours or longer a week, which usually includes late afternoon and Saturday work. Many part-time operators are also employed during these busy periods.

In many large salons, department stores, and hotels, operators may participate in group life and health insurance and other employee 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 Proprietors' 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

State boards of cosmetology can supply information about approved training schools and requirements for licensing.

Additional information about careers in beauty culture, and State licensing requirements, can be obtained from:

National Beauty Career Center, 3839 White Plains Rd., Bronx, N.Y. 10467.

General information about cosmetology may be obtained from:

National Hairdressers and Cosmetologists Association, 3510 Olive Street, St. Louis, Missouri 63103.

Journeymen Barbers International Union, 1141 North Delaware St., Indianapolis, Ind. 46207.

COOKS AND CHEFS

(D.O.T. 313.131 through .887; 314.381 through .878; and 315.131 through .381)

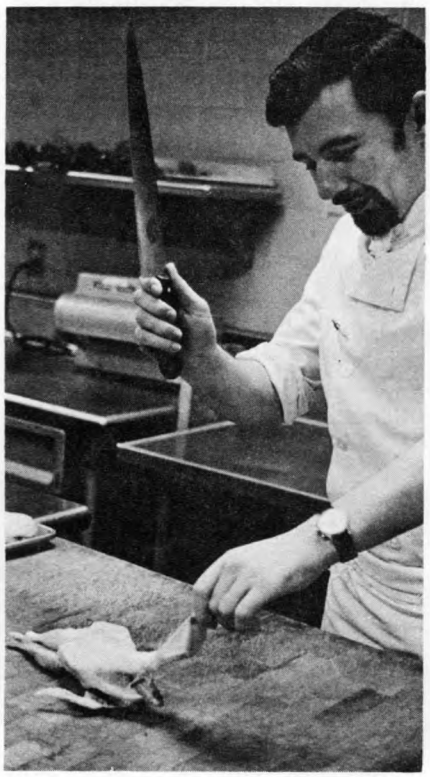
Nature of the Work

The nature of a cook's job depends partly on where he works. There is a good deal of difference,

for example, in preparing food for students in a high school cafeteria, for passengers on a jet airliner, or for patients in a hospital. Similarly, the "home cooking" which is the trademark of many small establishments is far different from the elaborate cuisine featured in some cosmopolitan restaurants; and the cook who works in a steak house prepares food that is quite different from that prepared by the cook in a restaurant which serves Chinese dishes.

A cook's duties also depend on the size of the establishment in which he works. In many small restaurants, one cook—perhaps aided by a short order cook and one or two kitchen helpers—prepares all the foods. Often, the menu consists of a few dishes prepared on a short order basis, plus pies and other baked goods purchased at a bakery.

Large eating places are more likely to have varied menus and to prepare on the premises all the food served. The kitchen staff often includes 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—or, in a large restaurant or hotel, the executive chef—coordinates the work of the kitchen staff and often may take direct charge of certain kinds of food preparation. He decides on the size of the food portions served, and sometimes plans menus and purchases food supplies. In addition, he has the important responsibility of seeing that the dishes served taste good and are attractive. Because of their special skill in creating new dishes and improving the flavor of familiar ones, some chefs have acquired national and international reputations for themselves and for the restaurants and hotels where they work.



Places of Employment

Approximately 740,000 cooks and chefs were employed in 1970. Most of these workers were restaurant cooks, but large numbers were employed in public and private schools and in hotels and hospitals. Government agencies, manufacturing plants, private clubs, and many other kinds of establishments also employed cooks and chefs.

Three out of every 5 of these workers are women. About half of the cooks in restaurants, and the great majority of those employed in schools and hospitals, are women. Men, on the other hand, outnumber women as cooks in hotels and private clubs. Also, most head cooks and practically all chefs are men.

Training, Other Qualifications, and Advancement

Most cooks—particularly those who work in small eating places—acquire their skills on the job while employed as kitchen helpers. Less frequently, they are trained as apprentices under trade union contracts or the training programs which some large hotels and restaurants conduct for new employees.

Young people seeking jobs in large restaurants and hotels will find it advantageous to have had courses in restaurant cooking because hiring standards are often high in these establishments. Many vocational schools—both public and private—offer this kind of training to high school students. Other courses, open in some cases only to high school graduates, are given under the guidance of restaurant associations, hotel management groups, and trade unions, and in technical schools and colleges. These courses range from a few months to 2 years or more in length. Programs to train unemployed and underemployed workers for jobs as cooks were operating in several cities in 1970 under the Manpower Development and Training Act.

Although curriculums may vary, a student usually spends a major part of his time learning food preparation through actual practice in well-equipped kitchens. The student receives instruction in baking, broiling, and other methods of preparing food, and in the use and care of kitchen equipment. Instruction may be given in selecting and storing food, determining the size of portions, planning menus, and buying food supplies in quantity. Hotel and restaurant sanitation, and public health aspects of food handling, are also taught.

Many school districts provide

on-the-job training opportunities for their cafeteria workers who wish to become cooks. In addition, they may conduct cooking workshops during the summer, and frequently select school cooks from employees who have participated.

Inexperienced workers usually can qualify as assistant cooks or fry cooks after several months of on-the-job training, but acquiring all-round skills necessary for advancing to head cook or chef in a fine restaurant often takes several years. 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; other may become instructors at vocational schools and other institutions.

Cleanliness, the ability to work under pressure during busy periods, physical stamina, and a keen sense of taste and smell are among the important qualifications needed for this occupation. A cook or chef in a supervisory position must not only be an expert cook, but must also be able to organize and direct kitchen operations effectively. Health certificates, indicating that cooks and chefs are free from communicable diseases, are required by the laws of many States.

Employment Outlook

Employment of cooks and chefs is expected to increase moderately through the 1970's as new restaurants, hotels, and other food establishments open. Besides job openings resulting from employment growth, thousands will result each year from the need to replace experienced cooks and chefs who retire, die, or transfer to other occupations.

Continued expansion in the business of serving meals away from home is expected because of population growth and relatively rapid increases likely among some groups who customarily eat away from home. Large increases are expected in the number of married women working outside their homes and the number of students attending schools and colleges. In hospitals and other institutions, a continued increase is foreseen in the number of patients, attendants, and others who regularly eat on the premises. In addition, travel for business and pleasure is expected to increase; as a result, more people will be patronizing eating places.

Small restaurants and other eating places where the food preparation is fairly simple will provide the greatest number of starting jobs as cooks. Beginners—especially those having training in restaurant cooking—also will find starting positions available in those hotel and restaurant kitchens where foods are prepared more elaborately. The shortage of highly skilled cooks and chefs is acute, and employment opportunities for well qualified beginners will be especially good.

Earnings and Working Conditions

Limited wage data from union-management contracts covering eating and drinking places in large metropolitan areas provide an indication of earnings for cooks and chefs in 1970. In these contracts, straight-time hourly pay rates generally ranged from $2.22 to $4.65 for chefs; $2.02 to $4.12 for cooks of various types (such as pastry, fry, roast, and vegetable cooks); and $1.47 to $3.86 for assistant cooks. However, most cooks and chefs are not covered by union-management contracts. Wages also vary greatly according to geographic location and type of establishment. In large restaurants and hotels many cooks and chefs earn considerably more than the minimum rates. Some chefs with national reputations make more than $25,000 a year.

In addition to their wages, restaurant cooks usually receive at least one free meal a day and are furnished with uniforms. Paid vacations and holidays are common, and various types of health insurance programs also are provided. Scheduled hours in restaurants include late evening, holiday, and weekend work, and range from 40 to 48 a week. Cooks employed in public and private schools work during the school year only—usually 9 months. The hours worked frequently coincide with the school's hours.

Many kitchens are air conditioned, have convenient work areas, and are furnished with modern equipment and laborsaving devices. Others—particularly kitchens in small eating places—are often not as well-equipped and working conditions may be less desirable. In kitchens of all kinds, however, cooks spend long periods on their feet and may be required to lift heavy pots and other objects or work near hot ovens or 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 serv-

ice also may be a source of 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, Inc. 393 Prospect Street, NW., New Haven, Conn. 06511

Educational Director, National Restaurant Association, 153 North Lake Shore Dr., Chicago, Ill. 60610.

The Educational Institute, American Hotel and Motel Association, 221 West 57th Street, New York, N.Y. 10019.

A list of public and private schools offering courses in cooking may be obtained from:

Council on Hotel, Restaurant, and Institutional Education, 1522 K St., N.W., Washington, D.C. 20005.

WAITERS AND WAITRESSES

(D.O.T. 311.138 through .878)

Nature of the Work

Whether they work in small lunchrooms or fashionable restaurants, all waiters and waitresses have jobs that are essentially the same. They take customers' orders, serve food and beverages, make out customers' checks, and sometimes take payments. The manner in which waiters and waitresses go about their work may vary considerably, however, because food service in very small eating places differs from that in large ones; and service in restaurants that emphasize speed and efficiency is different from that where dining is formal and leisurely.

In addition to waiting on tables, waiters and waitresses usually perform a variety of other duties. Often, they set up and clear tables, and carry dishes back to the kitchen. In very small restaurants, they may combine waiting on tables with counter service, preparing sandwiches, or cashiering.

However, in large restaurants and in places where meal service is formal, waiters and waitresses are relieved of most of those additional duties. Busboys and busgirls often set up tables, keep water glasses filled, and perform other routine tasks, leaving the waiters and waitresses free to devote practically all of their time to serving guests.

In those eating places where meals are served elaborately and a great deal of emphasis is placed on the satisfaction and comfort of each guest, a waiter may be called upon to advise about the choice of a wine or answer questions about the preparation of items on the menu. Sometimes, from a side table, he may prepare and serve salads or flame certain dishes such as crepes suzettes.

Places of Employment

More than a million waiters and waitresses were employed in 1970. The great majority—about 9 out of every 10—were women. Many waiters and waitresses worked part time.

Approximately four-fifths of the waiters and waitesses were employed in restaurants and other retail establishments that serve food. Hotels and educational institutions of all kinds also employed many of these workers. Jobs for waiters

tended to be concentrated in those restaurants, hotel dining rooms, private clubs, and other establishments where meal service was formal.

Training, Other Qualifications, and Advancement

Although many waiters and waitresses do not have extensive schooling, more and more employers prefer that beginners have at least 2 or 3 years of high school. Home economics courses and special courses for waiters and waitresses, which are offered by some public and private schools, provide good preparation. Restaurant associations also offer training in this field. Unemployed and underemployed workers are trained for jobs as waiters and waitresses in several cities under provisions of the Manpower Development and Training Act.

Practically all newly hired workers without previous experience undergo a period of on-the-job training, during which they learn about the type of food service offered in their employer's establishment. Sometimes they work as busboys or busgirls before being assigned a station as a waiter or waitress.

Waiters and waitresses must be able to make the calculations necessary to total guests' checks and compute taxes. Personal appearance, a pleasant manner, an even disposition, and the ability to cope with the rush of business that usually occurs at mealtimes are very important. In a few restaurants, knowledge of a foreign language is desirable. Waiters and waitresses often are required by State law to obtain health certificates to assure that they are free of communicable diseases. Physical stamina also is needed because they are on their feet during their working hours.

In many small eating places, opportunities for promotion are limited. However, after gaining experience, a waiter or waitress may transfer to a larger restaurant where earnings and prospects for advancement are likely to be better. Advancement may be to a position as cashier or to supervisory work as a headwaiter or hostess. Some supervisory workers eventually advance to managerial positions.

Employment Outlook

Employment of waiters and waitresses is expected to increase moderately throughout the 1970's. Most openings, however, will result from the need to replace experienced workers who retire, die, or leave their jobs for other reasons.

A substantial increase in the consumption of food outside the home is expected as a result of population growth, higher personal incomes, more vacation and business travel, and other factors. Eating places which employ waiters and waitresses, however, will share only part of the additional business. Some of it will be handled by the growing number of food and beverage vending machines, and some of it will go to the drug stores, variety stores, and cafeterias where meal service is provided by counter and fountain workers instead of waiters and waitresses.

Most job openings will be for waitresses. The turnover of waitresses is particularly high because many of them leave their jobs to take care of family responsibilities. Jobs for waiters have become more concentrated in formal restaurants where hiring standards are high and turnover is usually low, and this trend is expected to continue. Both 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

Because most waiters and waitresses receive tips from the guests they serve, as well as wages paid by their employers, estimating average weekly earnings is difficult. Wages generally are lower than in other occupations, and the amount received in tips is usually somewhat greater than wages. Tips vary greatly in amount, however, depending on the skill of the waiter or waitress, the tipping customs in the community, and especially on the type of restaurant. Because tips often average between 10 and 15 percent of guests' checks, earnings from tips are usually highest in restaurants where prices are also highest.

Limited data from union-management contracts in effect in 1970, covering eating and drinking places in several large cities, provide an indication of earnings (excluding tips). In these contracts, straight-time hourly rates for waiters and waitresses ranged from $0.82 to $2.15. However, many waiters and waitresses are not covered by union-management contracts, and hourly rates in large cities generally are higher than those in small towns.

The majority of waiters and waitresses receive free meals at work. Many also are furnished with uniforms. Paid vacations, after qualifying periods of service, are customary, and various types of health, in-

surance, and pension plans also may be offered.

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. Scheduled hours often include work on holidays and weekends. Large restaurants and dining rooms usually are furnished comfortably with convenient working areas, and are often air conditioned. Workers in other eating places—particularly small ones—may find working conditions less desirable, and the pace of work very rushed at times. In restaurants of all types, workers often spend long periods on their feet and may be required to lift heavy trays. Work hazards include the possibility of burns and cuts.

The principal union organizing waiters and waitresses 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 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 about restaurant waiters and waitresses is available from:

Educational Director, National Restaurant Association, 1530 North Lake Shore Dr., Chicago, Ill. 60610.

BARTENDERS

(D.O.T. 312.878)

Nature of the Work

Although they may work in settings as varied as a neighborhood tavern, a discotheque, or a luxurious hotel lounge, all bartenders perform essentially similar functions. Their primary duties are to mix and serve a variety of alcoholic and nonalcoholic beverages by combining ingredients such as liquor, soda, water, sugar, bitters, and fruit garnishes. They also serve wine and draft or bottled beer.

Some bartenders handle the drink-buying transaction from beginning to end. They take the order, prepare the drink, collect the payment, and make proper change. Others, who work at service bars, simply prepare the drinks that are served by waiters or waitresses.

In addition to preparing and serving drinks, bartenders may be responsible for ordering and maintaining an inventory of liquor and supplies; preparing an attractive display of bottled goods and glasses; washing glassware; and cleaning the bar. They also may prepare fruit for garnishing drinks (for example, slice limes and oranges) and prepare and serve appetizers for the patrons at the bar.

Larger establishments customarily employ bar boys or *bartender helpers* (D.O.T. 312.887) who assist bartenders by replenishing supplies such as liquor, fruit, and ice; stocking refrigerators with wines and beer; replacing empty beer kegs with full ones; and washing equipment and polishing fixtures. In addition, they mop floors and remove empty bottles and trash.

Places of Employment

Approximately 160,000 bartenders were employed in 1970. Nearly one-third of them were self-employed. Most bartenders work in restaurants and bars; others work in hotels, entertainment and recreation places, and private clubs.

Several thousand persons tend bar part-time. They usually have full-time jobs in other occupations or attend college. Some of them serve drinks at banquets and private parties; bartenders' unions often are clearing houses for these temporary jobs. About 1 out of every 4 bartenders is a woman. Most of them work in small establishments.

Most bartenders are employed in the urban population centers of New York, California, and other large States, but many also are employed in small communities. 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

Most bartenders learn their trade on the job. Practice in preparing drinks at home can be helpful, but more practical experience can be gained by working as a bar boy or bus boy. They have an opportunity to observe the bartender at work; and, when he has time to give instructions, can learn how to prepare drinks and perform other tasks. Working as a waiter also can be valuable training for this occupation.

Some private schools offer short courses in bartending that include instructions on State and local laws and regulations, cocktail recipes, attire and conduct, and how to properly stock the bar. Some schools maintain a placement service for their students.

Manual dexterity, accuracy, and speed are required in order to prepare the proper mix, especially at times when the demand is heavy. Physical stamina is important, because the bartender works on his feet and may have to lift heavy kegs or cases. Because bartenders deal with the public, a pleasant personality is an important qualification.

Twenty-one is generally the minimum age required by law for employment as a bartender. Some employers, however, prefer their bartenders to be at least twenty-five. Some States require bartenders to obtain health certificates to assure that they are free of communicable diseases. In some instances, they must be bonded.

Beginners usually find the best entry opportunities in small establishments and resorts. After gaining experience, a bartender may transfer to a larger establishment where earning prospects are likely to be better. In these places they may advance to head bartender or food and beverage manager. Some bartenders with business know-how become proprietors of their own establishments.

Employment Outlook

Employment of bartenders is expected to increase moderately through the 1970's. In addition to employment growth, several thousand job openings will arise annually from the need to replace experienced bartenders who retire, die, or transfer to other occupations.

Most of the increase in demand for bartenders will occur as new restaurants and hotels are established to meet the needs of a growing population. Higher average incomes and more leisure time have resulted in increased vacation travel, and extensive business travel has become common. Also, with a greater proportion of women in the labor force, families often find dining out a welcome convenience. These factors are expected to contribute to a significant increase in consumption of food and beverages outside the home.

While technology has had little effect on this occupation, an automated liquor and cocktail mixing unit recently has been introduced and is being tested at several locations. The unit delivers a predetermined amount of liquor, or mixes and dispenses a variety of cocktails when the bartender presses a button. This type of device could increase bartender efficiency and also reduce skill requirements.

Earnings and Working Conditions

Limited data from union-management contracts in the restaurant industry indicate that straight-time hourly earnings of bartenders ranged from $2.09 to $3.87 in 1970, depending on experience, geographic location, and type of establishment. In addition to salaries, bartenders at public bars receive tips that generally increase earnings substantially. Since bartenders at service bars do not receive tips, some establishments provide wage differentials to increase their earnings.

Bartenders often 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 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 employment is important.

Sources of Additional Information

Information about job opportunities may be obtained from locals of the Hotel & Restaurant Employees and Bartenders International Union, which is the principal union organizing bartenders. Additional information about job opportunities may be available at local offices of the State employment service.

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 are responsible for the security of records, merchandise, money, and office machines and other equipment. Department store guards may work with plainclothesmen in watching for shoplifters and spotting 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 examine papers of truckers hauling goods, or direct and control 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 asked by visitors, and sometimes guide traffic.

In large factories, aircraft plants, and defense installations where valuable information must be protected, some guards are assigned to entrances where they check the credentials of persons and vehicles entering and leaving the premises. Similar duties often are performed by university, park, or recreation guards who also may issue parking permits and direct traffic.

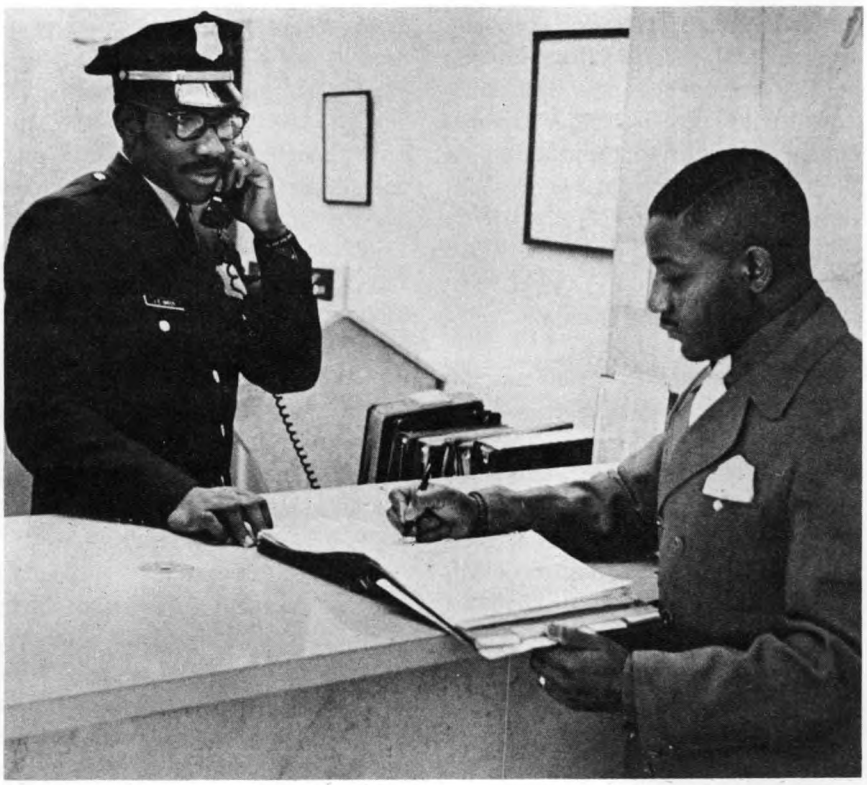
At social affairs, sports events, conventions, and other public gatherings, guards maintain order, give information, and watch for suspicious persons.

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.

Although most guards and watchmen are not expected to do janitorial work, they sometimes set thermostats or turn on machines for 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 they reach various check-points.



Places of Employment

Over 200,000 guards and watchmen were employed in 1970; about 90 percent were men.

The largest number of guards and watchmen are found in office buildings, defense installations and other government buildings, hospitals, nursing homes, hotels, banks, and schools. Many guards and watchmen in these places work for private guard companies. Large numbers of guards and watchmen also work in

various manufacturing industries such as automobiles, aerospace, steel, and rubber.

Although guard and watchman jobs are found throughout the country, the largest numbers are located in highly industrialized areas.

Training, Other Qualifications, and Advancement

These workers have no specific educational requirements but most employers prefer guards and watchmen who are high school graduates. Employers also seek people who have experience in the military police or in State and local police departments. Applicants who have less than a high school education usually are tested for their reading and writing ability, and their competence in following written and oral instructions. 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 companies give newly hired guards pre-job instruction and several weeks of on-the-job training. For example, guards may be taught the use of firearms, the administration of first aid, the handling of various emergencies, and ways to spot and deal with various security problems.

Applicants are expected to have good character references; no police record; good health, especially hearing and vision; and good personal habits. Although many companies require guards to meet height and weight requirements, no age limits are specified. Depending upon the material or the property being protected, some employers prefer an older person as a guard, while others look for the young applicants who may better cope with intruders.

Mental alertness, emotional stability, and physical stamina are prerequisites for guards and watchmen since they must be aware of anything unusual and make split-second decisions when quick action is important and outside help is not available. Guards and watchmen must be dependable since they often are the only ones guarding property. Because guards and watchmen often are the first company employee to have contact with the public, they should be neat, pleasant, and courteous.

Although guards and watchmen in small companies receive periodic salary increases, advancement is likely to be limited. However, the military-type ranking of guards—from patrolman, through intermediate ranks, to captain—which exists in most big companies and public agencies, provides advancement in position and salary. Guards with some college education may advance to jobs involving administrative duties or to prevention and disclosure of espionage and sabotage.

Employment Outlook

The number of guards and watchmen is expected to grow moderately through the 1970's. Continuing increases in the number of plants, offices, banks, retail stores, and educational institutions needed to serve a growing population will create more jobs for guards and watchmen.

In addition, the mounting incidence of crime and vandalism is expected to increase the need for more guards and watchmen. Similarly, social unrest also would necessitate the increased use of these workers. In addition to new jobs resulting from employment growth, many thousands of openings will occur each year as workers retire, die, or leave their jobs for other reasons.

Earnings and Working Conditions

Earnings of guards and watchmen in private industry varied widely in 1970. Salaries ranged from a low of $74 for inexperienced persons working a 40-hour week in small protective service agencies, to over $180 a week for experienced workers and supervisors in large industrial plants.

Entrance salaries for guards employed in the Federal Government were $5,212 a year in 1970; experienced guards often earned $5,853 a year. Top supervisory guard positions in the Federal Government may pay up to $15,000 annually. These workers usually receive overtime pay as well as a wage differential for the second and third shift. Guards and watchmen usually receive benefits such as 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, however, have three shifts, and in such cases guards are often rotated to divide daytime work, weekends, and holidays equally. Usually, guards and watchmen do not take a regular lunch break; instead, they eat on the job.

Working conditions vary and generally depend on whether most of the work is indoors or outdoors. In addition, since 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

central station watchman's reporting service which enables guards and watchmen to be in constant contact with the central station outside the plant. If they fail to transmit an expected signal, the central station investigates.

FBI SPECIAL AGENTS

(D.O.T. 375.168)

Nature of the Work

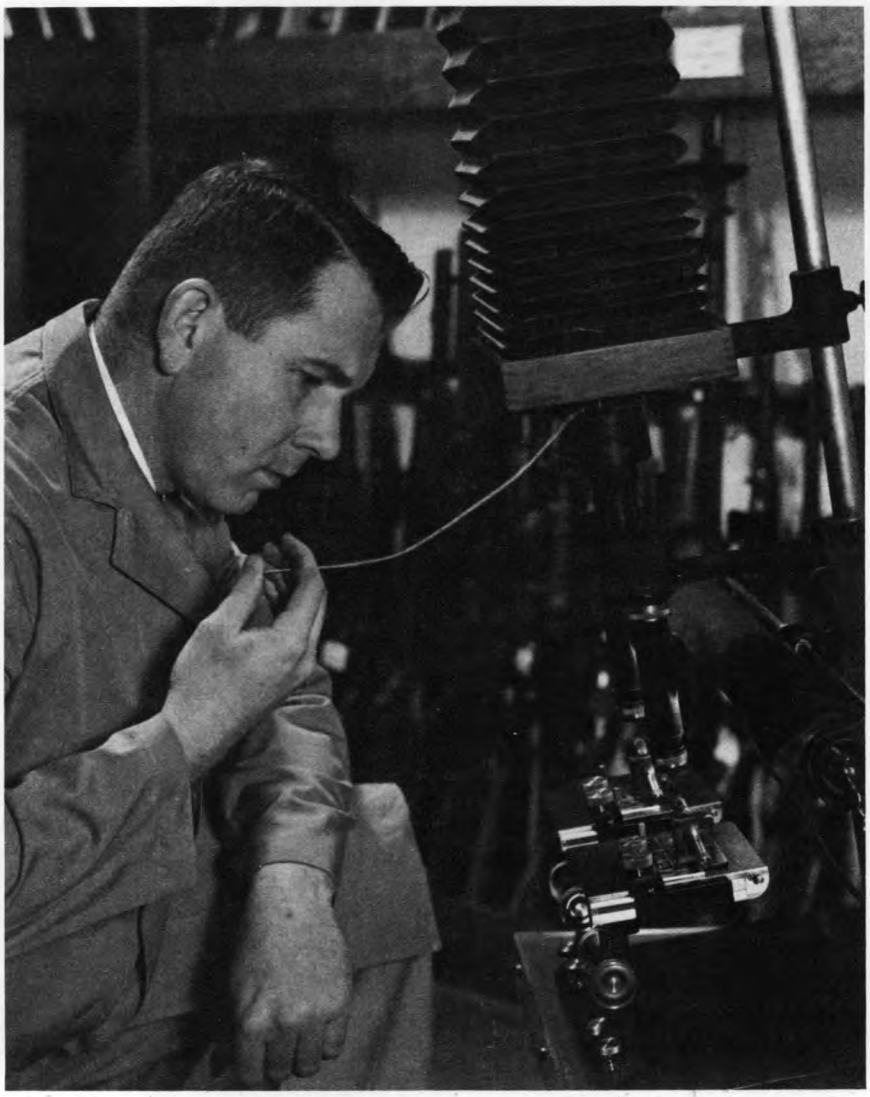
Federal Bureau of Investigation (FBI) Special Agents investigate many types of violations of Federal laws, such as bank robberies, kidnappings, frauds against the Government, thefts of Government property, espionage, and sabotage. The FBI, which is part of the U.S Department of Justice, has jurisdiction over more than 185 Federal investigative matters. Special Agents may be assigned to any type of case, but those having specialized training in accounting are likely to be assigned chiefly to cases involving complex financial records; for example, frauds involving Federal Reserve Bank records.

The FBI is a fact-gathering and fact-reporting agency, and its Special Agents function strictly as investigators. (Its authority does not include affording personal protection to individuals nor does it include police functions to assure that the law is obeyed. Such matters are within the purview of 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 of the highly confidential nature of the FBI's work, Special Agents may not disclose any of the information which they gather in the course of their official duties to unauthorized persons, including members of their families. Special Agents may have to testify in court about cases that they investigate, but they do not make recommendations pertaining to prosecution, express opinions concerning the guilt or innocence of suspects, nor issue "clearances" of any kind.

In most assignments, Special Agents work alone but must maintain continued contact with their superiors by radio or telephone. For potentially dangerous duties, such as arrests and raids, two agents or more are assigned to work together.

Places of Employment

Most of the more than 7,900 Special Agents employed in 1970 were assigned to the FBI's 59 field offices located throughout the Nation and in Puerto Rico. These agents work either in the city where the field office headquarters is lo-



cated or in resident agencies (suboffices) established under the supervision of the field office 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 an FBI Special Agent, an applicant 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 also must have had at least 3 years of experience in accounting or auditing or a combination of both.

Applicants for the position of FBI Special Agent must be male citizens of the United States, at least 23 and not more than 40 years of age, 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 before he is assigned to a field office. He receives most of this training at FBI headquarters at Washington, D.C., and the rest at the FBI Academy at the U.S. Marine Corps Base in Quantico, Va. During this period, he receives intensive training in defensive tactics and firearms. In addition, he is also 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 a period of about 2 weeks before handling any assignments independently.

All administrative and supervisory positions 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 men who would like to be considered for the position of Special Agent.

Earnings and Working Conditions

The entrance salary for FBI Special Agents in 1970 was $10,869 a year. FBI 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, and they can advance in grade as they gain experience. The top salary for regular field Special Agents in 1970 was about $23,000. Agents in supervisory and administrative positions received higher salaries.

Special Agents are subject to call 24 hours a day and must be available 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 a maximum of $2,870 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.

POLICE OFFICERS

(D.O.T. 375.118 through .868 and 377.868)

Nature of the Work

Police officers—whether directing traffic at busy intersections or arresting dangerous criminals—are helping to preserve law and order. As local government employees, their job is to prevent criminal ac-

tivities, to investigate crimes, and to apprehend and assist in the prosecution of offenders. Whether on or off duty, they are expected to exercise their authority whenever necessary. (This report covers policemen and policewomen employed by local governments. It does not include civilian employees of police departments; State and Federal Government police employees; or policemen and detectives employed by private businesses.)

The policeman who works in a small community handles many police 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, officers usually are assigned to a specific type of police duty. Most policemen are detailed either to patrol or traffic duty; smaller numbers are assigned to special work, such as accident prevention or operating communications systems. Some officers are detectives (plain-clothesmen) assigned to criminal investigation; others are experts in chemical and microscopic analysis, firearms identification and hand-writing and fingerprint identification. In very large cities, a few officers may be trained to work with special units such as mounted and motorcycle police, harbor patrols, helicopter patrols, canine corps, mobile rescue teams and youth aid services.

An increasing number of city police departments include women on their police forces. These policewomen work with juvenile delinquents, try to locate lost children and runaways, or search, question, book, and fingerprint women prisoners. They may also be assigned to detective squads, where they work mainly on crimes involving women.

Most newly recruited policemen begin on patrol duty, which has become particularly important as a means of preventing crime and providing other services to the public. Patrolmen may be assigned to 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 may 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 also prepare reports about their activities and may testify in court when cases result in legal action.

Places of Employment

An estimated 330,000 full-time policemen and policewomen were employed in 1970 by local police departments. The majority were men.

Some cities have very large police forces. For example, New York has

over 31,000 police officers and Chicago has over 12,000. 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 also is determined by performance on competitive examinations, physical and personal qualifications, and 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 usually are interviewed by a senior officer at police headquarters, and their character traits and background may be investigated. In some police departments, candidates also may be interviewed by a psychiatrist or a psychologist, or given a personality test. In large police departments, where most jobs are to be found, applicants usually must have at least a high school education. A few cities require some college training and some hire law enforcement students as police interns. Some police departments accept men who have less than a high school education as recruits, particularly if they have had work experience in a field related to law enforcement.

Police departments increasingly emphasize post-high school training in sociology, psychology, and minority group relations. As a result, more than 400 colleges and universities now offer major programs in law enforcement. Other courses considered helpful in preparing for a police career include English, American history, civics and government, business law, and physics. Physical education and sports activities are especially helpful in developing the physical stamina and agility needed for police work. College training may be required for policewomen because of their specialized assignments. Training or experience in social work, teaching, or nursing is desirable.

Young men 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 part of the time to learn police science and they also do clerical work. When police cadets who qualify in other respects reach the age of 21, they may be appointed to the police force.

Before their first assignments, policemen usually go through a period of training. In many small communities, the instruction is given informally as recruits work for about a week with experienced officers. More extensive training, such as that provided in large city police departments, may extend over several weeks or a few months. This training includes classroom instruction in constitutional law and civil rights, as well as in State laws and local ordinances, and in the procedures to be followed in accident investigation, patrol, traffic control, and other police work. Recruits learn how to use a gun, defend themselves from attack, administer first aid, and deal with other emergencies.

Policemen and policewomen generally become eligible for promotion after specified periods of service. In a large department, promotion may enable an officer to specialize in one kind of law enforcement activity such as laboratory work, traffic control, communications or work with juveniles. Promotions to the rank of sergeant, lieutenant, and captain 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. Advancement opportunities generally are most numerous in large police departments, where separate bureaus work under the direction of administrative officers and their assistants.

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 at colleges and other institutions, 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 very favorable through the 1970's. Many new positions will arise as cities increase the size of their police forces to meet the needs of a growing population. More openings, however, will occur as policemen and policewomen retire or leave their jobs for other reasons. Police officers usually retire at a somewhat younger age than workers in most other occupations, and replacement rates are relatively high for this reason.

Police employment is expected to rise moderately during the 1970's as population and economic growth create a need for more officers to protect life and property, regulate traffic, and provide other police services. Future police jobs are likely to be affected by changes now occurring in police methods and equipment. Specialists are becoming more essential to the effective operation of city police departments. 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 and 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 1970, entrance salaries for police officers averaged $8,500 a year, according to survey information. The earnings of more experienced officers averaged $10,000 annually.

Most policemen and policewomen receive regular pay increases during the first few years of employment until a specified maximum is reached. Sergeants, lieutenants, and captains are paid progressively higher basic salaries than patrolmen in the same police departments. Top salaries are paid to police chiefs or commissioners, and in 1970 their salaries averaged $11,000 a year in some small cities and $23,000 in the largest.

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, and in localities where the workweek is longer weekly hours gradually are being reduced. Police protection must be provided around the clock; therefore, in all but the very smallest communities, some officers are on duty over weekends, on holidays, and at night. Policemen are subject to call at any time their services may be needed and in emergencies may work overtime. In some departments, overtime is paid at straight time or at 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. Paid vacations, sick leave, and medical, surgical, and life insurance plans are among the other benefits frequently provided.

Policemen may be assigned to work outdoors for long periods in all kinds of weather. The injury rate is higher than in many occupations and reflects the risks police officers take in pursuing speeding motorists, capturing lawbreakers, and dealing with public disorder.

Sources of Additional Information

Information about local entrance requirements may be obtained from local civil service commissions or police departments.

Additional information on the occupation of policeman or policewoman may be obtained from:

International Association of Chiefs of Police, 11 Firstfield Road, Gaithersburg, Md. 20760.

Fraternal Order of Police, Pick-Carter Hotel, 1012 Prospect Ave., Cleveland, Ohio 44115.

Further information on the salaries and hours of work of policemen in various cities is published by The International City Managers' Association in its *Municipal Yearbook,* and by the Fraternal Order of Police.

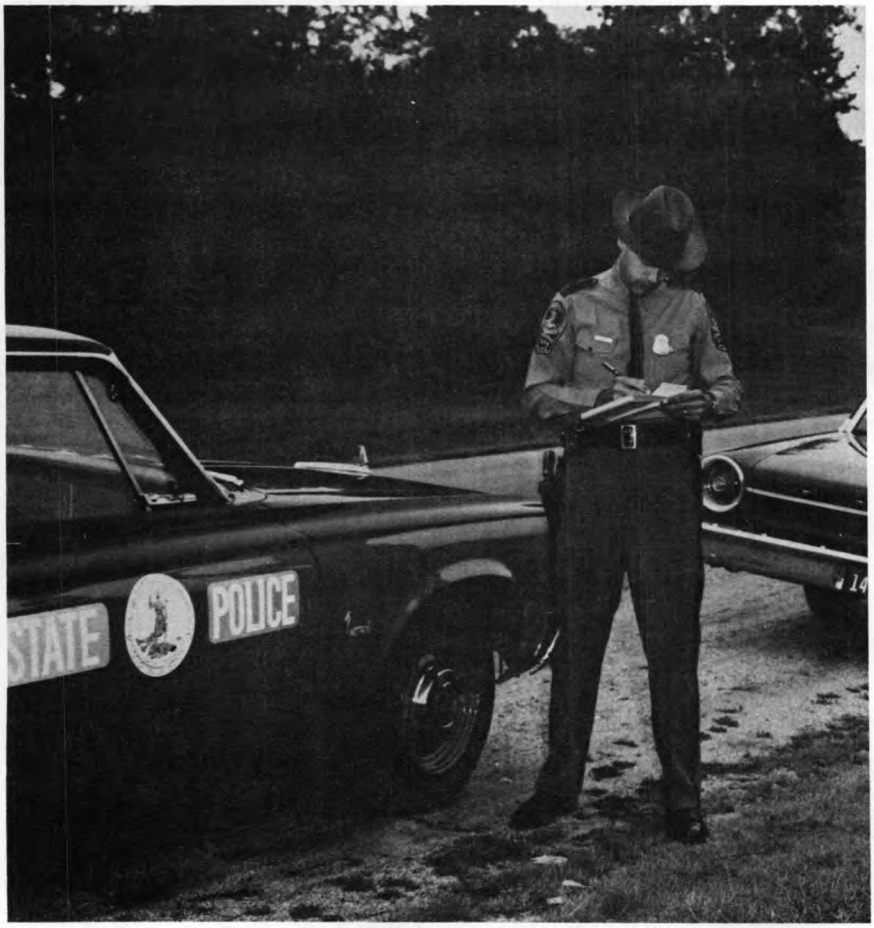
STATE POLICE OFFICERS

(D.O.T. 375.118, .138, .168, .228, .268, and .388)

Nature of the Work

State policemen (sometimes called State highway patrolmen or troopers) are protective service officers whose primary responsibility is to enforce the laws and regulations governing the use of highways. Officers spend most of their time patroling highways to insure that traffic laws are obeyed and issuing traffic tickets to motorists who violate the laws. When necessary, they testify in court.

State police officers assist at the scene of traffic accidents. They give first aid to injured persons, summon ambulances and other emergency equipment, and direct traffic to avoid additional accidents. Patrolmen conduct investigations of accidents and write reports containing information that may be used as legal evidence in determining cause and liability. In addition, State police officers provide services to motorists on the highways. For example, they radio for road service in case of mechanical trouble, direct tourists to their destination, or pro-



State police officer investigates accident.

vide information about lodging, restaurants, and tourist attractions.

State police officers also direct traffic during road repairs, fires, and other emergencies, as well as for special occurrences such as parades, celebrations, and sporting events. They sometimes check the weight of commercial vehicles, conduct driver examinations, and serve as public safety information officers.

In some States, these policemen may investigate crimes such as thefts, murders, and narcotics violations. However, the jurisdiction of the State police in such matters usually is limited to those areas that do not maintain their own police forces. Nevertheless, they sometimes assist municipal or county police forces in criminal investigations, the apprehension of lawbreakers, and the control of civil disturbances and riots.

Some police officers spend part or all of their time in specialized work. These specialties include fingerprint classification, chemical or microscopic analysis, instruction of 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 have clerical duties. They prepare reports and maintain police records. Some officers are administrators, including division or bureau chiefs responsible for training or investigation, and those who command police operations in an assigned area.

Places of Employment

About 40,000 State police officers—virtually all men—were employed throughout the 49 States that maintained a police force in 1970. 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.

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 States require that applicants have a high school education or equivalent education and experience and be at least 21 years of age.

State police 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. Since personal characteristics such as honesty and a sense of responsibility are especially important in police work, an applicant's character traits and background are investigated.

In all States, recruits enter a formal training program for a period of several months. The minimum period of training usually is 12 weeks. Recruits receive classroom instruction in State laws and jurisdictions. They also study procedures for accident investigation, patrol, traffic control, and other police work.

They learn to use a gun, defend themselves from attack, handle an automobile at high speeds, administer first aid, and deal with other emergencies. After gaining experience, some State police officers take advanced or specialized 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 composition, reading comprehension, American history, civics and government, psychology, sociology, and physics are helpful in preparing for a police career. Physical education and sports activities are useful, for they develop needed 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 from 6 months to 2 or 3 years. After a specified period of time, State police officers become eligible for promotion. Most States have merit promotion systems requiring officers to pass a competitive examination to qualify for the next highest rank. Although the organization of State police forces differs among States, the typical avenue of advancement is from private to corporal, to sergeant, to first sergeant, to lieutenant, and then to captain. Police officers who demonstrate administrative ability may be considered for higher level positions such as commissioner or director.

In some States, high school graduates may enter State police work as police 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 1970's. Hundreds of job openings are expected to result each year from growth in employment requirements; a somewhat smaller number of openings will arise as officers 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 and related activities. 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 require increased police patrol to control high speeds, prevent accidents, and assist stranded motorists. The newer dual highways also require more patrolmen, since officers can patrol effectively only one side of these roads.

Because law enforcement work is becoming more complex, some specialists will be needed to work in crime laboratories and electronic data processing centers to create better administrative and criminal information systems.

Earnings and Working Conditions

In 1970, entrance salaries for State policemen ranged from $480 to about $800 a month, according to a private survey. The most common entry rates ranged from $500 to $700 per month. Average monthly starting rates are highest in the Western States and lowest in the South.

State policemen generally receive regular salary increases, based on experience and performance, until a specified maximum is reached. The 1970 maximums ranged from $640 to $1,100 a month; the most common maximum rates ranged from $700 to $900 a month. Earnings may increase above these levels with promotions to a higher rank, such as corporal or sergeant.

State police agencies usually furnish officers uniforms, firearms, and other necessary equipment, or provide special allowances for their purchase.

In most States, the scheduled workweek for police officers is 40 hours. Although the workweek is longer in some States, weekly hours in excess of 40 rapidly are being reduced. In a few States, officers are paid overtime. 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 police usually are covered by liberal pension plans. Paid vacations, sick leave, and medical, surgical, and life insurance plans frequently are provided.

The work of State police officers sometimes is hazardous. They always run the risk of an automobile accident while pursuing speeding motorists or fleeing criminals. Police officers also face the risk of bodily harm while apprehending criminals or controlling disorders.

Sources of Additional Information

Information about specific entrance requirements may be ob-

tained from State civil service commissions or State police headquarters, usually located in each State capitol.

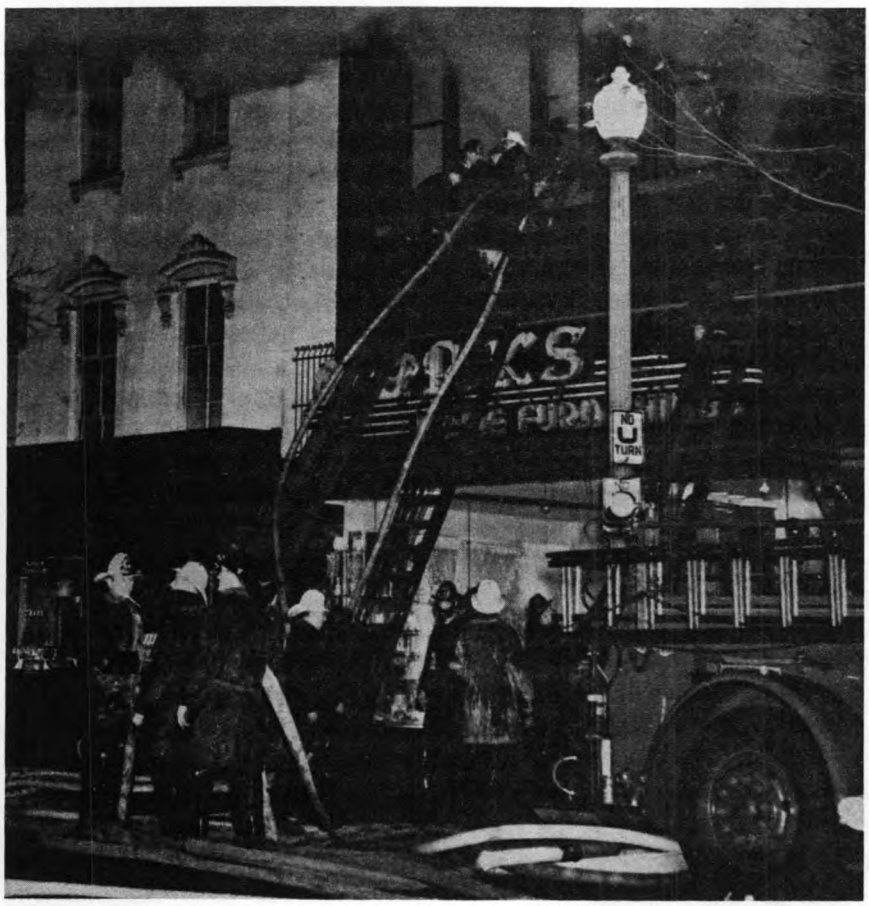
FIREFIGHTERS

(D.O.T. 373.118 through .884)

Nature of the Work

Firefighters help protect us from fires that claim thousands of lives and cause extensive property damage each year. This statement gives information about firefighters who are full-time paid employees of city and town fire departments. It does not cover part-time volunteer firemen and "call men" who serve only when the alarm signals that they are needed.

While on duty, firefighters must be prepared at a moment's notice, to rush to a fire and handle any emergency that occurs. Because firefighting is dangerous and complicated, it requires teamwork and must be well organized. At every fire, firefighters perform specific jobs assigned to them by a commanding officer; they may connect hose lines to hydrants, operate a pressure pump, position ladders, or perform some other duty. Furthermore, the assigned duties of individual firefighters may be changed several times while the company is in action. Under emergency conditions firefighters are often called on to use their own initiative and judgment. They must, therefore, be proficient in many different kinds of firefighting activities. They also must be able to help people to safety and administer first aid.



Fire prevention is another important responsibility of municipal fire departments. Specially trained personnel inspect public buildings for conditions that might cause a fire and for compliance with local regulations relating to fire escapes, fire doors, storage of flammable materials, and other possible hazards. Educating the public about fire prevention and safety measures is also a part of the firefighter's job. Frequently, they speak on this subject before school assemblies and civic groups. In many communities, they regularly inspect private homes, at the owner's request, to point out possible fire hazards.

Between alarms, firefighters spend considerable time at their local stations, improving their knowledge of firefighting and doing maintenance work. They also participate in practice drills, clean and lubricate firefighting equipment, stretch hoses to dry, stand watch at fire alarm instruments, and verify and record alarms.

Places of Employment

There were 180,000 firefighters employed in 1970 by municipal fire departments. In addition, thousands of paid "call men" and hundreds of thousands of part-time volunteer firemen are organized in small towns and rural communities throughout the Nation to help fight fires. A few very large cities have several thousand firemen; some small cities have fewer than 25.

Training, Other Qualifications, and Advancement

To become eligible for an appointment as a firefighter, an applicant must pass a written intelligence test, a medical examination, and tests of strength, physical stamina, and agility, as specified by local civil service regulations. In most communities, these examinations are open only to men who are at least 21 years of age, meet certain height and weight requirements, and have a high school education. The men who receive the highest grades on their examinations have the best chances for appointment. Extra credit usually is given for military service. Experience gained as a volunteer fireman or through firefighting training in the Armed Forces also may improve an applicant's chances for appointment.

As a rule, beginners in large fire departments are given training for several weeks at the city's fireschool. Through classroom instruction and practice drills, the recruits study such fundamentals as firefighting techniques, local building codes, fire prevention, and first aid; and learn about the use of axes, chemical extinguishers, ladders, and other firefighting equipment. Upon completion of this training, they are assigned to local fire companies. Opportunities for promotion are good in most fire departments. As firefighters gain experience, they may advance to higher ratings, and, after 5 to 10 years or more of service, become eligible for promotion to the grade of lieutenant. The line of further promotion is usually to captain, then battalion chief, assistant chief, and finally to chief. Chances for advancement generally depend upon each candidate's position on the promotion list, as determined by his rating on a written examination, his work as a fireman, and his seniority. Throughout their service, many firefighters continue to study fire prevention and related subjects to improve their performance on the job and prepare for promotional examinations. Programs conducted by many State governments and city fire departments throughout the country provide training of this kind for tens of thousands of firefighters each year. Some universities offer courses in fire engineering.

Among the important personal qualities of firefighters 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. Leadership qualities are valuable assets for officers, who have the responsibility for establishing and maintaining a high degree of discipline and efficiency, as well as planning and directing the activities of the firefighters in their companies.

Employment Outlook

Several thousand openings for firefighters are expected to occur each year through the 1970's. Many openings will arise from the need to replace men who retire, die, or otherwise leave the occupation. Firefighters often are permitted to retire at an earlier age than people in many other occupations. New jobs also will become available as city fire departments enlarge their staffs and as paid departments replace volunteer fire companies in smaller, growing communities. In addition, some openings probably will be created as city fire departments continue to shorten the hours that firemen are on duty.

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. Competition among candidates is apt to be keen since employment in this occupation is very stable.

The number of firefighters is expected to increase rapidly to meet the needs for fire protection in growing urban communities. As cities become more crowded, however, officials will give more emphasis to activities associated with fire prevention, and many firefighters will spend a greater amount of their time inspecting buildings for compliance with fire regulations and participating in fire prevention campaigns.

Earnings and Working Conditions

Firefighters in larger cities usually receive the highest starting salaries. In 1970 the average salary for beginning firefighters was about $7,800 a year in cities which had populations of more than 500,000. In cities which had populations of 10,000 to 25,000, the average annual starting salary was about $6,100.

Experienced firefighters also usually earn more money in the larger cities. In cities of over 500,000 persons, the average salary received by experienced firefighters was $9,200 a year. In nearly all other cities, the average salary received was over $7,000 a year.

In 1970, fire chiefs were receiving average salaries of $9,600 a year in the smaller cities and $21,600 a year in cities that had populations over 250,000.

Practically all fire departments furnish pay allowances for protec-

tive firefighting clothing (helmets, boots, and rubber coats) and many also provide dress uniforms.

In some cities, firemen are on duty for a 24-hour shift, then off for 24 hours, and receive an extra day off at intervals. In other cities, the day shift is 10 hours and the night shift is 14 hours, and firemen rotate shifts at frequent intervals. Firemen's hours range from 40 a week in some cities to 60 in others; the national average workweek is about 56 hours. Duty hours usually include some time when firemen are free to read, study, or pursue other personal interests.

In addition to their scheduled hours, firefighters must work as many extra hours as necessary to bring a fire under control. When overtime is worked, most city fire departments either give compensatory time off or extra pay for the additional hours.

The job of a firefighter involves risk of life or injury from sudden cave-ins of floors or toppling walls, as well as hazards associated with exposure to flames, smoke, and bad weather. In fighting fires in industrial establishments, firefighters may come in contact with poisonous, flammable, and explosive gases and chemicals.

Firefighters generally are covered by liberal pension plans, many of which provide for 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 very liberal; health and surgical benefit plans are offered in many fire departments; and compensation also is provided for firefighters injured in the line of duty. Most fire departments either allow paid holidays—ranging up to 11 or more a year—or time off for working on holidays.

Most firefighters are members of the International Association of Fire Fighters (AFL–CIO).

Sources of Additional Information

Information on how to obtain a job as a firefighter may be secured from your local civil service commission or fire department.

General information on the occupation may be obtained from:

International Association of Fire Fighters, 905 16th St. NW., Washington, D.C. 20006.

International Association of Fire Chiefs, 1725 K Street, 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 Managers Association in its *Municipal Yearbook,* available in many libraries.

HOSPITAL ATTENDANTS

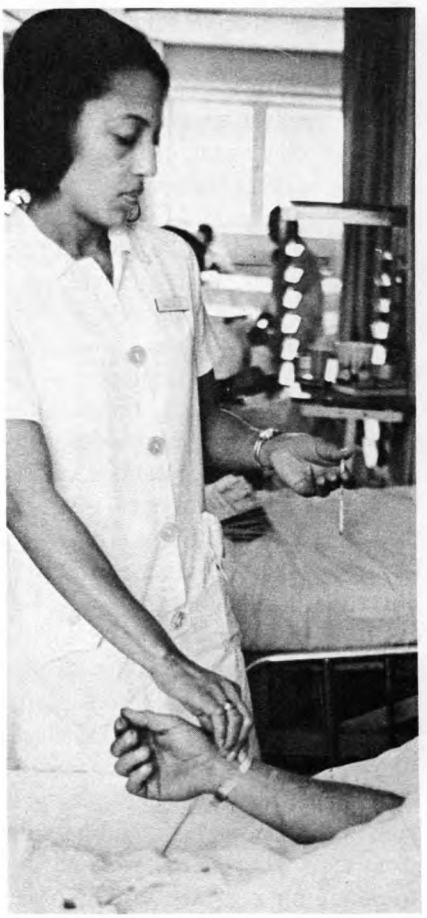
(D.O.T. 355.687 through 355.887)

Nature of the Work

Under the direction of registered nurses and licensed practical nurses, hospital attendants perform a variety of duties. Most require relatively little specialized training but contribute to the comfort and care of patients. The help they provide enables nurses to devote more time to work that requires professional and technical training.

Women employed as hospital attendants usually are called nursing aides and men often are known as *orderlies.* Other job titles include *nursing assistant, auxiliary nursing worker,* and (in mental institutions) *psychiatric aide.*

Nursing aides answer patients' bell calls and deliver messages, serve meals, feed patients who are unable to feed themselves, make beds, and bathe or dress patients. They also may give massages, take temperatures, and assist patients in getting out of bed and walking. Orderlies provide many of the same services for male patients and, in addition, perform tasks such as wheeling patients to operating and examining rooms, and transporting and setting up heavy equipment. Attendants also may perform tasks less directly associated with patient care such as working in hospital pharmacies or helping with sterile supplies.



The range of duties performed by hospital attendants depends on the policies of the institutions employing them, the type of patient being cared for, and—equally important—the capacities and resourcefulness of the nursing aide or orderly. In some hospitals, the nursing aide's work may include household tasks such as cleaning patients' rooms, whereas in others it may be limited to assisting in the care of patients. The tasks performed for patients differ considerably, depending on whether the patient is confined to his bed following major surgery, is learning to walk again after a disabling accident or illness, or requires assistance with daily activities because of infirmity caused by advanced age.

Places of Employment

An estimated 830,000 attendants were employed in 1970; more than four-fifths were women. Most of them worked in hospitals. Others were employed primarily in nursing homes, and other institutions providing facilities for care and recuperation.

Training, Other Qualifications, and Advancement

Although some employers hire persons with less than a high school education as hospital attendants, high school graduates are preferred. Many employers accept applicants 17 or 18 years of age. Others—particularly in nursing homes and in mental hospitals—prefer to hire more mature men and women who are at least in their mid-twenties.

Hospital attendants generally are trained after they are hired. In some institutions, on-the-job training under the close supervision of registered and licensed practical nurses is combined with classroom instruction that includes demonstrations in taking and recording temperatures, bathing patients, changing linens on beds which are occupied by patients, and moving and lifting patients. Training may last several days or continue over a period of a few months, depending on the policies of the hospital, the attendant's aptitude for the work, and the nature of the duties assigned. Many training programs for hospital attendants are aided by funds provided by the Manpower Development and Training Act and the Vocational Education Act.

Courses in home nursing and first aid, offered by many public school systems and other community agencies, provide a useful background of knowledge for the work. Volunteer work and temporary summer jobs in hospitals and similar institutions also may furnish helpful experience. Applicants for this work should be in good health. Personal qualities, such as tact, patience, understanding, emotional stability, and dependability are important. For work as an attendant, as in other health occupations, a basic requisite is a genuine interest in people and a desire to be of help to them. Also, persons planning to become hospital attendants should be willing to accept menial tasks.

Promotional opportunities are limited for hospital attendants, unless they undertake further training. Some may prepare for better paying positions such as hospital operating room or oxygen technician by acquiring specialized training.

In order to become licensed practical nurses, hospital attendants must complete the year of training required for licensure. (See statement on "Licensed Practical Nurses" elsewhere in the Handbook.)

Employment Outlook

Employment of hospital attendants is expected to increase very rapidly through the 1970's. In addition to those needed for occupational growth, many thousands of hospital attendants will be needed each year to replace those who die, retire, or leave the occupation for other reasons.

Most new jobs for nursing aides and orderlies during the 1970's will be in hospitals, but many openings also will occur in nursing homes, convalescent homes, and other long-term care facilities. A major reason for expected occupational growth is the increasing need for medical care of a growing population, including a larger proportion of elderly people (a group particularly susceptible to long-term illness). Combined with this will be an increasing ability of persons to pay for health care because of rising incomes, the growth of health insurance plans (both public and private), and the expansion of medical care services to the elderly through Medicare and to the poor through Medicaid. Important also will be the emphasis being placed on rehabilitation in mental hospitals and other institutions. In addition, employment opportunities will arise as hospitals continue to delegate to attendants tasks which, although associated with patient care, do not require the training of registered and licensed practical nurses.

Earnings and Working Conditions

Weekly earnings of hospital attendants averaged $80.50 in State and local hospitals and $74 in non-

government hospitals in early 1969, according to a survey conducted by the Bureau of Labor Statistics. Attendants employed full time by nursing homes and related facilities earned considerably less than those in hospitals. Salaries of inexperienced hospital attendants in Veterans Administration hospitals started at $89 a week in 1970.

In some institutions, free lodging may be furnished hospital attendants. Free meals or meals at cost, as well as uniforms and laundering of uniforms, also are provided hospital attendants in some institutions.

With few exceptions, the scheduled workweek of attendants in hospitals is 40 hours or less. Because nursing care must be available to patients on a 24-hour-a-day basis, scheduled hours include nightwork and work on weekends and holidays.

According to the limited information available, attendants who are employed in hospitals and similar institutions generally received paid vacations which, after 1 year of service, may be a week or more in length. Paid holidays and sick leave, hospitalization and medical benefits, and pension plans also are available to many hospital employees.

Sources of Additional Information

Information about employment opportunities and duties may be obtained from local hospitals and State and metropolitan health career programs.

Additional information about the work of hospital attendants also may be obtained from:

ANA-NLN Committee on Nursing Careers, American Nurses' Association, 10 Columbus Circle, New York, N.Y. 10019.

Division of Careers and Recruitment, American Hospital Association, 840 North Lake Shore Dr., Chicago, Ill. 60611.

PRIVATE HOUSEHOLD WORKERS

(D.O.T. 301.887; 302.887; 303.138 and .878; 304.887; 305.281; 306.878; 307.878; and 309.138 through .999)

Nature of the Work

Although private household work involves many different jobs, most women employed in this field are maids of various kinds. The *general maid* performs a variety of duties, such as cleaning household furnishings, floors, and lavatories; changing beds; attending children at play; washing dishes; buying, cooking, and serving food; and washing and ironing clothes. The *mother's helper* performs similar duties under her employer's supervision, while learning on the job. More specialized duties are performed by other kinds of maids. For example, the *personal maid* performs personal services for a woman such as keeping her clothes in good condition by mending, cleaning, washing, and pressing them or by having these services performed; cleaning and keeping private quarters tidy; and helping her employer dress. The *nursemaid* cares for children, gives baths, supervises play activities, washes and irons clothes, and prepares meals. When caring for infants, she is called an *infant's nurse* and her duties include sterilizing bottles and other feeding equipment, preparing formulas, and feeding the child at scheduled periods during the day and night. *Babysitters* may perform some or all of the duties of a nursemaid or infant's nurse, but on a daily or an hourly basis.

Housekeepers usually have more responsibility and less supervision than maids. The *home housekeeper* manages a household where there is a large staff of other household employees. She directs their activities, orders food and cleaning supplies, keeps an expenditure record, and may hire and fire employees. The *working housekeeper,* or her rural counterpart, the *farm housekeeper,* often is the only employee in homes where the housewife is absent or is unable to do her own housework. Her household duties combine those of the general maid and the usual responsibilities of a housekeeper. The farm housekeeper also assists in light farm chores, such as feeding chickens, and picking fruits and vegetables for the table.

As their titles suggest, the *cook* and the *laundress* usually handle only one aspect of household work. The laundress washes and irons household laundry, but seldom does other housework. The cook prepares meals. She plans her own

menus or follows instructions. She prepares vegetables and meats for cooking, or supervises a *cook's helper* who performs these tasks and other work requiring little skill. The cook also may serve meals and perform special cooking duties such as making preserves and fancy pastries.

A *companion* lives with a convalescent or a person who is alone, and acts as an aide and friend; she generally has the same social background as the employer. A companion attends to the the employer's personal needs and looks after social or business affairs. She may entertain her employer by reading or conversing. A *governess* has charge of children in a home; usually she supervises their recreation, diet, health, and education, according to parents' instructions. Among her duties are teaching music and language, arranging outings, and taking disciplinary measures.

Although women predominate in household work, some jobs are performed by men. The *man-of-all-work,* sometimes called the *handyman* or *odd-job man,* performs a variety of duties to keep a private home clean and in good condition, such as dusting furniture, washing windows, waxing and polishing floors, tending the furnace, repairing screens, painting fences, and caring for the yard. When employed the year-round, he may be called a *caretaker,* and when concerned only with taking care of the house, a *houseman.* The *valet* performs personal services for a male employer, such as brushing, cleaning, ironing, mending, and laying out clothing; mixing and serving drinks; and running errands. The *butler* may supervise household workers, by assigning and coordinating their work; receive and announce guests; answer the telephone; serve food and drinks; or act as a valet. Households not large enough to require both a butler and chauffeur, or butler and houseman, may employ one person who is referred to as *butler-chauffeur,* or *butler-houseman.*

Places of Employment

Over 1.5 million people were employed as private household workers in 1970. These workers are employed in residences throughout the country, but are concentrated in heavily populated urban areas.

Household workers usually spend their working time in their employer's residence. Laundresses, the exception, may work either in their own or their employer's home. Few household workers "live in" their employer's home.

Training, Other Qualifications, and Advancement

For most household workers, there are no formal educational requirements. The ability to cook, sew, wash and iron, clean house, and care for children is generally acquired by girls while helping with the housework in their own homes. This ability also may be acquired by working for about a year as an assistant to an experienced household worker or housewife. Most employers prefer workers who can operate household equipment such as vacuum cleaners, floor waxers, dishwashers, and electric mixers. Home economics courses offered in high schools, vocational schools, and junior colleges as well as training courses sponsored by Federal agencies, State employment service offices, and local welfare departments help to develop domestic service skills beyond the level ordinarily reached in the home.

With knowledge acquired as a mother's helper, a woman can take a job as a general household worker or nursemaid. With this experience or with the skill acquired in a special training program, she can progress to personal maid, infant's nurse, cook, or housekeeper.

For the positions of governess and companion, work experience is less important than educational and cultural background. A companion should be similar to the employer in age, interests, and background. Practical nursing experience is helpful if the employer is feeble or an invalid. A broad educational background in the arts is useful to a governess. Special skills in music, in foreign language, and in teaching young children also are helpful.

Because of the close contact between household workers and members of the families for whom they work, employers look for agreeable and trustworthy workers who are neat, clean, and in good health. Some employers require their household workers, particularly cooks and infant's nurses, to have a health certificate.

Advancement other than a wage increase is generally not available in households with only one or two workers. To get a better job, a domestic worker usually must change to a home where a job requiring greater skill is available.

Employment Outlook

This occupation is characterized by a large number of employment opportunities, but a reluctance on the part of job seekers to do this type of work. In spite of the strong demand for private household workers created by rising family incomes and the added number of wives and mothers working outside

the home, the traditionally low pay, long hours, and absence of fringe benefits have attached a social stigma to this work.

In addition to new job opportunities resulting from increased demand for these workers, many thousands of job openings will occur each year as private household workers retire, die, or transfer to other kinds of work.

Earnings and Working Conditions

Wages of household workers vary according to the size of the employer's income, kind of work performed, and local standards of pay. Wages tend to be higher in larger cities, especially in the northern part of the country. Workers who "live in" generally are paid the same wage rates as those who "live out," but get free room and board. Workers who "live out" usually receive a free meal plus the cost of their transportation. According to limited data available, most private household workers earn between $0.90 and $2 an hour.

Private household work involves some hard labor at times, especially for day-workers, who are usually given the heavier tasks in the home. "Live-ins" in homes with no other household workers are likely to be alone most of the time; length and irregularity of working hours often isolate these workers from family and friends.

Dayworkers generally do cleaning on a part-time basis at specific intervals (once or twice a week, or maybe at longer intervals) for part or all of a day. Duties are negotiated with each employer, sometimes on a day-to-day basis. Frequently there is no supervision, as when the employer works away from home during the day and the employee has her own key to the home or apartment.

Most household workers are employed part time. Full-time workers generally work at least 35 hours a week; those who live in usually work longer hours.

Sources of Additional Information

Information about employment opportunities and training programs in private-household work may be obtained from local offices of the State employment service.

Additional information on private household work can be obtained from:

National Committee on Household Employment, 1725 K Street, NW., Washington, D.C. 20036.

BUILDING CUSTODIANS

(D.O.T. 187.168; 381.137, .887; 382.138, .884)

Nature of the Work

Building custodians, often called janitors or cleaners, are responsible for the upkeep and maintenance of hotels, hospitals, office buildings, apartment houses, and other buildings. Their jobs include the responsibility that heating and ventilating equipment function properly, that the building be kept clean and orderly, and that they attend to many other tasks that maintain 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 eradicate insects and rodents.

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. In recent years, the maintenance of a building has required less and less physical labor, in part because 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 not only will result in a poor job but may actually harm the surfaces involved, as well.

Most women employed in custodial occupations are assigned tasks such as mopping, dusting, and furniture waxing. Men usually perform the maintenance tasks that require more physical effort; for example, moving furniture, removing refuse cans, and operating floor polishers and buffers.

Some custodians have supervi-

sory positions. Supervisors are responsible for seeing that an entire building or sections of a building are properly cleaned and maintained. They see that certain jobs, such as floor waxing or furniture polishing, are being performed correctly throughout the building.

Places of Employment

About 1.1 million building custodians were employed in 1970; approximately three-quarters were male. They were employed in cities and towns throughout the Nation, and the distribution of jobs was parallel to the population patterns of the United States.

Many building custodians are employed by hospitals and hotels. Large numbers are employed in manufacturing plants and retail stores; many others work in apartment houses and office buildings. Some are employed by contract firms that provide building maintenance service on a fee basis.

Training, Other Qualifications, and Advancement

Most building custodians learn their skills while working on the job. Usually, an inexperienced worker begins by doing simple tasks of cleaning and maintenance. As the worker gains experience with the various cleaners and machines, he is given more complex duties.

There are no formal educational requirements for most positions in custodial work. However, entry workers should be able to do simple arithmetic and follow instructions. Also, high school shop courses may help the building service worker perform the many handymen tasks that are required such as minor plumbing repair or carpentry.

In some cities, training programs where prospective building custodians can learn the necessary skills are provided by unions and government agencies. Students are taught the properties of different surfaces, and the correct way to clean each. They learn to operate and maintain machines such as wet and dry vacuums, buffers, and polishers. Instructions on how to make minor electrical, plumbing, and other repairs also are given. In addition to specific courses that involve custodial tasks, students learn to plan their work and to deal with the public. A few training programs for these workers offer remedial courses in reading, writing, and arithmetic.

Advancement opportunities for custodial workers often are limited because the custodian often is the only maintenance employee in a building. However, where a large maintenance staff is employed, custodians can advance to supervisory positions. For advancement to supervisory positions, a high school diploma is helpful. Some custodians go into business for themselves after becoming thoroughly familiar with their job; they then maintain buildings for clients on a fee basis.

Custodial workers may obtain employment by answering advertisements in the newspapers or by applying directly to a company. Jobs also may be obtained through State employment offices. For government positions, it is necessary to fill out an application for employment and contact civil service or personnel headquarters.

Employment Outlook

Opportunities to enter building custodian jobs are expected to be very favorable through the 1970's. In addition to rapid growth in the number of new jobs that will be created, thousands of job openings will occur each year as experienced custodians retire, die, or transfer to other types of employment.

The employment of building custodians is expected to increase as continued high levels of economic activity, increases in population, and large numbers of young families spur the demand for new apartments, hospitals, offices, recreation centers, and other buildings. However, recent improvements in cleaning and maintenance technology will limit the growth of custodial jobs. Buildings are being designed with surfaces that are specially treated for easy maintenance, and new cleaners and solvents work much more efficiently than those used previously. The growing use of new machines, such as ultrasonic venetian blind cleaners, will reduce the time needed to perform maintenance tasks.

Earnings and Working Conditions

The earnings of building custodial workers vary with the industry in which they are employed. A survey of workers employed in private industry covering 229 metropolitan areas in 1969–70, reports the following average hourly earnings of building custodians:

	Average Hourly Earnings	
Industry	*Men*	*Women*
Manufacturing	$2.80	$2.57
Public Utilities	2.85	2.38
Wholesale Trade	2.46	2.20
Retail Trade	2.15	1.89
Finance	2.45	2.15
Services	2.14	1.89

Earnings tend to be highest in the large cities of the West Coast and North Central section of the country.

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 vacations and health insurance. Some employers give paid holidays.

Custodians usually work inside heated, well-lighted buildings. However, sometimes they may work outdoors doing tasks such as sweeping walkways, mowing lawns, or shoveling snow. Those primarily concerned with machinery maintenance and building heating systems may find themselves working in noise and grease. Building custodians often suffer from minor cuts, bruises, and burns caused by machines, hand tools, and chemicals.

Custodial workers spend most of their time on their feet. Many of the tasks, such as dusting or sweeping, require constant bending, stooping, and stretching. Some custodial workers work during the evening, because many buildings and offices are cleaned after the regular staff has left for the day. When there is a need for 24-hour maintenance, custodial workers may be assigned to shifts.

Sources of Additional Information

For information about opportunities in custodial work and training programs set up under provisions of the Manpower Development and Training Act of 1962, contact the local office of your State employment service.

SOCIAL SERVICE AIDES

Nature of the Work

Social service or social welfare aides, by freeing the professional social worker for more creative and supervisory responsibilities, enable the social welfare agency to provide more and better service to its clients. Most work under the close guidance and supervision of a social worker or a counselor.

Aides often greet new applicants, help to fill out eligibility forms, and explain the reason information is needed and the way it will be used. Aides also supply applicants with general information about the agency's services, facilties, and procedures. In some welfare agencies, aides gather data necessary to determine an individual's or family's eligibility for public assistance. This work can involve making home visits, interviewing friends and relatives of the applicant, or obtaining necessary documents such as marriage licenses or birth certificates.

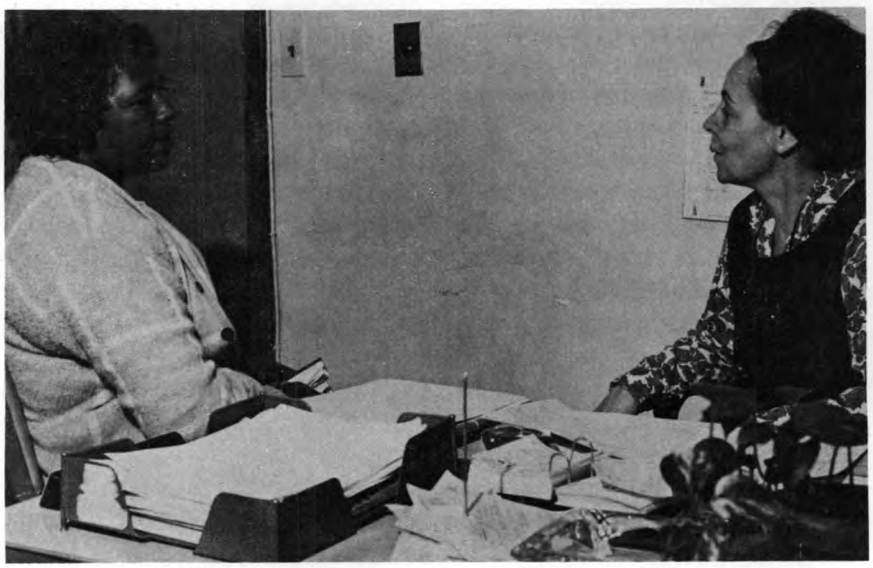
Much of the routine paperwork required in most welfare programs has been taken over by welfare aides. They may keep fact sheets on clients up to date, maintain a filing system of reports or a control system for periodic case reviews, and fill out school enrollment, employment, medical, and compensation forms.

Welfare aides also provide escort services, such as guiding the elderly to clinics for medical checkups or driving unemployed clients to job interviews.

Aides usually referred to as *casework aides* or *assistants,* may work directly with clients. They may help clients locate and obtain more adequate housing, counsel parents regarding their children's personal hygiene and dress, or mediate differences between landlords and tenants.

Apart from these more specific duties, the single most useful function of the aide is to be a friendly listener—to be available when needed to offer encouragement and counsel.

Homemaker aides are assigned to a home for 1 or more days a week or instruct a group of housewives at a community center. They help



women improve their skills in shopping, cleaning, sewing, budgeting, family health and hygiene, child care, and meal planning and preparation.

An important facet of the homemaker aides' work is the actual demonstration of homemaker skills. Stressing the importance of regularity and routine in the home, they set up a schedule of weekly activities. Then they get down to particulars of housekeeping by teaching homemakers how to clean a stove or refrigerator, how to prepare a meal from leftovers, or how to recognize a bargain in inexpensive material and make an attractive dress. They encourage clients to take advantage of all cost-saving opportunities—the barber school for inexpensive haircuts, the thrift shop, surplus foods, and free recreation.

In addition to instructing in domestic skills, some homemaker aides help housewives develop social skills by going with the homemaker to the clinic to act as an interpreter and to lend moral support or help communicate effectively with institutions that provide valuable services—the schools, the welfare department, or a Community Action Agency. *Outreach workers* serve as a bridge between community agencies and the people being served, to maintain a two-way flow of information.

Neighborhood workers are one type of outreach worker. Functioning through a Community Action Agency, they personally contact the residents of an area to explain and discuss the services of the agency. They determine the needs of individuals and families and refer routine cases to a counselor or to the appropriate community service agency. The more difficult problems are reported to a supervisor. Neighborhood workers may inform residents about employment opportunities, availability of housing, manpower training opportunities, and public services. On a broader scale, they assist in the organization of block clubs and other neighborhood groups designed to conduct programs to benefit the neighborhood, to foster a sense of community responsibility among residents, and to encourage participation in the antipoverty efforts of the community action agency. They may assist in routine neighborhood surveys and counts, keep records, and prepare reports of their activities for the supervisor.

Employment aides, another type of outreach worker, assist in actively seeking out the disadvantaged and preparing them for employment through special training and counseling. Stationed in neighborhood centers or working in mobile units, they locate candidates for available jobs and training programs by contacting residents at various locations throughout the neighborhood—poolrooms, laundromats, and street corners. Then, they provide the unemployed with initial information about the services of the local State Employment Service office and the requirements for a particular position, and help them fill out the necessary application forms. After the workers are employed, aides maintain contact with their clients to help them adjust to the new work environment and to iron out minor difficulties.

Places of Employment

An estimated 50,000 social service aides were employed in the United States in 1970. Most are concentrated in large cities, especially in "poverty pockets." About 3,400 employment aides were employed in State Employment Service offices.

Training, Other Qualifications, and Advancement

Graduation from high school is not generally a requirement for social service aides. Aides usually are trained on the job from one to several months; in addition, nongraduates often have classroom instruction to help them pass a high school equivalency examination. Employers of social service aides do not always look for the most highly skilled applicants. A person's need for work, as well as his potential for upgrading his skills and making a useful contribution to the agency, is weighed in evaluating prospective applicants.

Apart from formal requirements, aides need to get along well with people, especially the disadvantaged. It is important that they be tactful and courteous and possess strong leadership qualities.

Homemaker aides should be housewives and mothers who have demonstrated competence in running homes and rearing children. Neighborhood workers assigned to a Puerto Rican or Mexican-American community should be able to understand and speak Spanish. Typing ability is required for some welfare service aide positions.

Most social service programs emphasize the development of career ladders with opportunities for advancement through a combination of work experience and further education. Entry level jobs as employment aides can lead to positions as employment agents and coaches, then to employment interviewers, and, finally, after special training, to employment counselors. Employing agencies frequently are willing to

pay part of the cost of further education for their social service aides.

Employment Outlook

A large proportion of aide jobs in the social services have been generated by antipoverty legislation. The Economic Opportunity Act of 1964 created opportunities for neighborhood workers through Community Action programs. The 1967 Amendments to the Social Security Act authorized the employment of supportive staff in welfare programs. And finally, the 1966 Scheuer Amendment to the Economic Opportunity Act is expected to open up a wide variety of social service jobs for unemployed and low-income persons. This amendment established the New Careers program, which is designed to create entry level positions in public service, including health, education, welfare, neighborhood redevelopment, public safety, and recreation. Its objectives are to provide permanent positions within service agencies and to encourage employer responsibility for providing aides with the training and education necessary to move up an established career ladder. The promise of a job upon successful completion of training and the opportunity to move up to higher level positions set the New Careers program apart from most other federally sponsored training programs.

Earnings and Working Conditions

The starting salary of social welfare aides graduating from the New Careers program was about $2.25 per hour in 1970. Employment aides started at about $4,200 per year.

In the Federal Government in 1970, beginning social work aides (welfare aides) earned from $4,125 to $5,212 per year. Experienced workers earned from $5,853 to $7,294 per year.

Many aides work fewer than 40 hours a week.

Sources of Additional Information

Information on requirements for positions as social service aides may be obtained from the city, county, or State department of welfare, department of recreation, or local Community Action Agency. Information on employment aide positions is available from the State civil service or merit system office in each State capital or from local offices of the State Employment Service.

MODELS

(D.O.T. 297.868 and 961.868)

Nature of the Work

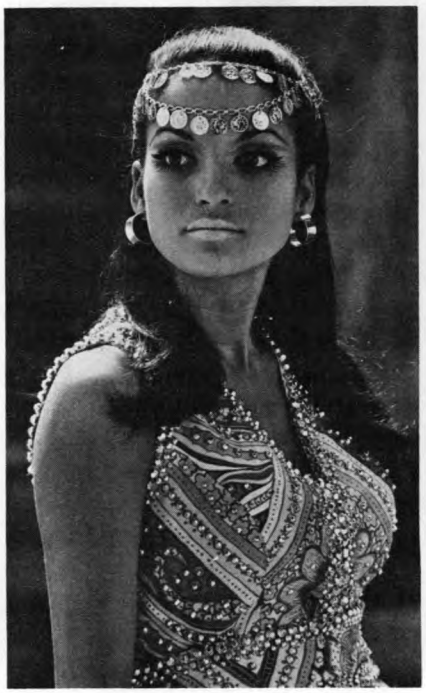
Models convey the idea that life can become happier, more glamorous, adventuresome, or secure if people buy the products or use the services they advertise. The attractive female model or the athletic male model furnishes the indispensable image that can trigger public demand for a new look or product.

Most models specialize in some line of fashion or photographic work.

Fashion models wear clothing gracefully and exhibit an air of distinction. As they walk, pivot, and turn to the back and side, they reveal the highlights of each garment for prospective buyers. On some jobs, they may stop before a prospective purchaser to mention the price and the style number of the garment. Fashion models employed by apparel designers, manufacturers, and wholesalers are called showroom or wholesale models. At peak seasons, showroom models are on duty constantly. During slack periods, when the showroom is empty for many hours each day, they may perform various clerical jobs.

Fashion models employed in department stores, custom salons, and other retail and specialty shops are called informal models. This type of modeling is for customers or promotional purposes and usually conducted at a more leisurely pace than in showrooms.

In the other major branch of modeling—photographic—the work generally is done for advertising or editorial purposes. Photographic models are employed by advertising agencies or free-lance photographers who supply pictures for cata-



logs, pamphlets, and magazine and newspaper ads or features. Photographic models should have some acting ability, since facial expressions help to create the desired mood. To show pleasure, dissatisfaction, or surprise under bright lights in a hard-to-hold pose is not easy.

Photographic models usually work in a neighborhood photographer's studio; occasionally they fly to places such as Miami Beach or Paris to pose against an authentic background.

In addition to fashion or photographic work, models demonstrate new products and services at manufacturers' exhibits and industry trade shows, in commercial or fashion films, or on television. Some are hired by designers for fittings; still others pose for artists and sculptors.

Places of Employment

An estimated 55,000 models were employed in the United States in 1970. Many worked part time; approximately 4 out of 5 were women or girls. Although most models are employed in major cities, the largest number work in New York City, center of the fashion industry. Large numbers also are employed in Chicago, Dallas, Detroit, Los Angeles, Miami, San Francisco, and Washington, D.C.

Manufacturers, designers, and wholesalers employ the largest number of full-time models. In New York City's garment district, for example, thousands of firms and designers permanently employ from one to four models. Others work for advertising agencies, retail stores, mail-order houses, and magazines, as well as for commercial artists, sculptors, illustrators, fashion artists, and art schools.

Training, Other Qualifications, and Advancement

Employers prefer to hire models who have training or experience. Prospective models should attend a modeling school to learn the proper way to walk and stand, how to style hair and use makeup, and to select the appropriate clothing and accessories. In photo modeling courses, students are taught to pose for the photographer and convey different emotions through facial expressions. Classes in developing personality and poise are helpful.

Placement offices at modeling schools provide jobs for many students. Some jobseekers find employment by registering at a model agency. The agency usually asks the applicant for photos in a number of modeling poses to show prospective clients. Department stores sometimes hold auditions that give inexperienced models an opportunity to display the newest styles. Some part-time jobs in department stores also provide useful experience in handling clothing, observing customers, and occasional modeling. Sometimes experience can be gained in local fashion shows to raise funds for charity.

Although no formal educational requirements are necessary for many jobs, some employers require a high school diploma; a few prefer some college. Courses in art, speech, drama, dancing, fashion design and salesmanship are useful. The job demands not only perfect grooming, poise, and a pleasant personality, but also physical stamina and a generous helping of determination. Models are required to withstand the pressures of close schedules and quick changes. Sometimes they work under uncomfortable conditions, such as modeling furs in the summer or swim suits in winter. The wise aspirant will take typing, shorthand, or other practical courses as income insurance between modeling assignments.

Young fashion models must be well proportioned and slim, since they usually model manufacturers' samples in small sizes. Many models, however, work for manufacturers who specialize in apparel for particular types of individuals, such as sportsmen, toddlers, the short, the tall, or the stout. A female shoe model generally must wear size 5, and a hosiery model must have very long and graceful legs. The male model should be able to wear trim clothing—usually a size 40 or 41 long suit. In short, a fashion model is hired to fit the clothing.

Not all attractive people have physical characteristics acceptable for commercial photography. Women photographic models, for instance, usually must be long-waisted and at least 5 feet 6 inches tall, have good teeth, and a face that is pretty or reflects the style demand of the period.

Modeling can serve as 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 serve 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 should remain highly competitive through the 1970's. Because young people are attracted to the glamour attached to this occupation, the number of job hunters is expected to be much larger than the number of full-time

jobs. Employment opportunities for part-time work, however, should be favorable.

Employment of models is expected to increase moderately through the 1970's. Expanded employment is anticipated in industries such as apparel manufacturing, wholesale and retail trade, and advertising. The competition to gain a greater share of growing sales volume will increase emphasis on product promotion and, in turn, stimulate the demand for models.

Most openings for models will result from the need to replace those who leave the field. The work span of most models is relatively short —particularly in high fashion modeling where the accent is on youth. Others are eased out of the field because the work with which they are identified becomes outdated or their pictures have been seen too often. Many women also leave modeling to marry and raise a family. For these reasons, female models seldom work more than 8 years. The working life of the male model, on the other hand, generally is much longer—often 20 years or more.

Earnings and Working Conditions

A model's earnings depend on factors such as the type and place of employment and the nature, frequency, and duration of assignments. Although the earnings of a few top models are high and range to $40,000 or more a year, most models earn much less. According to the limited information available, beginning fashion models who worked full time for manufacturers or wholesalers generally earned from $95 to $100 a week in 1970. Those having experience had weekly earnings of $100 to $135. Beginning models employed by retail stores usually were paid from $65 to $100 a week, whereas experienced retail models earned from $110 to $125. Retail models often supplement their weekly salaries by modeling in fashion shows. A model is paid for pre-show fittings as well as the show at hourly rates ranging from $15 in some cities to $60 for experienced models in the New York City area.

Beginning photographic models earned from $25 to $50 an hour in 1970. This rate is deceptive when considered on a weekly or annual basis because many models—especially beginners—work only a few hours each week. Although photographic modeling often pays well, it can be an "expensive" career. In many cases, models must provide their own accessories and pay for other expenses. Occasionally, a complete outfit is needed to get a job.

Television models earn at least $35 an appearance as an extra, and at least $135 an appearance as a principal character, plus an additional amount for each rerun. They must be members of a union—either the Screen Actors Guild, Inc., or the American Federation of Television and Radio Artists.

Manufacturers, wholesalers, and retailers usually employ models on a permanent basis. They work a 5-day week and receive a 2-week vacation and other benefits. Those who work through agencies or on a free-lance basis, however, receive no supplementary benefits. Models usually are paid time and a half for work after 5:30 p.m. on weekdays, and for any time worked on Saturdays and Sundays. The client pays travel expenses outside the city. Additional compensation also is received for hazardous assignments, such as striking a friendly pose with a lion or climbing a ship's rigging.

Modeling may influence the model's personal life. Since the camera highlights the effects of keeping late night hours, for example, a model may limit evening social engagements to be fresh for the next day's work. In addition, a female model must devote part of each evening to beauty care, and sometimes must prepare clothing and accessories for the next day's assignment. To stay in the profession, the high fashion model must remain very slender.

Sources of Additional Information

Young people interested in attending a professional modeling or charm school can write to the Department of Education in their State for a list of approved modeling schools.

Catalogs describing the program, entrance requirements, and tuition costs at particular modeling schools may be obtained by writing their directors.

SKILLED AND OTHER MANUAL OCCUPATIONS

The 27.8 million blue-collar workers—skilled, semiskilled, and unskilled—employed in 1970 made up more than one-third of all the Nation's employed workers. They work in hundreds of different occupations and perform many important functions in our economy. They transform the ideas of scientists and the plans of engineers into goods and services. They operate transportation and communication systems that tie the country together. They build homes, office buildings, and factories. They fabricate, install, control, maintain, and repair the complex equipment necessary for operating our highly mechanized society. They repair automobiles, television sets, washing machines, and other household appliances. They move raw materials, wrap and pack finished products, and load and unload supplies and equipment of all kinds.

Young persons who have mechanical interests and abilities, or who enjoy working with their hands, will find many employment opportunities among the hundreds of occupations in this group.

Technological progress is causing major changes in the occupational composition of the Nation's labor force. Rapid advances in the industrial applications of scientific knowledge and invention are making possible increasing use of automatic devices that operate the machinery and equipment used in manufacturing. Nonetheless, the number of skilled and semiskilled workers is expected to continue to increase through the 1970's, despite this rapid mechanization and automation of production processes. It is expected that our increasingly complex technology generally will require higher levels of skill to operate and service this machinery and related equipment.

Although blue-collar workers declined slightly as a proportion of total employment between 1960 and 1970, their number increased by about 3.7 million. Semiskilled workers accounted for nearly 53 percent of the increase, skilled workers for 43 percent, and unskilled workers for less than 5 percent.

Through the 1970's, employment of blue-collar workers is expected to increase only about half as fast as total employment. However, different rates of growth are expected for each of the three major occupational groups that make up the blue-collar worker category. For example, employment of skilled workers is likely to increase nearly as fast as total employment; semiskilled workers will grow at a much slower rate; and no significant change is expected in the number of unskilled workers.

In addition to the large number of job opportunities expected to be available for blue-collar workers because of employment growth, an even greater number is expected to result from the replacement of experienced workers who retire, die, or transfer to other fields of work. Replacement needs caused by retirements and deaths alone should provide more than 600,000 job openings annually. For skilled workers, replacement needs are expected to offer about the same number of job opportunities as employment growth. For semiskilled workers, on the other hand, replacement needs are expected to offer more than twice as many job opportunities as employment growth. For unskilled workers, virtually all job opportunities will come from replacement needs.

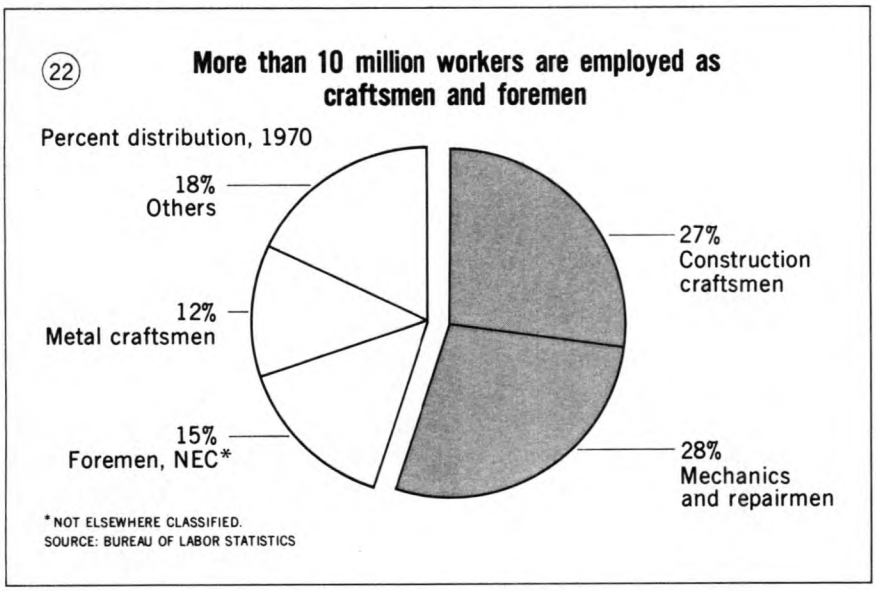
The skilled, semiskilled, and unskilled occupation groups are discussed separately in the following section. Following these general discussions are more detailed statements on selected blue-collar occupations. Many other blue-collar occupations also are described in individual industry statements elsewhere in the *Handbook*.

SKILLED WORKERS

(Craftsmen, Foremen, and Kindred Workers)

The Nation's economic strength depends to a great extent on the initiative and competence of its skilled work force. Skilled workers make the patterns, models, tools, dies, machines, and equipment without which industrial processes could not take place. They repair the equipment used in industry, and the mechanical equipment and appliances used by consumers. They also build homes, commercial and industrial buildings, and highways.

In 1970, there were about 10.2 million skilled workers. More than half of them were employed in two broad occupational groupings—construction craftsmen and mechan-



ics and repairmen. (See chart 22.) Two occupations had more than 800,000 workers each—carpenters and automotive mechanics. About a dozen additional skilled occupations had more than 100,000 workers each. (See chart 23.) However, many skilled occupations, such as watch repairmen and paperhangers, had fewer than 20,000 workers each.

Although skilled workers are employed in almost every branch of industry, more than three-fifths work in manufacturing and construction. About 9 out of every 10 skilled workers are employed by private firms; others are self-employed or work for Federal, State, or local governments. The building trades have a fairly high percentage of self-employed craftsmen. As might be expected, the skilled work force is concentrated in the highly populated and industrialized States. Job opportunities, however, are found in every State. A very small proportion (about 3 percent) of skilled workers are women.

Training, Other Qualifications, and Advancement

Skilled workers must have a thorough knowledge of the processes involved in their work. They often exercise independent judgment and they may also be responsible for valuable equipment or products. Consequently, they require considerable training to qualify for their jobs. A large proportion of skilled workers learn their trades through informal on-the-job training and experience. Many others learn their trades through apprenticeship or other formal training programs. Large numbers of young men also acquire skills in the armed services. For others, vocational school training plays an important role.

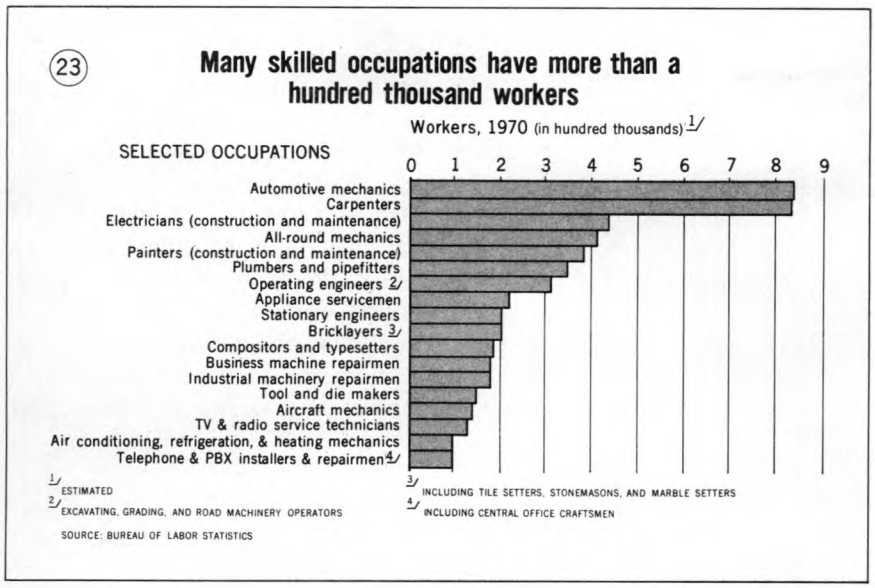
Most training authorities agree that the best way to learn a skilled trade is through a formal apprenticeship program. Apprenticeship is a period of systematic on-the-job training, supplemented by related trade instruction, which is designed to familiarize the apprentice with the materials, tools, and principles of the trade. The apprenticeship program provides the trainee with a balanced knowledge of his trade. The formal apprenticeship agreement specifies the training time the apprentice is to receive in the various aspects of the trade. Most apprenticeship programs last from 3 to 4 years.

Apprenticeship has several advantages over less formal methods of learning a trade. An apprentice receives broad training and experience that enable him to adjust to constantly changing job requirements, and prepare him to work in a wide range of jobs. The completion of an apprenticeship also gives the worker a recognized status that is an advantage in finding and holding jobs. In addition, it may increase his opportunities for promotion to a foreman or supervisory-level job.

Many companies have training programs that also provide systematic on-the-job training. Frequently, these programs include supplementary classroom instruction.

Many young persons move from one semiskilled job to another and, over a period of years, acquire knowledge and skills sufficient to make them skilled workers. Others begin learning a skilled trade in vocational, trade, or technical schools. A small proportion of these students move directly into jobs in their trade and, after acquiring on-the-job experience, qualify as skilled workers. Other young persons, who already are employed in semiskilled or unskilled jobs, move into skilled occupations by taking vocational studies related to their work, such as correspondence courses, manufacturers' training programs, and night school courses.

Large numbers of young men acquire skills in the Armed Forces that enable them to qualify, with additional training, for skilled jobs in civilian life, such as automobile



mechanic, aircraft mechanic, electrician, or office machine repairman.

Many supervisors and men in administrative positions have come from the ranks of craftsmen. Employers long have recognized the value of executives who have both industrial know-how and administrative ability.

Young persons who do not expect to go to college should consider the definite advantages the skilled trades offer, compared with semiskilled and unskilled occupations. Skilled workers have higher earnings, more job security, better chances for promotions, and more opportunities to open their own businesses than most workers having lesser skills. Among the 11 occupational groups that make up our labor force, only men in the professional, managerial, and salesworker groups had higher earnings than the average $8,791 a year earned by skilled men in 1969.

Employment Trends and Outlook

Employment in skilled occupations grew from about 8.6 million workers in 1960 to 10.2 million in 1970. Continued growth in the number of skilled jobs is expected in the years ahead. Job opportunities also will result from the replacement of skilled workers who transfer to other fields of work, are promoted, retire, or die. About 215,000 skilled workers are expected to be needed each year to replace those who retire or die.

Employment in skilled occupations is expected to rise moderately through the 1970's because of industrial growth and technological advances that increase the need for skilled workers. As in the past, rates of employment growth will differ among the skilled occupational groups. For example, employment of mechanics and repairmen and construction craftsmen is expected to grow more rapidly than the skilled work force as a whole, and employment in major skilled machining occupations is expected to grow less rapidly. On the other hand, employment in the printing trades is expected to show little or no change.

Young men who acquire a good basic education (including courses in mathematics and the sciences), as well as thorough job training, will be better able to compete for higher paying skilled jobs than applicants without this training.

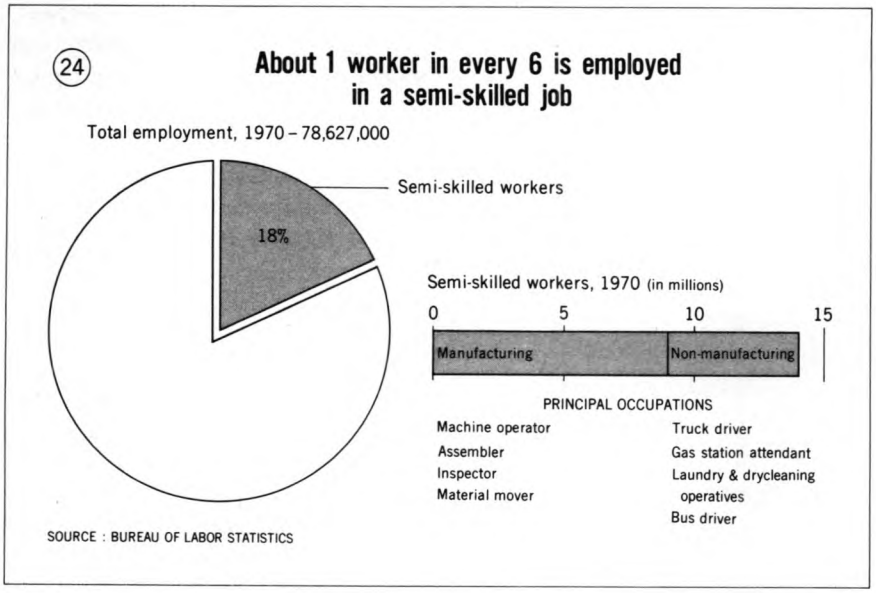
SEMISKILLED WORKERS

(Operatives)

Semiskilled workers make up the largest occupational group in the Nation's labor force. About 13.9 million workers—1 out of every 6—were employed in semiskilled jobs in 1970. Of the 9 million semiskilled workers employed in manufacturing industries (chart 24), large numbers were engaged in processing food, making textiles and clothing, and producing automobiles and industrial machinery. The broad field of semiskilled jobs will provide hundreds of thousands of employment opportunities for young persons in the years ahead.

Truckdrivers account for the largest single group of semiskilled workers. Millions of other semiskilled workers operate power driven machines in factories. Many use sewing machines to join fabrics for clothing. Others operate machines to stamp out metal parts; still others use machine tools, such as engine lathes and milling machines, to shape metal to precise sizes. A considerable number of semiskilled workers operate materials moving equipment, such as forklift trucks, to move raw materials and manufactured products from place to place in factories.

Large numbers of semiskilled workers are employed as assemblers and inspectors. Assemblers install



components and subassemblies into end products such as radios and television sets. Inspectors examine and test products to find out whether their quality is satisfactory. Many semiskilled workers in factories are employed as helpers or assistants to skilled workers. For example, stationary firemen help skilled stationary engineers operate and maintain steam boilers.

In 1970, 4.3 million women accounted for about 30 percent of all semiskilled workers. Jobs like those of sewing machine operators, packers and wrappers, and assemblers were by far the largest source of employment for women in manufacturing. The number of women employed in the different manufacturing industries varied considerably. Women accounted for a large proportion of the semiskilled jobs in the apparel, textiles, and food industries. On the other hand, plants that produce iron and steel and petroleum products employed relatively few women in semiskilled jobs.

Training, Other Qualifications, and Advancement

Semiskilled workers ordinarily receive only brief on-the-job training. Usually, they are told exactly what to do and how to do it, and their work is supervised closely. They often repeat the same motions or the same routine throughout the working day.

Semiskilled workers do not need to invest many years in learning their jobs. The simplest, most repetitive jobs can be learned in a day and mastered in a few weeks. Even jobs that require a higher degree of skill, such as truckdriving, can be learned in a few months. At the same time, the ability to learn new jobs quickly, including the operation of new machines, is an important qualification for semiskilled workers.

New employees in semiskilled jobs are not expected to be highly proficient. After a short training period, however, they must work at a fast and steady pace. Frequently good eyesight and good coordination are required.

Semiskilled jobs often pay well. Some semiskilled workers who are paid on an incentive basis are among the highest paid workers in manufacturing. However, the average annual earnings of semiskilled men in 1969 was $7,348—$1,443 less than those of skilled men. An added disadvantage is that semiskilled workers are more likely to lose their jobs during a business recession, and to remain unemployed longer than skilled or white-collar employees.

Employment Outlook

Employment of semiskilled workers is expected to increase slowly through the 1970's. Most job opportunities are expected to result from the need to replace workers who are promoted, transfer out of semiskilled jobs, retire, or die. About 320,000 job openings are expected each year as a result of retirements and deaths. Transfer rates for semiskilled workers are high because a large proportion of them are young workers who tend to change jobs frequently, and women workers who leave their jobs to marry, raise families, or move to other areas when their husbands change jobs.

The continuing growth in the use of commercial motor vehicles will increase employment opportunities for drivers of trucks and buses. Greater substitution of power equipment for unskilled labor in lifting, hauling, digging, and similar heavy physical work will create new jobs for semiskilled workers such as power equipment operators. On the other hand, employment growth in manufacturing will be limited by increasing automation of production processes. There are many processes, however, to which automation is not likely to be applied in the

1970's, and many industries in which the impact of automation will be limited.

Young men and women who have no training beyond high school will continue to find a major area of job opportunities in semiskilled occupations. The most rapid gains in the Nation's employment, however, will be in professional, technical and other white-collar occupations and in skilled occupations. If possible, young persons having ability should obtain the additional training and education that these occupations require. Semiskilled workers, however, even those who did not complete high school, are not cut off permanently from advancement if they take advantage of the many educational opportunities available in their communities. They may take courses in evening schools or enter apprentice training programs and eventually qualify for better jobs.

UNSKILLED WORKERS

(Laborers)

Unskilled laborers work in manual occupations that generally require no special training. These jobs usually involve handling and moving materials; for example, loading or unloading, digging, hauling, hoisting, wrapping, and mixing. Some jobs require heavy physical work. About half of the 3.7 million unskilled laborers employed in 1970 worked in manufacturing and construction industries. A large proportion of the remainder were employed in retail and wholesale trade, transportation, public utilities, and service industries.

Although some of these jobs pay well, particularly in construction work, the average annual earnings of unskilled men in 1969 was $6,082—$1,266 less than those of semiskilled men. Moreover, unskilled workers are usually the first to lose their jobs during a business recession; they have the highest unemployment rate of all the major occupational groups.

Little or no change in the number of unskilled laborers is expected through the 1970's. Nevertheless, there will be thousands of opportunities for new workers to get jobs as unskilled laborers because of the need to replace workers who transfer to other fields of work, retire, or die. Deaths and retirements alone are expected to result in about 70,000 job openings each year.

Mechanical equipment has been replacing manual labor, and this trend will continue. Power-driven equipment, such as forklift trucks, derricks, cranes, hoists, and conveyor belts will take over more and more materials-handling work in factories, freight terminals, and warehouses. Other power-driven machines will do excavating, ditch-digging, and similar work. Integrated systems of processing and materials-handling equipment, a more advanced step in automation, will be installed in an increasing number of plants in the years ahead. Industrial expansion, however, is expected to create a need for unskilled laborers which will approximately offset the jobs lost to laborsaving mechanical equipment.

FOREMEN

Nature of the Work

Foremen play a strategic role in the economic activities of the Nation. They supervise and coordinate the work of highly skilled, semiskilled and unskilled blue-collar workers, and are often responsible for millions of dollars worth of equipment and material. They may oversee workers engaged in assembling television sets, servicing automobiles, laying bricks, unloading ships, or any thousands of other activities. Foremen often are referred to by different titles. For example, in the textile industry they are referred to as second hands; on board ship they are called boatswains; and in construction they are known by titles such as overseer, strawboss, gang leader, or pusher.

Supervising workers is the most important part of the formen's job. Many blue-collar workers never work under supervisors above the rank of foreman, and it is through their foremen that they get their work orders, their discipline, and their recognition. Foremen interpret and communicate company policy to the workers. They are responsible for the guidance and instruction necessary to assure that workers are qualified to handle their assignments and to see that new employees are properly trained for their jobs.

In some enterprises, foremen, in addition to their supervisory responsibilities, work at specific crafts. "Working foremen" are common in construction, where, for example, bricklayer foremen supervise the work of journeymen bricklayers and helpers and also lay brick. Working foremen in some cases belong to the same labor union as the workers they supervise.

Foremen must plan and schedule the work of their subordinates and maintain production and employee records. They spend part of their time participating in meetings and preparing reports on production, cost, personnel, and safety. Foremen must exercise considerable judgment in their planning and allow for unforeseen contingencies such as absenteeism and machinery breakdown.

Foremen see that safety rules and regulations are observed 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 provisions of labor-management agreements and run their operation according to the agreements.

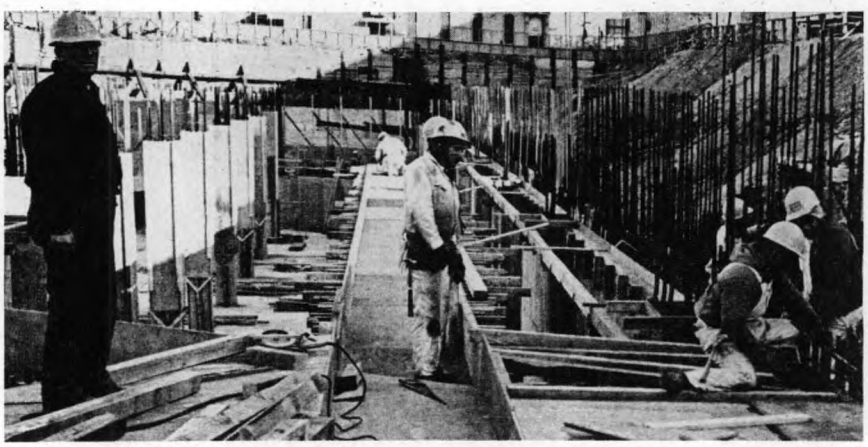
Places of Employment

Almost every business enterprise and government agency that employs blue-collar workers has foremen. Nearly 1.5 million were employed in 1970; about 90 percent were men.

Foremen work mainly in the highly industrialized sections of the Nation. About three-fifths are employed in 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. Female foremen, or foreladies, are primarily employed in the apparel, electrical machinery, leather products, and laundry and drycleaning industries.

Training, Other Qualifications, and Advancement

Unlike entry requirements for most supervisory positions, employers generally look for experience and skill rather than specific educational background when choosing foremen. Most foremen rise through the ranks—that is, they are promoted from the machine or work bench or construction craft. By performing different jobs over a period of time, they develop their skills and acquire a thorough knowledge of the processes involved in the work they supervise. During this time, they also learn much about their fellow worker, individually and collectively, 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 foremen rising through the ranks gives them 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.

Most workers who are promoted to foremen jobs are high school graduates who have learned their skills on-the-job. Many have acquired technical skills through apprenticeship or other formal training programs, and some have benefited from courses offered through Armed Forces training schools. 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. These workers are hired as foremen helpers and undergo on-the-job training until they are capable of accepting supervisory responsibilities.

Employers look for leadership qualities when considering persons for foremen positions. Especially helpful is the ability to motivate employees, command respect, and get along with people.

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

Employment Outlook

Employment of foremen is expected to increase moderately through the 1970's. In addition to the substantial number of job opportunities expected to occur as a result of employment growth, an even greater number of job openings will occur each year as experienced foremen are promoted, transfer to other occupations, retire, or die.

Factors underlying the expected growth of foremen are the increase in the size of business operations and government services requiring blue-collar workers, and the growing trend towards increased supervision as industrial production processes become more technical. More foremen, for example, will be required for functions such as inspection and production scheduling.

Most foremen will continue to be employed in manufacturing. However, more than half of the increase in the number of foremen during the 1970's 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

Salary levels of foremen generally are keyed to the earnings of the highest paid workers they supervise. Some companies have a formal policy to maintain specific wage differentials between foremen and the workers they supervise that range from about 10 percent to 40 percent. However, these differentials do not take into account overtime payments to hourly workers. Foremen are usually salaried and not paid for overtime. If they are paid for overtime, they normally do not get the premium rate that workers under their supervision receive. In 1969, the average (median) earnings of foremen who worked full time during the year was $9,493.

Working conditions of foremen vary widely from industry to industry. As the lowest level supervisory group, foremen spend much of their time with the workers on the plant floor or at the construction site. Plant foremen are apt to get dirty around machinery and materials and may be subjected to noisy manufacturing operations. Construction foremen often are subject to unpleasant weather conditions. Foremen generally work more than 40 hours a week and often are expected to be at work before their subordinates arrive, and remain there after they leave.

Some foremen who have limited authority may feel isolated, neither a member of the workforce nor a significant part of management. On the other hand, the foreman position holds more prestige than that of blue-collar workers and the work is often more challenging and rewarding.

Sources of Additional Information

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

BUILDING TRADES

Building trades craftsmen represent the largest group of skilled workers in the Nation's labor force. Altogether, there were more than 2¾ million of these craftsmen employed in 1970—about 3 out of every 10 skilled workers.

The more than two dozen skilled building trades vary greatly in size. Several major trades—carpenter, painter, plumber, pipefitter, bricklayer, operating engineer (construction machinery operator), and construction electrician—each had more than a hundred thousand workers. (See chart 25.) Carpenters alone numbered 830,000—nearly one-third of all building craftsmen. By contrast, only a few thousand were employed in each of several trades such as marble setter, terrazzo worker, glazier, and stonemason.

What Are the Building Trades?

Building trades craftsmen are employed mainly in the construction, maintenance, repair, and alteration of various structures. These include homes and other types of buildings, highways, and airports. They also include substantial work in the Nation's defense and space programs.

The wide range of materials and skills used in construction has resulted in the specialization of various work operations. Thus, building trades workers who use essentially the same materials or skills have tended to become identified with distinct trades. For example, bricklayers and stonemasons both work with masonry materials. Although operating engineers do not work with particular materials, they have a group of related skills that enables them to handle various types of excavating, grading, hoisting, and other equipment.

The building trades consist primarily of journeymen (craftsmen) who generally must have a high level of skill and a sound knowledge of assembly and construction operations. They often are assisted by apprentices, tenders, and laborers.

The work of journeymen may be grouped into three broad classifications—structural, finishing, and mechanical. However, some craftsmen —for example, carpenters—may do finishing as well as structural work. Generally, each building trade is classified in one of these three categories, as follows:

Occupations 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.

Occupations mainly concerned with finishing work: Lather, plasterer, marble setter, tile setter, terrazzo worker, painter, paperhanger, glazier, roofer, floor covering installer, and asbestos worker.

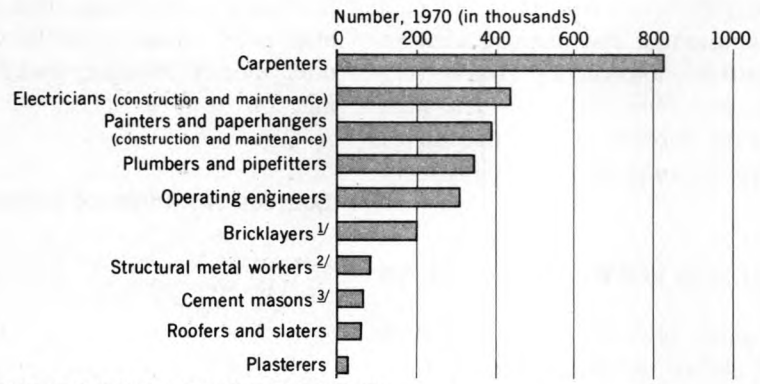
Occupations mainly concerned with mechanical work: Plumber, pipefitter, construction electrician, sheet-metal worker, elevator constructor, and millwright.

Most building trades occupations are described individually later in this chapter. These descriptions are necessarily brief and incomplete. They do not apply fully to all localities because of local differences in the types of work done by the various trades.

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.

Detailed descriptions of the nature of the work, training, employment outlook, and other information concerning boilermakers and millwrights appear elsewhere in the *Handbook*.

(25) **Employment in the building trades**



1/INCLUDES STONEMASONS, MARBLE SETTERS, AND TILE SETTERS
2/STRUCTURAL AND ORNAMENTAL IRON WORKERS
3/ INCLUDES TERRAZZO WORKERS
SOURCE: BUREAU OF LABOR STATISTICS

Where Building Trades Workers Are Employed

Building trades workers are employed mainly by contractors in the contract construction industry. Many others are employed in industries other than construction, mainly to do maintenance and repair work. Some work directly for business firms or government agencies that have their own construction force, and others are self-employed.

The building trades craftsmen who work in the contract construction industry are employed by general and special-trade contractors. General contractors may be classified as building (residential, commercial, or industrial), highway, or heavy construction contractors, since most general contractors limit their operations to one of these activities. These contractors construct buildings and other structures, such as dams, bridges, tunnels, and roads. They take full responsibility for the complete job, except for specified portions of the work omitted from the general contract. General contractors may do a large part of the work with their own crews, but they often sub-contract particular phases of the construction job to special-trade contractors.

Special-trade contractors usually do the work of only one trade, such as painting, carpentry, or electrical work, or of two or more closely related trades, such as plumbing and heating, or plastering and lathing. Beyond fitting their work to that of other trades, they have no responsibility for the structure as a whole. The special-trade contractors obtain orders for their work from general contractors, from architects, or from property owners. Repair work is done almost always on direct order from owners, occupants, architects, or rental agents.

There are several hundred thousand contractors (both general and special-trade); most of them operate within a limited geographical area. The great majority are small —generally employing fewer than 10 workers. Some large firms employ several thousand workers each.

Thousands of building trades workers are employed in factories, stores, mines, hotels, and most other types of large business establishments. For example, plumbers and pipefitters are employed by firms to maintain, repair, and install piping systems. In addition, large firms frequently employ crews of building trades workers to construct houses, office buildings, and other new structures. Government agencies also employ many construction craftsmen to build, maintain, and repair highway, water, and sanitation systems.

Many building trades workers are self-employed. Self-employed journeymen work directly for property owners on small jobs. They may be paid by the hour or the day, or they may be paid an agreed price for the job. They may provide the materials and include them in the price, or use materials provided by the owner. Self-employment is most common in carpentry and painting, but it also is characteristic of other skilled building trades.

The work of the skilled building craftsman is identified with a specific trade, such as carpentry or bricklaying, rather than with an individual contractor or even a broad group of contractors. Thus, a carpenter may be employed mainly by a particular builder but, in the course of a year, he also may be employed by a concrete contractor to build forms for a concrete bridge; by an electrical or plumbing contractor to build a temporary structure at a large construction site; or he may contract to do a small repair job on his own.

In some of the trades, work may be performed away from the construction site. For example, sheet-metal workers may be employed in shops where ducts are fabricated for installation in a building. In other trades, craftsmen may work in the central shop of the contractor or in fabrication shops at the job site.

Employment of these workers is distributed geographically in much the same way as the Nation's population. Thus, their employment is concentrated generally in the industrialized and highly populated States, such as California, New York, Illinois, Pennsylvania, Ohio, and Texas.

Training, Other Qualifications, and Advancement

Most training authorities, including national joint labor-management apprenticeship committees established for most of the building trades, recommend formal apprentice training as the best way to acquire the all-around proficiency of craftsmen in the building trades. Apprenticeship is a prescribed period of on-the-job training, supplemented by related classroom instruction, which is designed to develop skill by making the apprentice familiar with the materials, tools, and principles of his trade. This type of training provides the apprentice with a balanced knowledge of his field of work and enables him to perform its operations competently. Formal apprenticeship agreements are registered with a State apprenticeship agency or the U.S. Department of Labor's Bureau of Apprenticeship and Training.

Many building trades workers have acquired the skills of their

trades informally by working as laborers and helpers, observing or being taught by experienced craftsmen. Some building trades craftsmen have acquired their skills, or part of their skills, by attending vocational or trade schools or by taking correspondence school courses.

Apprentices in the building trades generally are required to be between 18 and 25 years of age, and in good physical condition. The maximum age limit may be waived for veterans or others having experience or special qualifications. A high school education, or its equivalent, including courses in mathematics and the sciences, is desirable and, in a few trades, actually required. Often, applicants are given tests to determine their aptitude for a particular trade. For some skilled building trades, it is important to have considerable manual dexterity, mechanical aptitude, and an eye for proper alinement of materials.

The formal registered apprenticeship agreement generally stipulates a training period of from 2 to 5 years of relatively continuous employment and training, in addition to a minimum of 144 hours a year of related classroom instruction. The journeymen on the job and the foreman explain to the apprentice how the work is done and show him how different operations are performed and the way different tools are used. Ordinarily, most of this instruction is given by a particular journeyman to whom the apprentice is assigned. The apprentice is required to do work of progressively increasing difficulty and with progressively less supervision.

Related classroom instruction varies among the skilled building trades, but usually includes courses such as history of the trade; characteristics of the materials used; shop mathematics related to the work of the trade; and some basic principles of engineering, where appropriate (particularly for pipework, work on ventilating systems, and electrical work). 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. Such related instruction seldom is offered in small communities where there may be only a few apprentices and a small number of journeymen in a particular trade. In these areas, apprentices receive instruction through courses offered in the local high school or by visiting instructors, generally furnished by the State. Other subject matter requirements are met through personal instruction by local journeymen and contractors or, sometimes, through correspondence courses.

The formal registered apprenticeship agreements also stipulate the length of time the apprentice is to be required to work in each major operation of the trade, as well as his rate of pay at successive intervals of advancement. The apprentice is paid at an advancing rate, usually starting 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 rate 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. Advanced standing is granted on an individual basis and usually is determined by a demonstration of trade skill and knowledge.

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 apprentices sign their apprenticeship agreements with these committees. The committee determines the need for apprentices in the locality and establishes minimum apprenticeship standards of education, experience, and training. Whenever employers cannot provide the variety of experience necessary to give an apprentice all-round instruction in the various branches of the trade, or relatively continuous employment over the entire period of apprenticeship, the committee transfers the apprentice to another employer. Where specialization by contractors is extensive—for instance, in electrical work—it is customary for the joint committee to rotate apprentices among several contractors in the trade at intervals of about 6 months. In some large cities, the local joint apprenticeship committee employs an apprenticeship program coordinator.

In areas where these committees have not been established, the apprenticeship agreement is solely between the apprentice and an employer or employer group. Many journeymen have received valuable training under this type of apprenticeship program, but such a program may involve some element of risk for the apprentice. In those instances, there is no joint committee to supervise the training offered, to settle differences over the terms and conditions of apprentice training, or to arrange a transfer in cases of personal disagreements between the apprentice and the employer. The apprentice's training depends principally on his employer's business prospects and policies. If the employer lacks continuous work or does only a restricted type of work, he cannot provide the apprentice

with the broad training needed to develop journeyman skills.

In early 1970, about 150,000 men were registered in apprentice training programs in the construction trades. Additional apprentices receive their training in unregistered programs. In future years, opportunities for many young men to receive apprentice training will be available in all parts of the country. In addition, thousands of other workers will be able to learn construction trades informally.

Some indication of the location of future apprenticeship opportunities in the building trades is available from the latest data showing the geographical distribution of registered apprentices in these trades. The following eight States accounted for nearly one-half of the registered apprentices in training for selected building trades in early 1970; California, New York, Ohio, Illinois, Michigan, Texas, Pennsylvania, and Florida.

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, demonstrating a broad knowledge of the job and of State and local regulations.

Building trades craftsmen may advance in a number of ways. For example, a journeyman may become a foreman in charge of a crew. 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 supervise only. A craftsman also can become an estimator for a contractor. In this job, he estimates 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. In addition, many thousands of journeymen have become contractors, particularly in the homebuilding field.

It is easier to start a small contract construction business than a small business in many other industries. Only relatively moderate financial investment is needed because liberal credit arrangements make it easier to buy materials, and it is possible to conduct a fairly substantial business from the proprietor's home. However, the contract construction field is highly competitive, and the rate of business failure is especially high among small contractors. To be successful, the proprietor of a small contracting firm must have the ability to plan work, to foresee needs and problems, to direct others, and to estimate material and labor requirements for jobs on which he is bidding. He also must have a sound knowledge of business practices and financing. Sound journeyman knowledge increases chances for success. Some States or municipalities require contractors to be licensed.

Employment Outlook

Employment in the building trades is expected to increase rapidly through the 1970's, assuming relatively full employment nationally and the high levels of economic activity needed to achieve this goal. If the high levels of economic activity are not achieved, employment in the building trades will increase at a slower rate than that projected. In addition to employment growth, tens of thousands of job openings will result from the need to replace experienced workers who transfer to other fields of work, retire, or die. Retirement and deaths alone will provide nearly 80,000 job openings in the building trades each year through the 1970's.

The rapid increase in total employment in the building trades (7 out of 10 of whom are employed in the construction industry) 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 recent years are expected to create strong pressure for new housing in the 1970's. Congress, through the Housing and Urban Development Act of 1968, has expressed its resolve that housing receive high priority among the Nation's domestic needs. Among other factors that will stimulate construction activity are a rise in expenditures for new industrial plant capacity, and higher levels of personal and corporate income. In addition, there will be a growing demand for alteration and modernization work on existing structures, as well as maintenance and repair work on the expanding highway system and on the increasing numbers of dams, bridges, and similar projects.

Employment of building trades workers outside the construction industry is expected to expand as a result of the anticipated high levels of economic activity, which will stimulate the construction of commercial and industrial buildings and, therefore, increase maintenance and repair requirements.

The increase in building trades employment is not expected to be as great as the total expansion in construction activity. Continued technological developments in construc-

tion methods, tools and equipment, and materials will permit increasing output per construction worker. One such important development in construction methods is the increasing use of prefabricated components, which are installed as complete units at the job site for almost all types of construction projects. For example, preassembled outside walls and partitions can be lifted into place in one operation, and electric circuit boxes and switchboards prewired at the factory instead of being wired by the electrician at the job site. An important extension of prefabrication is "module building" in which units, including complete rooms or buildings, are available in standard sizes. Furthermore, standardization of components will contribute to their greater use in the future.

Also expected to affect employment growth by increasing workers' efficiency are technological advances in construction tools and equipment, such as shock resistant, cordless, electric-powered tools. 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, speed, durability, and mobility of large cranes, construction machines, including bulldozers and scrapers, have increased considerably. Many of these machines, while they can do many times more work than the largest machines a few years ago, require only one operator. New types that reduce labor requirements also are being developed, including concrete paving machines that perform the work formerly done by four separate machines.

New and improved construction materials also are expected to limit employment growth. For example, lightweight and durable plastics are being used for a growing variety of components, including partitions, wall panels, siding, insulation, and roofing. Other new and improved products are adhesives that eliminate the need for conventional fasteners, nails that have improved holding power, paints that last twice as long as those in common use, and wood products that come from the factory prepainted with the prime coat and even the final coat.

The rates of employment growth will differ among the various building trades. Employment growth is expected to be most rapid for construction electricians; cement masons; plumbers and pipefitters; excavating, grading, and road machinery operators; and glaziers. Among the trades that will have a slower growth rate are stonemasons, marble setters, and plasterers.

Earnings and Working Conditions

Hourly wage rates paid to building trades craftsmen are among the highest paid to skilled workers. However, because construction work is seasonal and time also is lost for other reasons, average annual earnings of building trades craftsmen are not as high as the hourly rates of pay would indicate.

The hourly rates of pay for skilled workers in the building trades vary by trade and locality. Generally, the highest hourly rates are paid in the larger communities. Minimum hourly rates under union contracts for journeymen and for helpers and laborers in selected building trades in 68 large cities, on July 1, 1970, averaged as follows:

	Union minimum average hourly rate
All building trades	$6.18
Journeymen	6.54
Asbestos workers	6.69
Bricklayers	6.77
Carpenters	6.42
Cement masons (finishers)	6.02
Electricians (inside wiremen)	6.82
Elevator constructors	6.65
Glaziers	6.08
Lathers	6.44
Marble setters	6.29
Terrazzo workers	6.46
Tile setters	6.08
Painters	5.95
Paperhangers	6.02
Pipefitters	6.93
Plasterers	6.35
Plumbers	7.01
Roofers, composition	6.17
Roofers, slate and tile	5.81
Sheet-metal workers	6.75
Stonemasons	6.73
Structural-iron workers	6.72
Rodmen	6.64
Helpers and laborers	4.86
Bricklayers' tenders	5.06
Building laborers	4.78
Composition roofers' helpers	3.65
Elevator constructors' helpers	4.76
Marble setters' helpers	5.43
Terrazzo workers' helpers	5.46
Tile setters' helpers	5.15
Plasterers' laborers	5.17
Plumbers' laborers	4.95

Union wage rates for these occupations are negotiated between trade unions and employers. The minimum rates do not include holiday, vacation, or other benefit payments made or credited to the worker each pay period. They also do not include overtime, bonuses, or payments for special qualifications or for other reasons.

Construction work frequently requires prolonged standing, bending, stooping, and working in cramped quarters. Exposure to cold, hot, and inclement weather is common, as much of the work is done outdoors or in partially enclosed structures. During the winter, when the building is sufficiently enclosed, heat is sometimes provided. Many persons prefer construction work to other

skilled occupations because it permits them to work outdoors.

Construction work generally is more dangerous than work in manufacturing, but the risk of injury is lessened considerably when proper work practices are followed.

Forty hours was the standard workweek for a vast majority of union building trades workers in 1970. 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.

A substantial proportion of organized building trades workers are included in health, insurance, and pension programs negotiated between unions and employers, and financed entirely by employer contributions.

There are several reasons why young men may wish to consider one of the building trades as a career. These trades offer especially good opportunities for those who are not planning to go to college, but who are willing to spend several years in learning a skilled occupation. Well-trained building trades craftsmen 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, building trades craftsmen with business ability have greater opportunities to establish their own businesses than workers in many other skilled occupations. In addition, there will be job opportunities for workers in the major building trades in nonconstruction industries, mainly in maintenance and repair activities. This work is generally less seasonal than contract construction work.

A principal disadvantage of work in the building trades is the employment fluctuations that result from changes in general business conditions. Another disadvantage is that even during years of high levels of construction activity, annual earnings of workers in the building trades are limited somewhat by the seasonal nature of construction work. Worktime is lost as a result of bad weather and other interruptions.

A large proportion of building trades 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 types of construction employment in a particular locality should be obtained from individual construction firms, employer associations, locals of the building trades unions, the nearest 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 joint union-management apprenticeship committees. In these instances, an apprentice applicant may apply directly to the coordinator of the joint apprenticeship committee if there is one in his locality. In addition, the local office of the State employment service may be a source of information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities.

For additional information on jobs in the building trades, inquiries should be directed to the organizations listed above:

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 building trades, see the discussions of individual building trades later in this chapter.

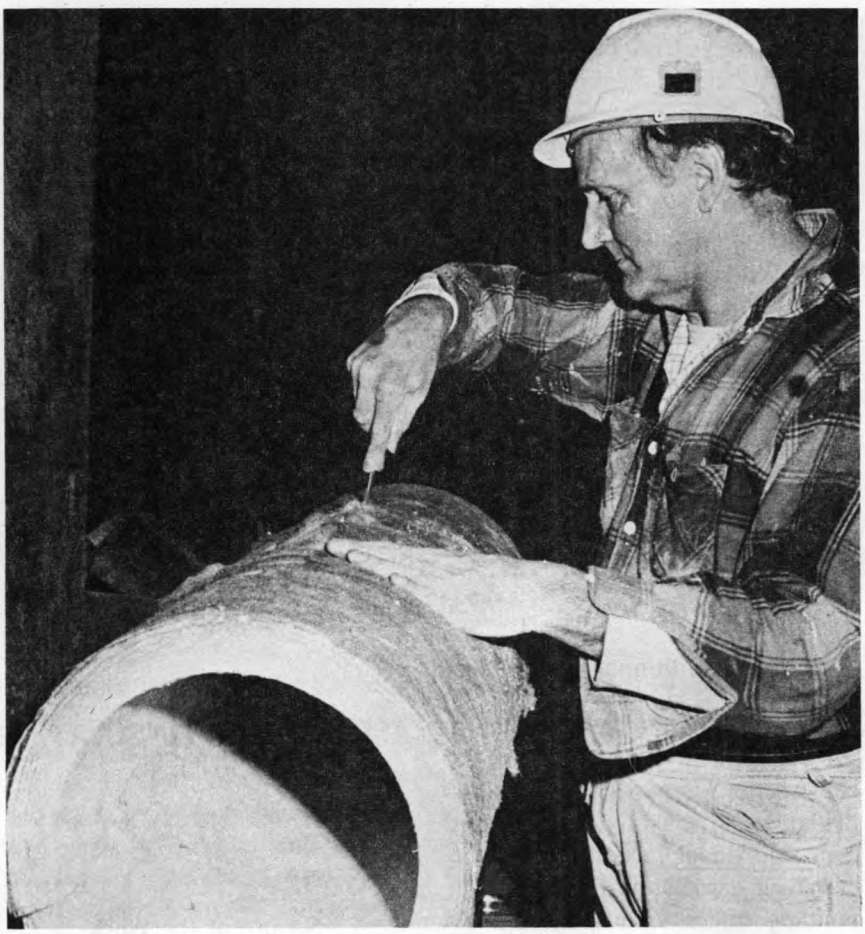
ASBESTOS AND INSULATING WORKERS

(D.O.T. 863.381, .781, and .884)

Nature of the Work

Asbestos and insulating workers cover pipes, boilers, furnaces, ducts, and other related equipment such as cork, felt, asbestos, and fiberglass. The insulating materials which these workers install serve many purposes. For example, insulated pipes and ducts retain heat and save fuel. Insulation in refrigeration systems prevents heat absorption. Insulation in walls and ceilings provides thermal insulation and disperses sound.

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. Care is



Asbestos worker cuts insulating material.

required to completely cover joints, flanges, elbows, and other connections. They secure the insulating material by using wire bands, or by covering the insulating pipework further with tar paper, cloth or canvas, sewed or stapled into place.

When covering flat surfaces, asbestos workers may spot weld or screw wire studs to the surface and fasten the insulating material to the studs. They may coat joints with an asbestos cement and then wrap the joints with tape for a tight seal. In some instances, asbestos workers may spray or plaster the insulating material to a wire netting placed on the surface to be covered. The wire netting provides adhesion and structural strength. The final coat is smoothed with a trowel, straightedge, and float.

Asbestos and insulating workers use handtools such as trowels, brushes, scissors, sewing palms and heavy-duty needles, hammers, saws, pliers, and stud-welding guns. Powersaws, as well as handtools, are used to cut insulating materials.

Places of Employment

Most asbestos workers are employed by insulation contractors in new industrial and commercial construction. A substantial number are employed in the alteration and maintenance of insulated pipework in chemical plants, petroleum refineries, atomic energy installations, and other industrial establishments which have extensive steam installations for power and heating. Some large establishments which have cold storage facilities also employ asbestos workers for maintenance work.

Training, Other Qualifications, and Advancement

Most asbestos 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 new worker learns how to handle the tools of the trade and to work with insulating materials.

Applicants for improvership programs are generally required to be between 18 and 30 and in good physical condition. Hourly wage rates start at about 50 percent of the journeyman's rate and increase 10 percent each year until 80 percent of the journeyman's rate is reached during the final stage of the program. Trainees are required to pass an examination which demonstrates their knowledge of the trade.

A skilled asbestos worker may advance to foreman, shop superintendent, or estimator, or he may open his own insulation contracting business.

Employment Outlook

Employment of asbestos and insulating workers—estimated at about 25,000 in 1970—is expected to increase moderately through the 1970's. In addition to the job openings resulting from the growth of

the trade, other opportunities will arise from the replacement of workers who transfer to other fields of work, retire, or die. Retirements and deaths alone will result in a few hundred job openings annually through the 1970's.

Employment growth will result mainly from the anticipated large rise in the volume of construction activity, particularly of commercial and industrial buildings. (See discussion, p. 375.) The increasing use of pipe in numerous manufacturing processes and in air-conditioning and refrigeration installations will expand the need for asbestos workers in installation and maintenance work.

Earnings and Working Conditions

Union minimum hourly wage rates for asbestos workers averaged $6.69, compared with $6.54 for all journeymen in the building trades, on July 1, 1970, according to a national survey of building trades workers in 68 large cities. Among individual cities, the minimum hourly rates for asbestos workers ranged from $4.90 in Norfolk, Va., to $8.46 in Cleveland, Ohio. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for asbestos workers in 12 of the 68 cities selected to show wage rates from various regions and areas of the country, on July 1, 1970, appear in the accompanying tabulation.

City	*Rate per hour*
Birmingham	$5.55
Buffalo	7.19
Columbus	7.96
Denver	6.32
Indianapolis	7.20
Memphis	5.40
Minneapolis–St. Paul	7.05
Newark	6.24
Pittsburgh	6.67
San Diego	7.45
Springfield	6.59
Tampa	5.99

Asbestos and insulating workers spend most of the workday on their feet, either standing, bending, stooping, or squatting. Working from ladders or in tight or inaccessible spaces when covering pipes and ducts may be necessary. Removing old insulation before installing new materials may be particularly 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 further information regarding asbestos workers' improvership programs or other work opportunities in this trade, inquiries should be directed to local asbestos contractors or to 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 be a source of information about work and training opportunities, including training programs operated under the Manpower Development and Training Act.

BRICKLAYERS

(D.O.T. 861.131, .381, .781, and .884)

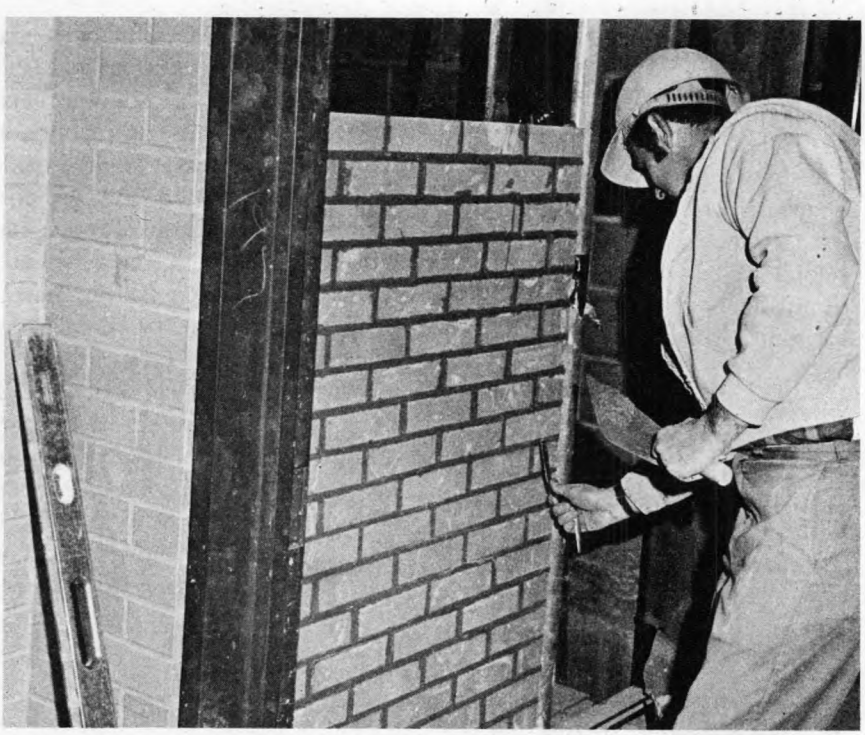
Nature of the Work

Bricklayers (or brickmasons) are craftsmen who construct walls, partitions, fireplaces, chimneys, and other structures from brick. They also work with various other masonry materials, such as concrete or cinder block; precast panels made of concrete, stone, or marble; porcelain glazed tile; structural tile; and terra cotta (a hard baked clay material used for ornamental purposes). They also install the brick linings of industrial kilns and furnaces.

When building a brick wall, bricklayers usually construct corners at each end of the building or wall, using plumb lines and a mason's level. Then the bricklayer is able to stretch a horizontal line (gage or course line) from corner to corner as a guide for each course or layer of brick. The line is raised when the course is completed. On longer walls, a brick is often set at fixed points along the wall, plumbed for accuracy, and the course line is trigged to this brick. The line trig overcomes sag in the course line; lessens line movement caused by the wind and by other bricklayers working on the wall; and overall, helps to insure the accuracy of the finished brickwork.

In laying brick, a bricklayer first spreads a layer or "bed" of mortar. He then applies a full cross-joint of mortar to one end of the brick to be laid or to the end of the last brick laid. In a single motion, he places the brick on the bed joint while positioning the cross-joint between the bricks to the desired width. A tap or two with his trowel positions the brick to the course line. He cuts off the excess mortar with his trowel and is then ready to lay the next brick. Once the course is completed (or sometimes sooner), the mortar joints between the brick are struck (jointed) with special finishing tools to achieve a neat and uniform appearance.

If two or more thicknesses of



brick are being laid, the bricklayer lays a "bond" or "header" course at regular intervals (usually every sixth or seventh course); that is, he arranges a course of bricks crosswise or in another bond pattern in order to tie the interior and exterior walls into a single unit. Whether the bricklayer works with brick, block, or other masonry material, the work is essentially the same.

Bricklaying requires careful, accurate work combined with planning and proper layout so that the structure will have a uniform appearance and the brickwork will line up with windows, doors, and other openings in an acceptable manner. Craftsmen in this trade mainly use handtools, including trowels, brick hammers, levels, jointers, brick cutting chisels, and rules. Powersaws are often used for cutting and fitting masonry materials; however, a bricklayer will usually cut brick with his trowel, brick hammer, or brick chisel. Journeymen bricklayers are usually assisted by hod carriers or helpers (detailed descriptions of the nature of the work, employment outlook, and other information concerning construction laborers and hod carriers appear elsewhere in the *Handbook*) who stock scaffolds with mortar, bricks, and blocks; mix the mortar; and set up and move scaffolding.

Places of Employment

The great majority of bricklayers work mainly on new construction. Some are employed also in sewer construction to build manholes and catch basins. In addition, bricklayers do a considerable amount of alteration work, especially in the larger cities where construction of fire-resistant partitions, store front remodeling, and similar modernization work are often done. They also do a substantial amount of maintenance and repair work.

Bricklayers also work for such industrial establishments as factories making glass or steel, where furnaces and kilns require special fire brick and refractory brick linings. For example, in a steel manufacturing plant, the bricklayer lines converters, cupolas, and ladles which hold molten metal. Bricklayers must have additional training to do refractory brick work.

Training, Other Qualifications, and Advancement

Most training authorities, including the National Joint (labor-management) Bricklaying Apprenticeship and Training Committee, recommend the completion of a 3-year apprenticeship program as the best way to learn this trade. Many workers in this trade have acquired bricklaying skills informally, by working as helpers or hod carriers, observing or being taught by experienced bricklayers. Many of these persons have gained additional knowledge of their trade by taking trade school courses.

Apprenticeship applicants are generally required to be between 17 and 24, 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 6,000 hours (3 years) of on-the-job training, in addition to related classroom instruction. In a typical 3-year bricklayer training program, the apprentice learns, among other things, to use, care for, and handle safely the tools, machines, equipment, and materials commonly used in the trade; lay, bond, and tie brickwork; build footings and foundations; do exterior brickwork such as straight wall work, steps, and arches; build col-

umns, piers, and corners; plan and build chimneys, fireplaces, and hearths; lay stone; point brick and stone; clean stone, brick, and tile using acid solutions, and by sandblasting; cut, set, and point concrete and cinder blocks, artificial stone, and glass blocks; and fireproof and waterproof structures.

The apprentice receives related classroom instruction in blueprint reading, layout work, measurement and sketches, and welding. In fact, some apprenticeship programs conduct actual welding instructions that qualify trainees as bricklayer-welder upon completion of their training. In addition, the apprentice trainee learns the relationship between bricklaying and other building trades.

In some areas, formal apprentice training for bricklayers includes brief preliminary instruction at a vocational school or some other type of prejob instruction. This training is designed to give the apprentice a basic knowledge in the handling of tools and materials to prepare him for the start of his on-the-job training.

Hourly wage rates for bricklayer apprentices generally start at 50 percent of the journeyman rate and increase periodically until 95 percent of the journeyman's rate is reached during the last period of the apprenticeship.

A bricklayer must have an eye for straight lines and proportions. Good physical condition and manual dexterity are important assets. Since the other building craftsmen must usually fit their work to his, he should know how the parts of a structure fit together.

Bricklayers may advance to jobs as foremen. They also may become estimators for bricklaying contractors. Estimators compute material requirements and labor costs. Some journeymen advance to the position of bricklaying superintendent on large construction projects, while others may start their own bricklaying contracting business.

Employment Outlook

Employment of bricklayers—estimated at about 175,000 in 1970—is expected to increase rapidly through the 1970's. In addition to new jobs created by employment growth, thousands of job opportunities will result from the replacement of journeymen who transfer to other fields of work, retire, or die. Retirements and deaths alone will result in a few thousand job openings annually through the 1970's.

Much of the expected growth in this trade will result from the anticipated large increase in construction activity. (See discussion, p. 375.) The demand for bricklayers also will be favorably affected by such factors as the increasing use of structural clay tile for fire-resistant partitions; and ornamental brickwork for structures, such as exterior screenwalls and lobbies and foyers. In addition, the use of brick masonry load-bearing walls is growing, particularly in apartment building construction.

These favorable developments will be offset to some extent by other construction techniques that reduce the amount of brickwork per structure. For example, the use of steel framework and reinforced concrete in structures permits the elimination of load-bearing exterior brick walls. Also, the use of metal, glass, and precast concrete wall panels in buildings results in less masonry work. Other recent developments that have increased the efficiency of bricklayers include high-strength mortars that can be applied with caulking guns or compressor-powered extruders.

Earnings and Working Conditions

Hourly wage rates for bricklayers rank among the highest in the building trades. Union minimum hourly wage rates for bricklayers, on July 1, 1970, averaged $6.77, compared with an average of $6.54 for all journeymen in the building trades, according to a national survey of building trades workers in 68 large cities. Among individual cities surveyed, the minimum hourly rates for bricklayers ranged from $4.90 in Charlotte, N.C., to $8.16 in Cleveland, Ohio. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for bricklayers in 12 of the 68 cities selected to show wage rates from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation.

City	*Rate per hour*
Atlanta	$5.40
Boston	7.25
Chicago	7.20
Detroit	7.68
Indianapolis	7.10
Memphis	6.15
Milwaukee	6.64
Newark	7.80
Sacramento	7.33
Seattle	6.95
Tampa	5.20
Topeka	6.20

Although these hourly rates indicate high annual incomes for bricklayers, time lost because of inclement weather and occasional periods of unemployment between jobs make average annual earnings less than hourly rates of pay imply.

The work of the bricklayer is active and sometimes strenuous, like the work in other building trades. 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 further information regarding bricklaying apprenticeships or other work opportunities in the trade, inquiries should be directed to 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 be a source of information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities. Some local employment service offices provide services such as screening applicants and giving aptitude tests.

General information about the work of bricklayers 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.

Structural Clay Products Institute, 1750 Old Meadow Road, McLean, Va. 22101.

CARPENTERS

(D.O.T. 860.281 through .781)

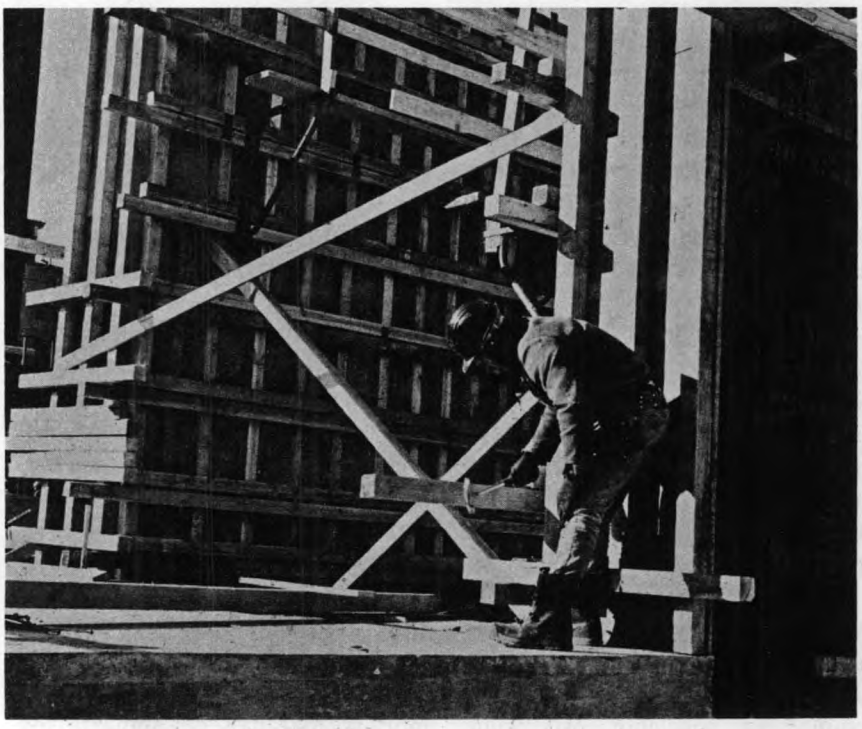
Nature of the Work

Carpenters, the largest group of building trades workers, are employed in almost every type of construction activity. They erect the wood framework in buildings, including subflooring, sheathing, partitions, floor joists, studding, and rafters. When the building is ready for trimming, they install molding, wood paneling, cabinets, window sash, doorframes, doors, and hardware. They also build stairs and lay floors. Carpenters, when doing finish work, must concern themselves with the appearance, as well as the structural accuracy, of the work.

Carpenters also 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 bridges, buildings, and other structures. They also erect scaffolding and temporary buildings at the construction site. Carpenters also may install linoleum, asphalt tile, and similar soft-floor coverings.

Carpenters also saw, fit, and assemble plywood, wallboard, and other materials. They use nails, bolts, wood screws, or glue to fasten materials. Carpenters use handtools such as hammers, saws, chisels, and planes, and power tools such as portable power saws, drills, and rivet guns.

Because of the wide scope of the work performed in the trade, some carpenters specialize in a particular type of carpentry. For example, some specialize in installing acoustic panels on ceilings and walls; others in installing millwork and finish hardware (trimming), laying hardwood floors, or building stairs. Specialization is more common in the large cities; in small communities,



carpenters ordinarily do all types of carpentry. 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.

Places of Employment

Most carpenters working in new construction are employed mainly by contractors and homebuilders at construction sites. A substantial number, however, are employed on alteration, remodeling, or building repair. Some carpenters alternate between wage employment for contractors and self-employment on small jobs. Others work for government agencies or nonconstruction firms which employ a separate work force to perform their own construction. A large number of carpenters do maintenance work in 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.

Training, Other Qualifications, and Advancement

Most training authorities, including the National Joint (labor-management) Carpentry Apprenticeship and Training Committee 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, have acquired some carpentry skills informally (for example, by working around a farm). Many of these men have also gained some knowledge of the trade by taking correspondence or trade school courses.

Apprenticeship applicants are generally required to be from 17 through 27 years of age; 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. Aptitudes which the apprentice should have include manual dexterity and the ability to solve arithmetic problems quickly and accurately.

The apprenticeship program usually consists of 8,000 hours (4 years) of on-the-job training, in addition to a minimum of 144 hours of related classroom instruction each year. During the apprenticeship period, the apprentice learns elementary structural design and becomes familiar with the common systems of frame and concrete form construction, and to use, care for, and handle safely the tools, machines, equipment, and materials used in the trade. He also learns how to lay out work, do rough framing, do outside and inside finishing work (for example, hanging doors, setting and finishing windows, fitting hardware, and flooring and stair work), weld, do acoustic and drywall construction, and erect scaffolding and shoring.

The apprentice receives related classroom instruction in drafting and blueprint reading, mathematics applicable to layout work, and the use of woodworking machines. Both in the classroom and on the job he learns 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 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.

It is important for young men interested in entering carpentry to obtain the all-around training given in apprenticeship programs, particularly because technological innovations increasingly are affecting carpentry. Carpenters having such training will have especially favorable long-range job prospects. They will be in much greater demand and have better opportunities for advancement than those in the trade 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 building craftsmen to become general construction foremen, since they are involved with the entire construction process. The proportion of self-employed is higher among carpenters than among most other skilled building trades. Some

self-employed carpenters are able to become contractors and employ other journeymen.

Employment Outlook

Employment of carpenters—who numbered about 830,000 in 1970—is expected to increase rapidly through the 1970's. In addition to new jobs created by employment growth, tens of thousands of jobs for carpenters will be available each year to replace experienced carpenters who transfer to other fields of work, retire, or die. Retirements and deaths alone are expected to provide more than 20,000 job openings annually.

The large rise expected in construction activity, particularly homebuilding (see discussion, p. 375), is expected to result in a growing demand for carpenters. In addition, more carpenters will be needed in the maintenance departments of factories, commercial establishments, large residential projects, and government agencies.

However, employment growth will continue to be limited by technological developments. For example, the use of construction materials prepared away from the building site is expected to increase. These materials, which include floors, partitions, and stairs, are designed for easy and speedy installation. Walls and partitions can be lifted into place in one operation. Beams and, in some instances, roof assemblies are lifted into place by cranes. Because of the standardization of prefabricated components, the use of such materials will increase further.

More widespread use of improved tools and equipment will increase the efficiency of carpenters. These products include new types of nails with improved holding properties; hence, fewer nails and less hammering are required. Stronger adhesives are being used that reduce the time needed to join pieces of wood and other materials. Power tools in widespread use include stud drivers, screwdrivers, sanders, saws, staplers, and nailing machines. One type of power tool can drill and nail in one operation. New types of scaffolding are easier to erect, adaptable to varying construction situations, and safer to use.

Employment of carpenters also will be affected by construction materials and techniques that reduce the amount of carpentry required in residential buildings. For example, where houses are framed with steel, the use of curtain-wall panels is possible. In addition to the speed with which they can be put in place, curtain-wall panels also may reduce the need for carpenters because they are available in nonwood materials such as glass, aluminum, and porcelain-coated steel. Although the use of plastics in construction is in its infancy, their greater use is expected. Already available in plastics are siding, curtain walls, partitions, roofing, ornamental screening, and insulation materials. Under development are foam plastic roofs and even entire houses of plastic that can be constructed on site.

Earnings and Working Conditions

Union minimum hourly wage rates for carpenters averaged $6.42, compared with $6.54 for all journeymen in the building trades, on July 1, 1970, according to a national survey of building trades workers in 68 large cities. Among individual cities surveyed, minimum hourly rates for carpenters ranged from $4.45 in Charlotte, N.C., to $8.10 in Cleveland, Ohio. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for carpenters in 12 of the 68 cities selected to show wage rates from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation.

City	*Rate per hour*
Atlanta	$6.20
Boston	6.65
Chicago	6.85
Denver	6.02
Detroit	7.36
Los Angeles	5.98
New Orleans	5.72
Philadelphia	7.05
Pittsburgh	7.00
St. Louis	6.61
San Diego	6.21
Seattle	6.10

As other building trades, the work of the carpenter is active and sometimes strenuous, but exceptional physical strength is not required. However, prolonged standing, as well as climbing and squatting, is 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 are able to work outdoors.

A large proportion of carpenters are members of the United Brotherhood of Carpenters and Joiners of America.

Sources of Additional Information

For further information regarding carpentry apprenticeships or other work opportunities in this trade, inquiries should be directed to 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. In addition, the local office of the State employment service may be a source of 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 apprenticeship 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

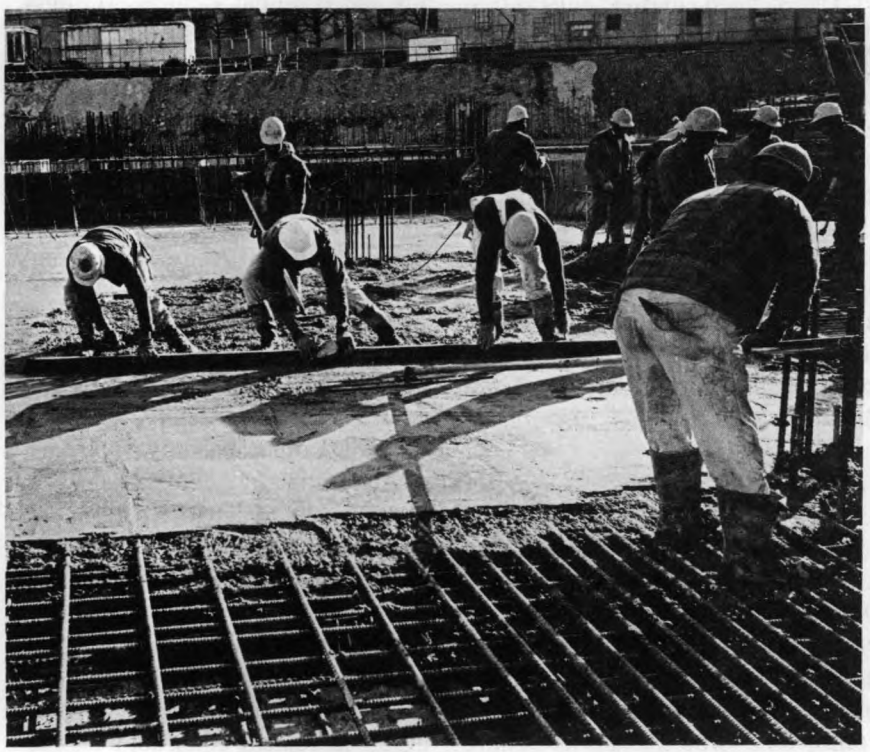
The principal work of cement masons is finishing the exposed concrete surfaces on many types of construction projects. These projects range from small jobs, such as the finishing of patios, floors, and sidewalks, to work on huge dams, miles of concrete highways, foundations and walls of large buildings, airport runways, and missile launching sites. On small projects, a cement mason, assisted by one or two helpers, may do all the concrete work; on large projects, a crew of several cement 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 hold the concrete, are set for the desired pitch and depth of the concrete mixture and are properly alined. On larger (and wider) pours, a screed (guide) may be placed to section the pour into 12–15 foot widths, which allows easier handling and greater accuracy in the initial leveling process.

The cement mason directs the pouring of the concrete. He usually supervises the laborers who use shovels or special rakes to "strike off" (place and spread the mixture to its approximate level) the concrete. The cement masons then level 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 ready for its intermediate and final finishing. The finisher uses special tools, such as a float, whip, or darby, to fill minor depressions and remove high spots. This agitation tends to draw surface fines (a rich mixture of cement and fine sand) to the top and imbed coarser aggregates.

Final finishing is usually delayed until the concrete has hardened sufficiently to support the weight of a finisher on kneeboards. While the concrete is still workable, the craftsmen use handtools—a wood or magnesium float and a finishing trowel—to bring the concrete to the proper consistency and obtain the desired finish. Concrete finishing also may be done with the aid of power-operated trowels; however, edges, corners, and other inaccessible places for power-operated tools must still be finished by hand.

On most small building projects, such as sidewalks, driveways, and patios, concrete finishing generally



involves hand operations. On highways and other large-scale projects, however, power-operated floats and cement finishing machines are used extensively.

On concrete work which is exposed (for example, columns, piers, ceilings, and wall panels), cement masons correct surface defects and air pockets (called honeycombs) when the forms are stripped. This involves preparing the surface with a rubbing brick (silicon carbide) to remove high spots. A rich cement mixture is rubbed into the concrete surface using a sponge rubber float or piece of burlap cloth to fill imperfections and voids. The end result is a smooth uniform 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.

The cement mason must know materials and be familiar with various cement and concrete mixes which speed or slow the setting time, and those which are used for weight-supporting walls or surfaces of specified strengths. Because of the effects that heat, cold, and wind have on the curing of cement, the skilled mason must recognize by sight and touch what is occurring in the cement mixture so that he may be able to prevent structural defects.

Places of Employment

Cement masons work principally on large buildings, but many are employed on highway or other nonbuilding construction. Cement masons work directly for general contractors who construct entire projects such as highways, or large industrial, commercial, and residential buildings. They also work for concrete contractors who do only the concrete work on a large construction project or who work on smaller projects such as sidewalks, driveways, and basement floors. Some install composition resilient floors, such as trowel applied epoxies, latex underlayments, and simulated terrazzo floors for specialty floor contractors. A small number are employed by municipal public works departments, public utilities, and manufacturing firms which do their own construction. Some cement masons are self-employed and do small cement jobs, such as sidewalks, driveways, patios, and curb and gutter work.

Training, Other Qualifications, and Advancement

Most training authorities, including the National Cement Masonry, Asphalt, and Composition Joint (labor-management) Apprenticeship and Training Committee, recommended the completion of a 3-year apprenticeship program as the best way to learn this trade. A substantial number of workers, however, have acquired cement masonry skills informally by working on building and road construction jobs as laborers assisting cement masons. Others have worked with specialty contractors constructing sidewalks and doing other masonry.

Apprenticeship applicants generally are required to be between 18 and 25. Good physical condition and manual dexterity are important assets.

The apprenticeship program usually consists of 6,000 hours (3 years) of on-the-job training, in addition to related classroom instruction. During the apprenticeship period, the apprentice learns, among other things, to use and handle the tools, equipment, and materials of the trade. He also learns finishing, layout work, and safety techniques. The apprentice receives related classroom instruction in subjects such as applied mathematics and related sciences, blueprint reading, architectural drawing, estimating materials and costs, and local building regulations. Although 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 estimators of material requirements and labor costs for concrete contractors. Others may start their own concrete contracting business.

Employment Outlook

Employment of cement masons —estimated at about 65,000 in 1970—is expected to increase very rapidly through the 1970's. In addition to new jobs created by employment growth, thousands of job opportunities will result from the replacement of craftsmen who transfer to other fields of work, retire, or die. Retirements and deaths alone will result in several hundred job openings annually through the 1970's.

Employment of cement masons is expected to increase mainly because the anticipated rapid increase in construction activity (see discussion, p. 375) will be accompanied by the growing use of concrete and concrete products. Prestressed concrete makes possible wide spans where column-free construction is desired. Lightweight concrete wall

panels that are fire- and weather-resistant are being used increasingly on nonload-bearing walls. These panels, available in different finishes, colors, and designs, can be speedily fastened into place. In some instances, buildings made with concrete wall panels can be easily dismantled and reerected elsewhere. Artistic and functional shapes can be incorporated into structures where prestressed concrete is used. In addition, the use of concrete and concrete products has expanded to include thinshell dome roofs, ornamental grill work, and slab and arch roofs in residential buildings; and bridge girders, columns, piles, and beams. Also, concrete can be poured year round by using heated, temporary shelters made of sheet plastic.

Employment of cement masons is not expected to increase as rapidly as the use of cement and concrete products. Many concrete products are now precast and generally do not require finishing. The efficiency of onsite masons also has increased through new and improved construction methods, materials, and equipment. Concrete slabs for floors, walls, and roofs can be processed at ground level and raised into place with synchronized hydraulic jacks or cranes. For certain jobs, concrete can be applied pneumatically through hoses. Glass-fiber-reinforced plastic forms provide a smooth surface and reduce rubbing and patching work. Reusable steel and plastic-covered wood forms are now available. Adhesives reduce the need for bolts and other fasteners. Worker efficiency has also been increased because of new machines, including powered concrete conveyors, such as powered wheelbarrows; portable, powered screeds; electric concrete vibrators; hydraulic joint-forming machines; powered concrete cutting saws; and cement-finishing machines.

Earnings and Working Conditions

Union minimum hourly wage rates for cement masons averaged $6.02, compared with $6.54 for all journeymen in the building trades, on July 1, 1970, according to a national survey of building trades workers in 68 large cities. Among individual cities surveyed, the minimum hourly rates for cement masons ranged from $3.93 in Charlotte, N.C., to $8.06 in Buffalo, N.Y., and Cleveland, Ohio. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for cement masons in 12 of the 68 cities selected to show wage information from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation.

City	*Rate per hour*
Birmingham	$4.68
Boston	7.35
Columbus	6.15
Dallas	5.40
Denver	5.85
Fresno	5.62
Jacksonville	4.35
Milwaukee	5.90
Newark	7.80
Pittsburgh	6.70
Salt Lake City	5.87
Washington, D.C.	5.93

Cement masons usually receive premium pay for hours worked in excess of the regularly scheduled workday or workweek. Overtime work for these craftsmen often occurs because once concrete has been poured, the work must be completed.

The work of the cement mason is active and strenuous, like the work of skilled building tradesmen generally. Since most cement finishing is done on floors or at ground level, the cement mason is required to stoop, bend, or kneel. Much of his work is done outdoors.

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 further information regarding cement mason apprenticeships or other work opportunities in the trade, inquiries should be directed to 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 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 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 AND HOD CARRIERS

(D.O.T. 809.887; 844.887; 850. through 852.887; and 859. through 862.887)

Nature of the Work

Construction laborers work on all types of building construction, as well as on other types of construction projects, such as highways, dams, pipelines, and water and sewer projects. Their work includes the loading and unloading of construction materials at the worksite and the shoveling and grading of earth. Laborers stack and carry materials, including small units of machinery and equipment, and do other work that aids building craftsmen. They also erect and dismantle scaffolding, set braces to support the sides of excavations, and clean up rubble and accumulated debris to provide clear work areas.

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 handloaded 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, fine grade and prepare the site, handle and place the forms into which wet concrete is poured, and cover new pavement with straw, burlap, or other materials to prevent excessive drying.

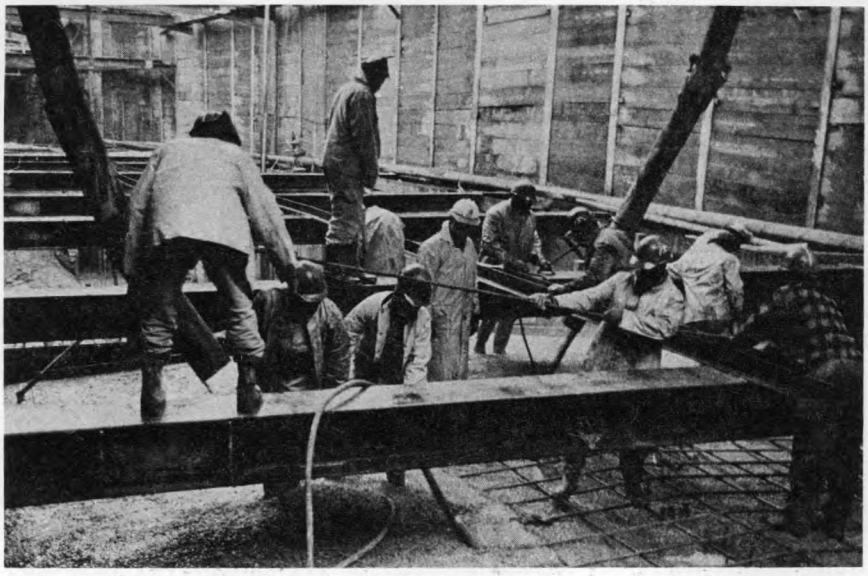
Bricklayers' tenders and *plaster tenders,* both commonly known as hod carriers, serve journeymen in their respective trades, mixing and supplying materials, setting up and moving portable scaffolding, and providing the many other services needed. Hod carriers must be familiar with the work of the journeymen and have some knowledge of the materials and tools used. Laborers also tend cement finishers, and some who have started as laborers have learned that trade.

Building and construction laborers are commonly classified as unskilled workers, but this term can be misleading. Their work covers a wide range of requirements. Many types of construction-laborer and hod-carrier jobs require training and experience, as well as a broad knowledge of construction methods, materials, and operations.

Rock blasting, rock drilling, tunnel construction, and concrete work are examples of work in which "know-how" is important. Construction laborers who work with explosives drill holes in rock, handle explosives, and set charges. These workers must know the effects of different explosive charges under varying rock conditions so that proper measures can be taken to prevent injury and property damage. Construction laborers learn how to handle and use blasting materials through job experience and instruction from foreman in charge of blasting work. Also, in the construction of tunnels, and dam and bridge foundations, contruction laborers must have specific on-the-job experience. They do all the work in the boring and mining of a tunnel, including operations which would be handled by journeymen if the job were located above ground.

Places of Employment

Laborers are employed by all types of construction contractors. In addition, a large number are employed by State and municipal public works and highway departments, and by public utility companies in road repairing and maintenance, and excavating.



Training, Other Qualifications, and Advancement

Little formal training is required to obtain a job as a building or construction laborer. Generally, to be employed in these jobs, 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 work. If he works closely with a skilled craftsman for several years, he may be able to pick up the skills of the trade. However, in their work as construction laborers, relatively few workers have such opportunities.

Many tasks assigned to laborers have become too complex to learn through a lengthy on-the-job training period. Recognizing these problems, 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 and hod carriers—estimated at about 815,000 in 1970—is expected to increase slowly through the 1970's. However, thousands of additional job openings will arise from the replacement of construction laborers who transfer to other occupations, retire, or die. Retirements and deaths alone are expected to provide nearly 15,000 job openings annually.

The anticipated large increase in construction activity (see discussion p. 375) is expected to result in a growing demand for laborers and hod carriers, but the increase in their employment will be somewhat limited by more widespread use of mechanized equipment. For example, construction 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 multistoried 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 bricklayers' tenders and building laborers averaged $5.06 and $4.78, respectively, on July 1, 1970, according to a national survey of building trades workers in 68 large cities. Among individual cities surveyed, the minimum hourly rates for bricklayers' tenders ranged from $2.70 in Norfolk and Richmond, Va., to $6.57 in Toledo, Ohio. The rates for building laborers ranged from $2.60 in Norfolk and Richmond, Va., to $6.52 in Cleveland, Ohio. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for bricklayers' tenders and building laborers in 12 of the 68 cities selected to show wage rates from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation.

City	*Rate per hour*	
	Bricklayers' tenders	*Building laborers*
Albuquerque	$3.91	$3.61
Baltimore	3.80	3.65
Buffalo	5.89	5.89
Columbus	5.02	4.86
Des Moines	4.91	4.91
Fresno	5.25	4.94
Los Angeles	5.00	4.55
Omaha	4.83	4.70
Phoenix	4.99	4.38
Providence	5.00	5.00
Seattle	5.20	4.90
Tampa	3.73	3.58

Construction work is physically strenuous, since it requires frequent bending, stooping, and heavy lifting. Much of the work is performed outdoors. Many laborers are members of the Laborers' International Union of North America.

Sources of Additional Information

For further information regarding work opportunities as a construction laborer, inquiries should be directed to local building or construction contractors, or a local of the Laborers' International Union of North America. In addition, the local office of the State employment service is a source of information about work opportunities.

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

Construction electricians lay out, assemble, install, and test electrical fixtures, apparatus, and wiring used in electrical systems. These systems provide heat, light, power, air conditioning, and refrigeration in residences, office buildings, factories, hospitals, schools, and other structures. Construction electricians also install and connect electrical machinery, electronic equipment, controls, and signal and communications systems. (Maintenance electricians do work which is similar in many respects to that performed by construction electricians. A discussion of maintenance electricians is presented elsewhere in the *Handbook*.)

Construction electricians usually follow blueprints and specifications when installing electrical components. If there is no electrical drawing, the electrician terminates the incoming electrical service into a central load center. The electrician then installs interior circuits and outlets according to the amount of electrical current expected to be used in the various sections of the building. He also installs fuses or circuit breakers of the proper rating in the incoming and interior circuits to prevent overloading, which causes overheating of wires, appliances, and motors. The construction electrician must know and follow National Electrical Code regulations and, in addition, must fulfill State, county, and municipal regulations.

When installing wiring, the construction electrician uses a mechanical or hydraulic bender to shape conduit (pipe or tubing). The conduit usually must fit inside partitions, walls, concealed areas of the ceiling, or within other narrow and inaccessible spaces. He pulls insulated wires or cables through the conduit to complete the circuit between the electrical outlet and the switch. Next, he connects the wires or cables to circuit breakers, switch-gear motors, transformers, or other components. Wires are spliced (joined) by soldering or mechanical means. When these operations are completed, the electrician tests the electrical circuits to make sure that the entire system is properly grounded, the connections properly made, and the circuits do not carry excessive current.

The electrician furnishes his own handtools, such as pliers, screwdrivers, brace and bits, knives, and hacksaws. The employer furnishes test meters and heavier tools and equipment, such as pipe threaders, conduit benders, chain hoists, electric drills, power fasteners, and ladders. In residential construction, heavier tools are not usually required.

Places of Employment

Most construction electricians work for electrical contractors. Substantial numbers are self-employed. Others work for government agencies or business establishments that do their own electrical work. Construction electricians usually work for a large number of different employers during their work life because of the intermittent needs of individual contractors. However, many construction electricians work for the same electrical contractor for long periods of time. During a single year, a construction electrician may work for an electrical contractor in the construction of new homes or office buildings, for a manufacturing firm in remodeling its plant or offices, or he may do electrical repairs for homeowners or business firms.

Training, Other Qualifications, and Advancement

Most training authorities, including the National Joint (labor-management) Apprenticeship and Training Committee for the Electrical Industry, recommend the completion of a 4-year apprenticeship program as the best way to learn all aspects of the electrical trade. However, in the past, some construction electricians have acquired skills of the trade informally by working for many years as helpers, observing or being taught by experienced craftsmen. Many of these persons have gained additional knowledge of the trade by taking trade school or correspondence courses, or through special training when 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 are required to be between 18 and 24, but exceptions may be made for veterans. A high school education is required; courses in mathematics and physics are desirable. Applicants are usually required to take tests to determine their aptitude for the trade.

All 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 give the apprentice all-round training by having him work for several electrical contractors who engage in particular types of work.

The apprenticeship program usually requires 8,000 hours (4 years) of on-the-job training, in addition to a minimum of 144 hours of related classroom instruction each year. In a typical 4-year training program, the apprentice learns, among other things, to use, care for, and handle safely the tools, equipment, and materials commonly used in the trade; do residential, commercial, and industrial electrical installations; and maintain and repair installations. In addition, he receives related classroom instruction in subjects such as electrical layout, blueprint reading, mathematics, and electrical theory, including electronics. After completing their apprenticeship, 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 80 to 85 percent of the jouneyman rate is reached during the last period of the apprenticeship.

An experienced construction electrician who has learned all the aspects of the craft through apprenticeship can transfer readily to other types of electrical work. For example, many take jobs as maintenance electricians in factories or in commercial establishments, and others work as electricians in shipbuilding and aircraft manufacturing.

Because improperly installed electrical work is hazardous, most cities require electricians to be licensed. To obtain a license, the electrician must pass an examination which requires a thorough knowledge of the craft and of State and local building codes.

Many journeymen electricians become foremen or superintendents for electrical contractors on construction jobs. These craftsmen may also become estimators for electrical contractors, computing material requirements and labor costs.

Many construction electricians go into business for themselves. As they expand their activities, they may employ other workers and become contractors. In most large urban areas, a master electrician's license is required to engage in an electrical contracting business.

Employment Outlook

Employment of construction electricians—who numbered about 190,000 in 1970—is expected to increase very rapidly through the 1970's. In addition to the growth that is anticipated in the trade, many thousands of job opportunities will result from the replacement of journeymen who transfer to other types of electrical work, leave the trade for other reasons, retire, or die. Retirements and deaths alone will result in a few thousand job openings annually.

The increase in employment of electricians is expected mainly because of the anticipated large expansion in construction activity. (See discussion, p. 375.) Other factors expected to contribute to the growth of this trade are greater requirements for electric outlets, switches, and wiring in homes to accommodate the increasing use of appliances and air-conditioning systems; and the extensive wiring systems needed for the installation of electronic data-processing equipment and electrical control devices being used increasingly in com-

merce and industry. Other recent developments expected to expand the demand for construction electricians include an increase in the number of "all-electric" homes, and the use of outdoor radiant heating, and snow- and ice-melting systems.

Technological developments are expected to limit the employment growth of this trade. A major technological development increasing the efficiency of electricians is the prefabrication of electrical equipment. For example, preassembled conductors and raceways that can be installed in one operation are available. Switch boxes and switchboards, which formerly had to be wired on site, are now preassembled at the factory. Also available are "packaged" (preassembled and prewired) ceiling units, which the electrician connects to the power source, eliminating the need to wire the complete system and install the fixtures.

Improved tools and equipment being used increasingly by electricians include more efficient conduit benders; multiple spindle drills; cordless electric drills, saws, and other tools; and "kits" of splicing materials that have reduced the time needed to do field insulation of cable splices.

Earnings and Working Conditions

Hourly wage rates of construction electricians are among the highest in the skilled building trades. Furthermore, because the seasonal nature of construction work affects electricians less than most other construction workers, their annual earnings generally are among the highest in the building trades.

Union minimum hourly wage rates for electricians averaged $6.82, compared with $6.54 for all journeymen in the building trades on July 1, 1970, according to a national survey of building trades workers in 68 large cities. Among individual cities surveyed, the union minimum hourly rates for construction electricians ranged from $5 in Charlotte, N.C., to $8.11 in Buffalo, N.Y. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for construction electricians in 12 of the 68 cities selected to show wage rates from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation.

City	*Rate per hour*
Birmingham	$6.20
Columbus	7.68
Des Moines	6.75
Erie	7.20
Fresno	6.88
Grand Rapids	6.52
Little Rock	5.65
Louisville	7.13
Providence	6.45
Spokane	6.13
Trenton	6.85
Washington, D.C.	6.85

The work of the construction electrician, like that of other building trades, is active but does not require great physical strength. Frequently, the construction electrician stands for prolonged periods; sometimes he works in cramped quarters. Because most of his work is indoors, the construction electrician is less exposed to unfavorable weather conditions than most other skilled building trades workers. Electricians risk falls from ladders and scaffolds, cuts from sharp tools, electrical shock, blows from falling objects, and burns from "live" wires. However, safety practice learned during apprenticeship and other types of training have helped to reduce the injury rate for these workers. The number of injuries per million man-hours worked by employees in contract electrical work has been lower than in contract construction work as a whole, but higher than that for production workers in manufacturing industries.

A large proportion of construction electricians are members of the International Brotherhood of Electrical Workers.

Sources of Additional Information

For further information regarding electrician apprenticeships or other work opportunities in the trade, inquiries should be directed to 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 be a source of information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities. Some local employment service offices provide services such as screening applicants and giving 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)

Nature of the Work

Elevator constructors (also called *elevator mechanics*) assemble and install elevators, escalators, dumb waiters, and similar equipment. In new buildings, this equipment is installed on-site while the building is under construction. In older buildings, these craftsmen may replace an earlier installation with the latest available elevator equipment. Once the elevator equipment is in service, elevator mechanics perform regular maintenance and repair work. Installation or repair work is usually performed by small crews consisting of skilled mechanics and their helpers.

In elevator construction work, the crew first installs the guide rails of the car in the elevator shaft of the building. Then they install the hoisting machines, the car frame and platform, the counterweight, the elevator chassis, and the control apparatus. Next, the car frame is connected to the counterweight with cables, the cab body and roof are installed, and the control system is wired. Finally, the entire assembly, including cables, wire, and electrical control apparatus, is carefully adjusted and tested.

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 work because all elevator equipment except the old rail, car frame, platform, and counterweight is generally replaced. In maintenance and repair work, 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 mechanical and electrical testing meters and gages.

Elevator constructor adjusts door.

Places of Employment

Most of the estimated 15,000 journeymen elevator constructors employed in 1970, worked for elevator manufacturers, doing new installation and modernization work and elevator servicing. Some elevator constructors are employed by small, local contractors who specialize in elevator maintenance and repair. Others work for government agencies or business establishments that do their own elevator maintenance and repair. Elevator constructors also are employed as elevator inspectors for municipal or other government licensing and regulatory agencies.

Training, Other Qualifications, and Advancement

Although elevator constructors are highly skilled craftsmen, training is comparatively informal and is obtained through employment as a helper for a number of years. 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 important assets.

To become a skilled elevator mechanic, 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 perform all of the operations involved in the installation, maintenance, and repair of 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 proper safety techniques.

Elevator mechanics may advance to positions as foremen for elevator manufacturing firms. A few may establish an individually owned small contracting business; however, opportunities are limited.

Employment Outlook

A moderate increase in employment of elevator constructors is expected through the 1970's. In addition to new jobs created by employment growth, a few thousand job opportunities for new workers will result from the replacement of experienced workers who transfer to other fields of work, retire, or die. Employment growth and retirements and deaths in this small occupation will provide a few hundred job openings annually.

More elevator constructors will be needed as a result of the anticipated large expansion in new industrial, commercial, and large residential buildings. (See discussion p. 375.) In addition, technological developments in elevator and escalator construction will spur modernization of older installations and thus will contribute to the growing need for these craftsmen. For example, modern high speed elevators having automatic control systems require more work and higher skill for the installation and adjustment of electrical and electronic controls.

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 hourly wage rates for elevator constructors averaged $6.65, compared with $6.54 for all journeymen in the building trades, on July 1, 1970, according to a national survey of building trades workers in 68 large cities. Among the individual cities surveyed, the minimum hourly rates for elevator constructors ranged from $5.09 in Norfolk, Va., to $8.12 in Cleveland, Ohio. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for elevator constructors in 12 of the 68 cities selected to show wage information from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation.

City	*Rate per hour*
Baltimore	$6.46
Chicago	7.64
Denver	5.69
Fresno	7.58
Houston	5.56
Jacksonville	5.27
Little Rock	5.19
Los Angeles	6.63
Madison	6.04
Philadelphia	6.83
Providence	6.07
Rochester	6.60

Elevator construction involves lifting and carrying heavy equipment and parts, but this is usually done by helpers. Most of the work is 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 information regarding work opportunities as a helper in this trade, inquiries should be directed to elevator manufacturers, elevator constructors, or a local of the International Union of Elevator Constructors. In addition, the local office of the State employment service may be a source of information about work 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 a number of floor coverings. These include resilient tile, linoleum and vinyl sheet goods, and carpeting. The craftsman installs these coverings over wood, concrete, metal, and other subfloors of residential, commercial, and industrial buildings. Areas covered may vary in size from a small kitchen or bathroom to a large supermarket floor or hotel lobby.

When installing resilient floor covering (such as asphalt tile or vinyl sheet goods), the floor covering installer first inspects the floor to be sure that it is firm, dry, smooth, and free of loose dust or dirt. If he

finds the floor inadequate, he prepares it for covering. He may sand a rough or painted floor; fill cracks, indentations, or other irregularities with a filler material; or, if a floor is extremely uneven, resurface it with plywood, hardwood, or synthetic underlayments.

In newly poured concrete floors or floors laid over earthwork at ground level or below, the installer also may test for moisture content. If the moisture in the floor is too great, he may suggest postponing installation of floor covering or recommend a type of floor covering technique particularly suited to the condition of the floor. For this reason, the installer should be familiar with the many types of adhesives and floor coverings recommended by manufacturers for specific subfloor conditions.

The craftsman then prepares for the installation of resilient floor covering by carefully measuring and marking off the floor in accordance with the floor covering plan. The plan may be in the form of architectural drawings specifying every detail of the floor covering design, or it may be a simple, verbal description by the customer. When the floor layout is completed, the craftsman, assisted, when necessary, by an apprentice or other worker, cuts and fits the flooring material, applies the proper adhesive, and installs the floor covering. He must take care in cutting, matching, and fitting floor covering, particularly at door openings, along irregular wall surfaces, and around permanent floor fixtures, such as columns or piping. He must take special care also in cutting out and setting in decorative designs in the flooring. After the flooring is installed, the craftsman runs a floor roller over it to insure good adhesion to the subfloor.

The carpet craftsman, like the installer of resilient floor coverings, first inspects the floor to be covered to determine its condition. Then he plans his layout carefully to minimize waste of materials. He also allows for expected foot-traffic patterns so that best appearance and long wear will be obtained, and that carpet sections expected to receive heavy traffic can be replaced easily.

When installing the carpet, the craftsman may fasten "tackless strip," with adhesive or nails along the borders of the installation. (The strip secures the carpet when it is installed.) Instead of using this strip, the floor layer may use tacks to secure carpeting. Padding, which is placed under the carpet, is cut and placed within the framework of the strip and the carpet then placed approximately in position. If the carpet has not been precut and seamed by the floor covering firm, the installer will do this work before stretching the carpet into place. He then trims the edge of the carpet so that it will be held securely and smoothly by tacks or by nails protruding from the border strip. Finishing touches may include the use of a special roller to obscure seam markings that may result when carpet sections are joined.

Floor covering craftsmen generally specialize in installation of either carpet or resilient floor covering, although some mechanics can install both types. Some may specialize even further. For example, the most skilled installers generally install the more expensive carpeting, and the resilient sheet flooring with the most intricate designs. Many floor installers specialize also in the installation of resilient tile; others, resilient wall and counter coverings.

The tools used by floor covering installers include hammers; pry bars; knives, shears, and other cutting devices; measuring and marking tools, such as tape measures, compasses, straightedges, scribes, chalk, and chalklines; and a variety of specialized tools, such as notched adhesive trowels, carpet stretching devices, and floor rollers.

Places of Employment

Most floor covering installers are employed by flooring contractors who may specialize in commercial and industrial flooring work, in residential floor covering, or in specific types of installations such as resilient tile. Many others work for retailers of floor covering who also provide installation service. Floor covering installers also are employed by furniture and department stores that sell and install floor coverings, as well as by home alteration and repair contractors.

Heavy concentrations of these workers are found in large business centers where high levels of both

commercial and residential building prevail.

Training, Other Qualifications, and Advancement

In considering applicants for floor covering installation jobs, employers are particularly interested in those having manual abilities. They prefer applicants with a high school education, but this qualification is not generally required. Most employers seek applicants between 17 and 30 years of age having at least average physical strength. A neat appearance and a pleasant business-like manner are important attributes 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. Most apprenticeship programs include 6,000 hours (3 years) or 8,000 hours (4 years) of on-the-job training in addition to related classroom instruction. In these training programs, the trainee learns the techniques of floor covering installation and how to handle the tools of the trade. Through work assignments with skilled craftsmen on a wide variety of floor covering jobs, he learns to plan and execute different types of jobs in a minimum of time and with the most efficient and decorative use of materials. Most apprentices are required to attend class twice a week to learn about the nature of the 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 of floor covering installations.

Some apprenticeship programs may combine training in the installation of resilient floor and wall covering with training in the laying of carpets. Other programs may be limited to the installation of resilient coverings.

Many workers in this trade have acquired their skills through informal training methods, such as working as a trainee or laborer, and observing or being taught by experienced floor covering installers. Many of these men also have gained some knowledge of floor covering installation by attending trade school or manufacturers' training courses, and through home study.

Many informal training programs limit the trainee's work experience to installation of resilient tile, or to residential floor covering work of limited complexity. This lack of all-round experience, however, may be partially offset by trade school and home-study courses and manufacturers' training programs. A young man interested in becoming a floor covering installer should direct inquiries to several firms about their training programs before accepting employment as a trainee.

Skilled floor covering installers may advance to the position of foreman or installation manager for a large floor laying firm. Some become salesmen or estimators for floor covering firms. Floor covering installers having business ability may form their own firms and employ their own mechanics.

Employment Outlook

Employment of floor covering installers—estimated at about 40,000 in 1970—is expected to increase rapidly through the 1970's. Many additional job openings will arise from the need to replace experienced workers who transfer to other occupations, retire, or die. Retirements and deaths alone are expected to provide several hundred job openings annually through the 1970's.

The projected increase in employment of floor covering installers is expected mainly because of the anticipated expansion in construction activity. (See discussion, p. 375.) Moreover, the use of resilient floor coverings and wall-to-wall carpeting will become more widespread. More versatile materials and colorful patterns are expected to contribute to a growing demand for floor coverings. For example, epoxy materials, a relatively new floor covering material, is extremely durable and can be used in many ways—as a solid floor covering to be painted a variety of colors, or as an adhesive or base for laying resilient flooring.

The best job opportunities will be for floor installers having all-round training in the installation of resilient tile and sheet goods or carpeting.

Earnings and Working Conditions

No national wage data on floor covering installers are available. However, wage information from a limited number of firms indicates that, in 1970, most experienced floor layers were paid between $4.50 and $6.00 per hour, although wage rates for skilled workers ranged from about $3.50 an hour in some areas to more than $7.00 an hour in others. Wage rates for these workers may also vary within an area because of differences in level of skill or degree of work specialization. Starting wage rates for apprentices and other trainees usually are about half of the mechanic's rate.

Most floor covering craftsmen, including those under union-man-

agement agreements, are paid on an hourly basis. In some nonunion shops, part of the installer's pay may be in the form of bonuses for work performed within a specified time period. In others, installers receive a monthly salary or are paid on the basis of the number of square feet or square yards 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 evening hours or on weekends when stores and offices are not open for business.

Floor covering installation work is usually not affected by weather conditions, since it is performed indoors. During the winter months, most work is done in heated buildings. Job hazards are not numerous, but installers frequently experience knee injuries because they do much of their work while kneeling; back injuries occur occasionally as a result of twisting and lifting on the job. Most of these injuries can be avoided, however, if proper work procedures are followed. Generally, an installer is assisted by a helper in heavy lifting, and usually he has proper equipment available to move heavy objects.

Sources of Additional Information

For further information regarding floor covering apprenticeships or other work opportunities in this trade, inquiries should be directed to local flooring contractors or floor covering 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. In addition, the local office of the State employment service may be a source of 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, Empire State Bldg., New York, N.Y. 10001.

Asphalt and Vinyl Asbestos Tile Institute, 101 Park Ave., New York, N.Y. 10017.

GLAZIERS

(D.O.T. 865.781)

Nature of the Work

Glaziers engaged in construction work cut, fit, and install plate glass, ordinary window glass, mirrors, and special items such as leaded glass panels. When installing glass, the glazier cuts the glass to size or uses precut glass. The glazier puts a bed of putty into the wood or metal sash (frames) and presses the glass into place. He fastens the glass using wire clips or triangular metal points and then places and smoothes another strip of putty on the outside edges of the glass to keep out moisture.

When installing structural glass, which is used to decorate building fronts, walls, ceilings, and partitions, the glazier (and sometimes the marble setter, see discussion, p. 401) applies mastic cement to the supporting backing and presses the glass into it. The glass may have to be trimmed with a glass cutter if it is not precut to specifications. Glaziers generally install all types of structural glass, both interior and exterior, that is set or glazed with putty, moulding, rubber, and mastic. For example, they install shower doors and bathtub enclosures, mirrors of all types, and window glass. These craftsmen also set a wide variety of automatic doors, and fabricated units constructed of glass that are installed in many buildings.

In addition to handtools, such as glass cutters and putty knives, glaziers use power cutting tools and grinders.

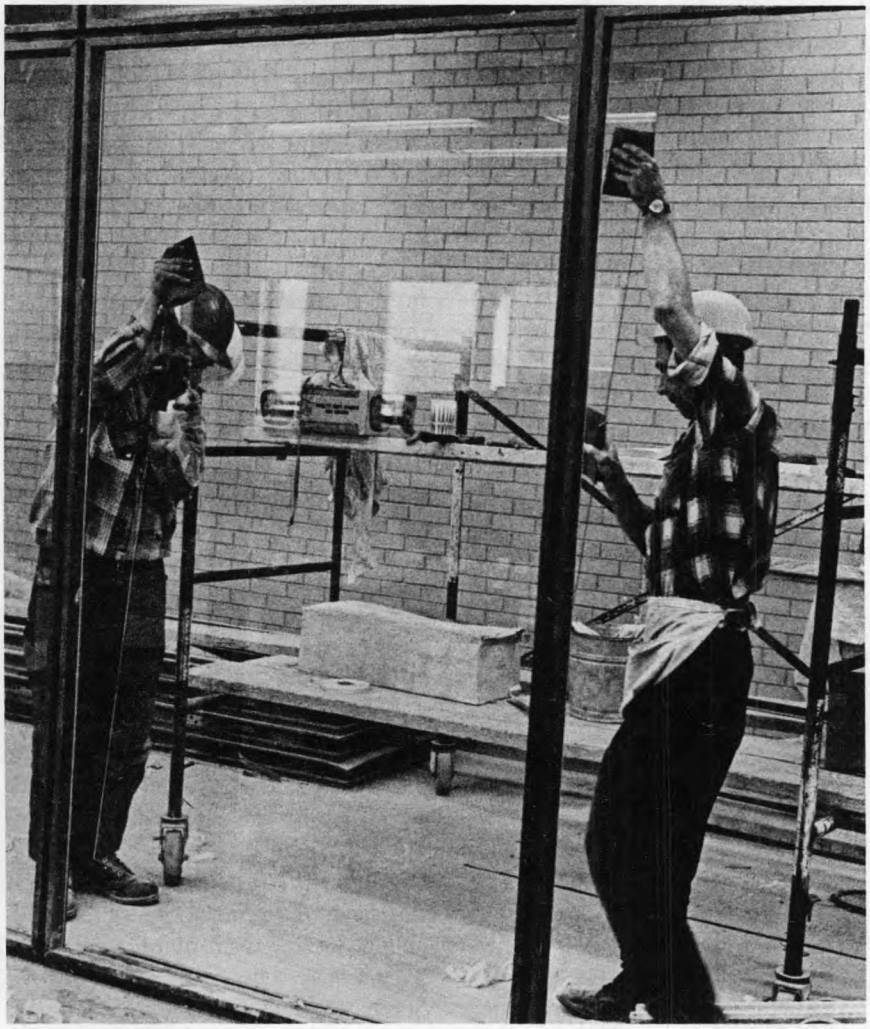
Places of Employment

Most of the estimated 10,500 construction glaziers employed in 1970 worked for glazing contractors engaged in new construction, alteration and modernization work, and on the replacement of broken glass, particularly for store windows. Some glaziers were employed by government agencies or business establishments which do their own construction work.

About 12,500 glaziers worked outside the construction industry. Many are employed in factories where they install glass in sash, doors, mirror frames, and partitions. Others, using skills similar to those used by glaziers, install glass or mirrors in furniture and ships or replace glass in automobiles.

Training and Other Qualifications

Most training authorities, including the National Joint (labor-management) Glazier and Glassworker



Apprenticeship Committee, recommend the completion of a 3-year apprenticeship program as the best way to learn the skills of the construction glazier. A substantial proportion of glaziers, however, have learned the trade informally. They have acquired their skills by working with experienced glaziers and observing or being taught by them. In smaller communities, many journeymen painters and paperhangers also have learned to do glazier work as part of the apprentice training for their trade.

Apprenticeship applicants generally are required to be at least 18 years of age, but they should not have reached their 26th birthday. Eligible veterans are exempt from the maximum age limit. A high school diploma or its equivalent is required.

The apprenticeship program usually consists of 6,000 hours (3 years) of on-the-job training, in addition to a minimum of 144 hours a year of related classroom instruction. During the apprenticeship, the trainee learns how to use and handle the tools, machines, and materials of the trade. Instruction is given in safety measures and first aid, and the reading of specifications and blueprints, and scaffolding. The program also includes on-the-job training in the glazing of wood and metal sash in doors, windows, partitions, and other openings; and the setting and replacement of all types of store front installations, structural glass, mirrors, showcases, partitions and fixtures, and automobile glass.

Hourly wage rates for 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 rapid increase in employment of construction glaziers is expected through the 1970's. In addition to new jobs created by employment growth, many job opportunities will result from the replacement of construction glaziers who transfer to other fields of work, retire, or die.

The large increase anticipated in construction activity (see discussion, p. 375) and the increasing use of glass in building construction are expected to result in more work for construction glaziers. Replacement and modernization work, frequently involving large glass installations, also will contribute to the demand for these workers. The long-range outlook for this occupation generally can be considered very favorable.

Earnings and Working Conditions

Union minimum hourly wage rates for construction glaziers averaged $6.08, compared with $6.54 for all journeymen in the building trades, on July 1, 1970, according to a national survey of building trades workers in 68 large cities. Among individual cities surveyed,

the union minimum hourly wage rate for construction glaziers ranged from $4.25 in Jackson, Miss., to $7.51 in Cleveland, Ohio. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for construction glaziers in 12 of the 68 cities selected to show wage rates from various regions and areas of the country, on July 1, 1970, appear in the accompanying tabulation.

City	*Rate per hour*
Albuquerque	$4.45
Atlanta	5.15
Baltimore	5.30
Dallas	5.25
Detroit	6.92
Kansas City	5.92
Los Angeles	7.03
Madison	5.20
Providence	5.42
San Diego	6.19
Spokane	5.34
Trenton	6.98

Glaziers are exposed to some hazards in their work, such as cuts from glass edges and sharp tools used in cutting glass, back injuries caused by lifting plate glass, and falls from scaffolding. However, employers and unions attempt to eliminate injuries by promoting safety training and procedures.

A large proportion of glaziers employed in construction work are members of the International Brotherhood of Painters and Allied Trades.

Sources of Additional Information

For further information regarding glazer apprenticeships or other work opportunities in this trade, inquiries should be directed to local glazing contractors or general 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 may be a source of 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

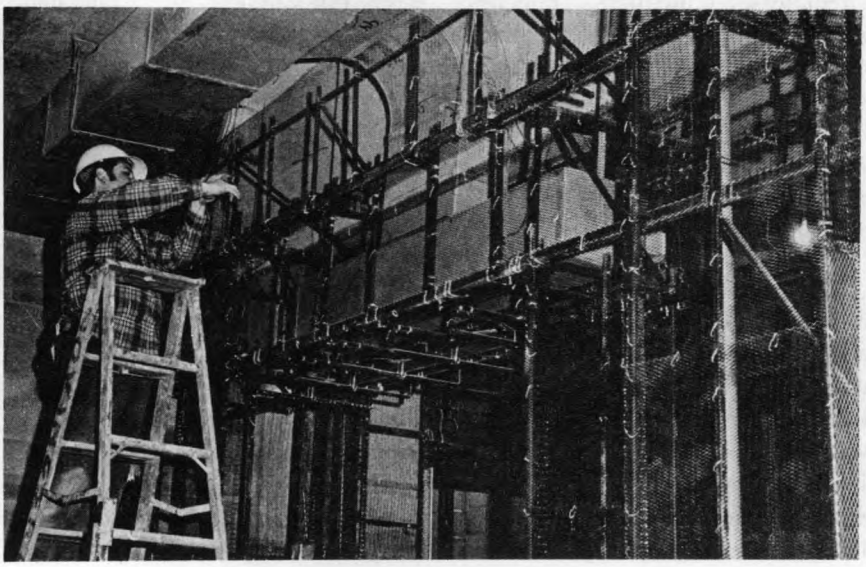
(D.O.T. 842.781)

Nature of the Work

Lathers install the support backings on which plaster, stucco, or concrete materials are applied. These supports are usually of two types—metal lath (strips of expanded metal or a metal wire mesh) or gypsum lath. The plaster easily adheres to either type of lath when mixed to the proper proportion and consistency.

When installing metal lath, the lathers first build a light metal framework (furring), which is fastened securely to the structural framework of the building. On ceilings or interior walls, the lath may be attached directly to the wood framework or partitions. Attachment to the furring or framework may be done by nailing, clipping, tying, or machine stapling. As the lath is being installed, the lathers cut openings for electrical outlets and piping.

Gypsum lath is installed in much the same way. These lath boards are usually 16 by 48 inches (⅜ inch thick) and cover three studs (upright 2 by 4 inches framework, placed 16 inches on center). The gypsum lath is cut by using a lath hatchet to score one side, and then easily broken with a sharp blow on the opposite side. Openings for electrical outlets and other openings must be cut before attaching the lath to the wall or ceiling.



Lathers also 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 as a guide for the plasterer. It provides protection and structural strength to the finished corner.

Lathers also install the metal studs and framework for metal interior partitions which receive lath and plaster or gypsum board. They erect the light iron furring which supports acoustical ceilings.

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 by the lather.

When stucco (a mixture of portland cement and sand) is to be applied over wood framework, the lather installs two layers of wire mesh, separated by a layer of felt, to act as a base.

The tools of the trade include measuring rules and tapes, drills, hammers, chisels, hacksaws, shears, wirecutters, boltcutters, punches, pliers, hatchets, stapling machines, and powder- or power-actuated fastening devices.

Places of Employment

Most lathers—who numbered about 30,000 in 1970—work for lathing and plastering contractors on new residential, commercial, or industrial construction. They also work on modernization and alteration jobs. Some lathers also are employed outside the construction industry; for example, they make the lath backing for plaster display materials or scenery.

Training, Other Qualifications, and Advancement

The National Joint (labor-management) Apprenticeship Committee for the Lathing Industry and many other training authorities recommend the completion of a minimum of 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 are required to be between 16 and 26, and in good physical condition. Aptitude tests are often given to applicants to determine whether they have manual and finger dexterity, as well as the other qualifications required. Apprentices generally must pass examinations that are given at the end of each 6-month period.

During the apprenticeship period, the apprentice learns to use and handle the tools and materials of the trade. For example, he installs gypsum lath, wall furring, and metal lathing. In addition, he generally receives related 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 the related 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.

Skilled and 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 1970's. In addition to new jobs created by employment growth, many job opportunities will result from the replacement of experienced lathers who transfer to other fields of work, retire, or die. Retirements and deaths alone are expected to result in a few hundred job openings annually.

Growth of the trade depends principally upon the anticipated large increase in construction activity. (See discussion p. 375.) Moreover, there will be a growing need for lathing work because of the increasing use of new kinds of plaster and improved methods of applying plaster. Improved, lightweight plasters are being used increasingly because of their excellent fireproofing qualities and ease of handling. There is also a trend toward the greater use of curved surfaces and ceilings made of plaster, both as a form of architectural treatment and to achieve special lighting and acoustical effects. The use of "plaster veneer" as a surface finish is expected to expand because of time and cost economy. 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

Union minimum hourly wage rates for lathers averaged $6.44, compared with $6.54 for all journeymen in the building trades, on July 1, 1970, according to a national survey of building trades workers in 68 large cities. Among individual cities surveyed, the minimum hourly rates for lathers ranged from $4.45 in Tampa, Fla., to $8.56 in Cleveland, Ohio. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance or pension funds, for lathers in 12 of the 68 cities selected to present wage data from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation.

City	*Rate per hour*
Boston	$6.50
Des Moines	5.78
Knoxville	4.90
Los Angeles, gypsum	6.74
Los Angeles, metal	6.22
Louisville	5.84
Newark	6.65
Peoria	6.58
Philadelphia	6.39
Rochester	7.23
Sacramento	6.45
Shreveport	5.38
Washington, D.C.	5.98

A large proportion of lathers are members of The Wood, Wire and Metal Lathers International Union.

Sources of Additional Information

For further information regarding lathers' apprenticeships or other work opportunities in the trade, a young man should apply to a lathing contractor in his area; 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. In addition, the local office of the State employment service 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 lathers may be obtained from:

Contracting Plasterers' and Lathers' International Association, 304 Landmark Bldg., 1343 H St. NW., Washington, D.C. 20005.

National Bureau for Lathing and Plastering, 938 K St. NW., Washington, D.C. 20001.

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

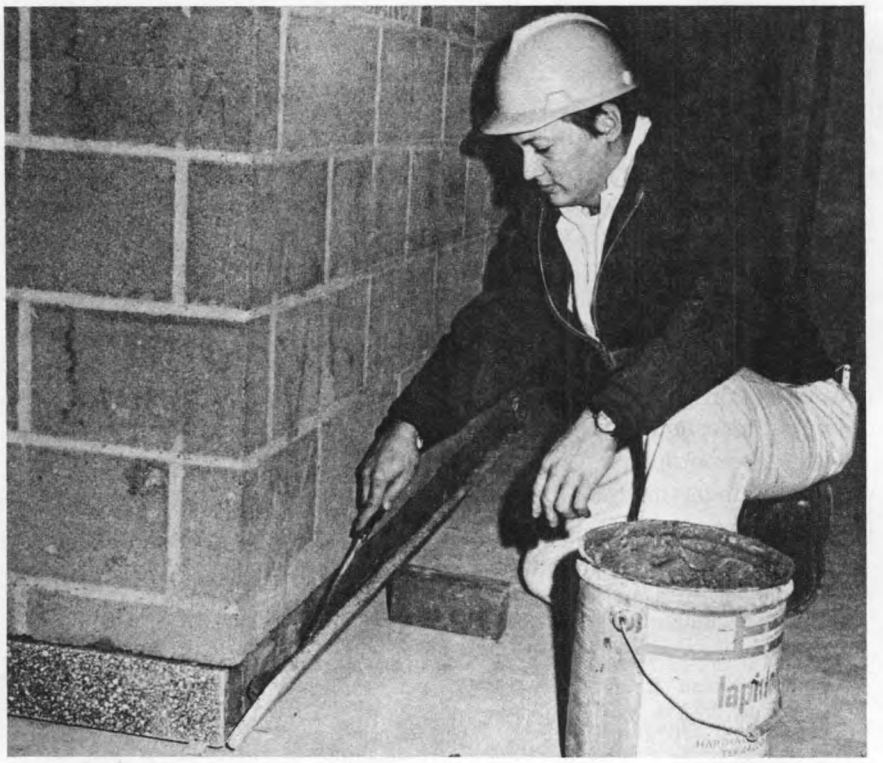
(D.O.T. 861.381 and .781)

Nature of the Work

Marble setters, tilesetters, and terrazzo workers cover interior or exterior walls, floors, or other surfaces with marble, tile, or terrazzo. Craftsmen in each of these distinct trades work primarily with the material indicated by their job title.

Marble setters install marble, shop-made terrazzo panels and artificial marble, and structural glass in building interiors. The marble setter does little fabrication work because the marble and other materials are cut to size and polished before they are delivered to the worksite. However, he may do some minor cutting to make the materials fit exactly. In setting marble, he lays out the work, drills anchor holes in the marble for wall-work, fastens the nonferrous anchors to the marble, and then applies a special plaster mixture to the backing material and sets the marble pieces in place. When necessary, he braces the marble until the setting plaster has hardened. Special grout is packed into the joints between the marble pieces, and the joints are "pointed up" (slightly indented) with a pointing trowel or wooden paddle. Bolt holes have to be drilled if attachments to the marble are necessary, and for the installation of all marble toilet and shower compartments. The setting of marble on floors involves the preparation of the portland cement mortar, applying sufficient mortar for one piece of marble, and then placing the marble on the mortar and tamping it to the proper elevation. The craftsman then removes the marble piece, brushes or trowels a coat of neat cement to the back surface and, finally, resets the piece of marble on the setting bed and retamps it to the proper line and elevation. Each marble setter has a helper to prepare plaster, carry marble slabs, and clean the completed work.

The tilesetter attaches tile (a thin slab of baked clay, stone, or other material) on walls, floors, or ceilings according to blueprints or other instructions. For walls and ceilings, the tilesetter applies a setting bed to the surface or other support backing on which the tile is to be installed.



Marble setter applies mortar to terrazzo panel.

This setting bed consists of a coat of sand, cement, and a small amount of lime, plus a bond coat of pure portland cement mixed with water, or one of a number of patented portland cement mixtures. This bond coat is troweled directly on the mortar setting bed or is applied to the back of each individual tile immediately before the placement of the individual tiles to the setting bed. By using patented portland cement mixtures, one can wait for the setting bed to harden, and using the same procedure, set the tile on the hardened setting bed the following day or even the following week. Tiles are tapped into place on the setting bed with a trowel handle. In laying tile floors, the tilesetter applies the mortar setting bed on the floor, tamping the mortar firmly and screeding (leveling) the bed to the correct elevation. A bond coat of neat cement is then brushed or troweled to the setting bed or to the back of the tiles. The craftsman places the tile on the setting bed, and they are tapped firmly into the mortar. He chips the tile with a hammer and chisels or cuts it with pincers to make it fit into irregular areas, into corners, or around pipes.

Small tiles, such as those laid in bathrooms, are available on paper-backed strips and sheets that can be attached to the floor as a unit, using portland cement or various adhesives. This eliminates the setting of individual tiles. The tilesetter usually is assisted by a helper who mixes mortar, sets up scaffolds, supplies the setter with material, grouts (fills) the joints after the tile setting is completed, and cleans the completed work.

Terrazzo is a type of ornamental concrete used mainly for floors. Marble chips are used as the coarsest concrete ingredient. After the terrazzo hardens, it is ground and polished to give a smooth surface on which the marble chips are exposed against the background of the material in which the chips are mixed.

A terrazzo worker starts his work by laying a base of concrete mortar. He levels and tamps the concrete base with a long, flat tool called a straightedge. Then he places metal strips in the base wherever there is to be a joint or a change of color between panels or to create a pattern, and imbeds their bottom edges in the base. If there is to be lettering or an ornamental figure, he also imbeds a shopmade mold. Finally, he mixes the top course of cement and marble chips, pours it onto the base, and rolls and levels it. A separate mixture is made for each color. Where no concrete base is required, the craftsman mixes the marble chips with epoxy polyester resins, or latex, and this mixture is poured directly onto the floor. After the mixture has hardened for a few days, a terrazzo helper grinds and polishes the floor with an electric-powered grinding machine.

The terrazzo worker is assisted by helpers in the mixing and placing of the base course, but he alone does the leveling and placing of the metal strips. Helpers handle sand, cement, marble chips, and all other materials used by the terrazzo worker. They rub and clean marble, mosaic, and terrazzo floors and perform other work required in helping a terrazzo craftsman. The terrazzo worker generally supervises mixing of the top course that, along with the grinding, governs its final appearance.

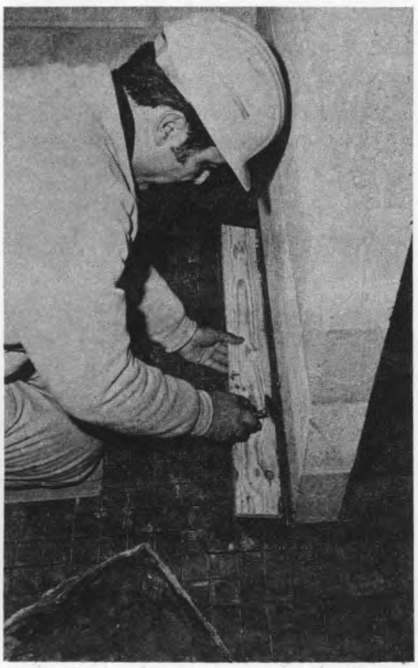
Places of Employment

Marble setters, tilesetters, and

terrazzo workers are employed mainly in new building construction and in the large urban areas. Substantial numbers of terrazzo workers are employed in Florida and California.

Training, Other Qualifications, and Advancement

Most training authorities, including the national joint labor-management apprenticeship committees that set the training standards in these trades, 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, have acquired their skills informally by working as helpers, observing, or being taught by experienced craftsmen.



Apprenticeship applicants generally are required to be between 17 and 22; a high school education or its equivalent is desirable. Good physical condition and manual dexterity are important assets. Applicants should have an eye for quickly determining proper alinements of tile, terrazzo, and marble, and have a good sense of color harmony.

The apprenticeship programs in each of these trades generally consist of 6,000 hours of on-the-job training, in addition to related classroom instruction. In a typical 3-year training program for terrazzo workers, apprentices learn, among other things, to use, care for, and handle safely the tools, equipment, and materials commonly used in the trade; mix, place, tamp, and level concrete and terrazzo material; and select, set, and level metal dividing strips. The apprentice also learns the selection and placement of materials according to the design of the job; the rough and final finishing of bases and covers; and hand and machine rubbing.

The apprentice receives related classroom instruction in blueprint reading, layout work, basic mathematics, and shop practice.

Hourly wage rates for apprentices in each of these trades 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 and experienced tile, terrazzo, or marble setters may become foremen. Others may be able to start their own small contracting businesses.

Employment Outlook

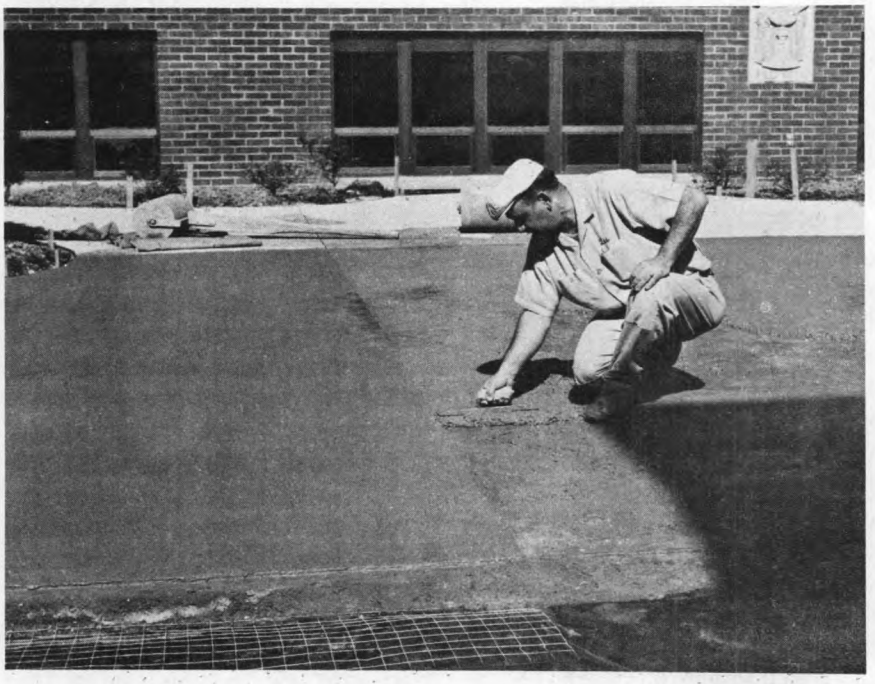
Combined employment estimated at about 30,000 in 1970 in the three trades—marble setter, tilesetter, and terrazzo worker—is expected to increase moderately through the 1970's. In addition, job opportunities will result from the need to replace experienced workers who transfer to other fields of work, retire, or die. However, employment growth and retirements and deaths will provide only several hundred job openings annually.

Total employment in these trades is expected to increase mainly because of the anticipated rapid expansion in construction activity. (See discussion, p. 375.) However, the rate of employment growth will vary sharply among these trades.

The demand for terrazzo workers is expected to increase rapidly. Because terrazzo is durable and attractive, the number of terrazzo installations is expected to continue to increase substantially. Growth of the trade also will be stimulated by the use of new terrazzo materials, especially epoxy and latex terrazzo. These products, which are lighter and occupy less space than cement-based terrazzo, are being used increasingly, especially on the upper floors of multistoried buildings. A small number of skilled terrazzo workers have been recruited from abroad to meet shortages of these workers in some areas.

A moderate increase is expected in the employment of tilesetters. Growth of this trade will be limited by the increasing use of competing materials, such as asphalt floor tile, structural glass, plastic tile, and plastic-coated wallboards, which usually are installed by workers other than tilesetters.

Little change in the employment of marble setters is expected. However, the excellent properties of marble as a building material will insure its continued use and provide work for marble setters, despite the relatively higher costs of marble compared with competitive materials.



Earnings and Working Conditions

Union minimum hourly wage rates for terrazzo workers averaged $6.46; for marble setters, $6.29; and for tilesetters $6.08; on July 1, 1970, according to a national survey of building trades workers in 68 large cities. These rates compared with the average of $6.54 for all journeymen in the building trades. Among the individual cities surveyed, the minimum hourly rates for terrazzo workers ranged from $4.50 in Norfolk, Va., to $8.09 in Cleveland, Ohio. For marble setters, the hourly rates ranged from $4.50 in Norfolk, Va., to $8.16 in Cleveland, Ohio. The rates for tilesetters ranged from $4.50 in Norfolk, Va., to $8.09 in Cleveland, Ohio. Straight time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for marble setters, tilesetters, and terrazzo workers in 12 of the 68 cities selected to show wage rates from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation.

	Rates per hour		
City	*Marble setters*	*Tile-setters*	*Terrazzo workers*
Atlanta	$5.20	$5.20	$5.20
Baltimore	6.60	5.39	5.39
Boston	6.40	6.75	6.40
Chicago	6.55	6.55	6.55
Dallas	5.25	5.60	5.60
Denver	5.55	5.55	5.55
Detroit	8.04	7.00	6.77
Little Rock	4.70	4.70	4.70
New Orleans	5.75	5.30	5.30
Sacramento	...	6.00	7.73
Spokane	6.16	5.81	6.00
Toledo	7.66	6.44	6.44

Marble setters and terrazzo workers work both indoors and outdoors, depending on the types of installation. Tilesetters work mostly indoors.

A large proportion of the workers in each of these trades are members of one of the following unions —Bricklayers, Masons and Plasterers' International Union of America; and 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 further information regarding apprenticeship or other work opportunities in these trades, inquiries should be directed to local tile, terrazzo and marble setting contractors or to locals of the unions previously mentioned. In addition, the local office of the State employment service 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 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.

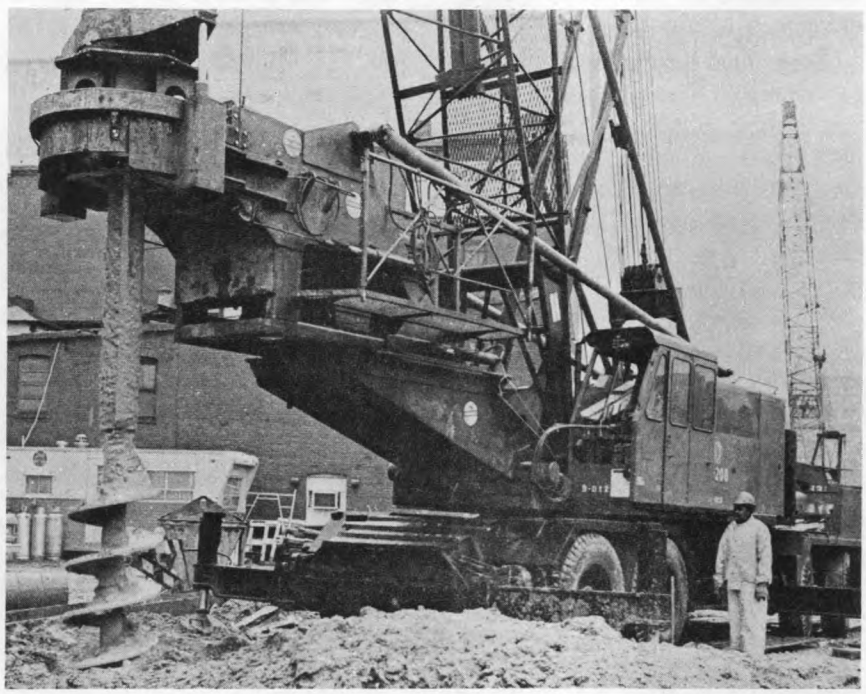
OPERATING ENGINEERS (CONSTRUCTION MACHINERY OPERATORS)

(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 operate and maintain various types of power-driven construction machinery. These machines include power shovels, cranes, derricks, hoists, pile drivers, concrete mixers, paving machines, trench excavators, bulldozers, tractors, and pumps. Operating engineers often are identified by the types of machines they operate; for example, craneman, bulldozer operator, derrick operator, or heavy equipment mechanic. These craftsmen have a wide range of skills, working with many different machines—some complex and others relatively simple. The range of skills may be described by discussing the duties of an engineer who operates a crane and one who operates an earth-boring machine.

The crane operator manipulates various pedals and levers to rotate the crane on its chassis and to raise and lower the crane boom and the loadline. The operator also manipulates a number of different attachments to the crane boom for various construction purposes. For example, he manipulates buckets for excavation work; pile drivers to drive steel beams, wood, and concrete piling into the ground; and wrecking balls for demolition work. Good eye-hand-foot coordination, precision handling of heavy equipment, and judgment in estimating proper load size are essential aptitudes for a crane operator. In contrast, earth-boring machines that dig holes for poles or posts require less skilled operators to set the proper auger (drill) in the spindle, start the machine, and stop the auger when it has penetrated to the correct depth.



Although skills vary, the trend is toward more versatility. An individual who desires steady employment, particularly in construction, should know how to operate several different types of equipment. Operators prefer to work on more complex machines because wage rates for operating such machines are higher.

Places of Employment

An estimated 310,000 operating engineers were employed as excavating, grading, and road machinery operators in 1970. In addition, thousands of operating engineers were employed for other types of construction machinery, including cranes, derricks, hoists, diesel engines, air-compressors, trench-pipe layers, and dredges.

Most operating engineers are employed by contractors engaged in highway, dam, airport, and other large-scale engineering projects. They are employed in excavating, grading, landscaping and in hoisting concrete, steel, and other building materials. Others are employed by utility companies, manufacturers, and other business firms that do their own construction work, as well as by State and local public works and highway departments. Relatively few operating engineers are self-employed. Those few are usually owner-operators of construction equipment, such as bulldozers, small cranes, and backhoes.

In addition to employment in construction work, operating engineers operate cranes, hoists, and other power-driven machinery in factories and mines. In some cases, the duties of operating engineers in nonconstruction jobs are about the same as those in construction work. For example, operation of a crane to unload cars of coal at a factory is

very similar to operation of a crane to unload barges of sand and gravel for a street paving job. On the other hand, the work of a steel pourer (craneman) in a steel mill differs considerably from that of a crane operator in the construction industry.

Construction machinery operators are employed in every section of the country. Their work, however, may often take them to remote locations where highways and heavy engineering projects, such as dams are being built.

Training, Other Qualifications, and Advancement

Most training authorities, including the National Joint (labor-management) Apprenticeship and Training Committee for Operating Engineers, recommend completion of a 3-year apprenticeship as the best way to qualify for journeyman operating engineer. Apprenticeship standards provide training in the following equipment: (1) Universal equipment (hoists, shovels, cranes, and related equipment), (2) grading and paving equipment, and (3) plant equipment (such as material mixing and crushing machines). These standards also provide for training of heavy-duty construction machinery repairmen.

The apprenticeship program for each classification consists of at least 6,000 hours (3 years) of on-the-job training. Training is given by a lead engineer, a journeyman, or a master mechanic. In a typical universal equipment program, the apprentice learns to use, maintain, and handle safely the equipment and tools of the trade; set grade stakes; and read plans and instructions. He also learns the different types of greases and oils and to use welding and cutting equipment. In addition to on-the-job training, the program includes a minimum of 144 hours a year of related classroom instruction in subjects such as reading grade plans, elements of electricity, physics, welding, and automotive maintenance.

Apprenticeship applicants generally must be between 18 and 30; physically able to perform the work; have a high school education or its equivalent; and the ability and aptitude to master the trade.

Hourly wage rates for apprentices start at a stipulated proportion of the journeyman rate (at least 65 percent in most cases), and increase periodically until the journeyman rate is reached at the completion of the apprenticeship.

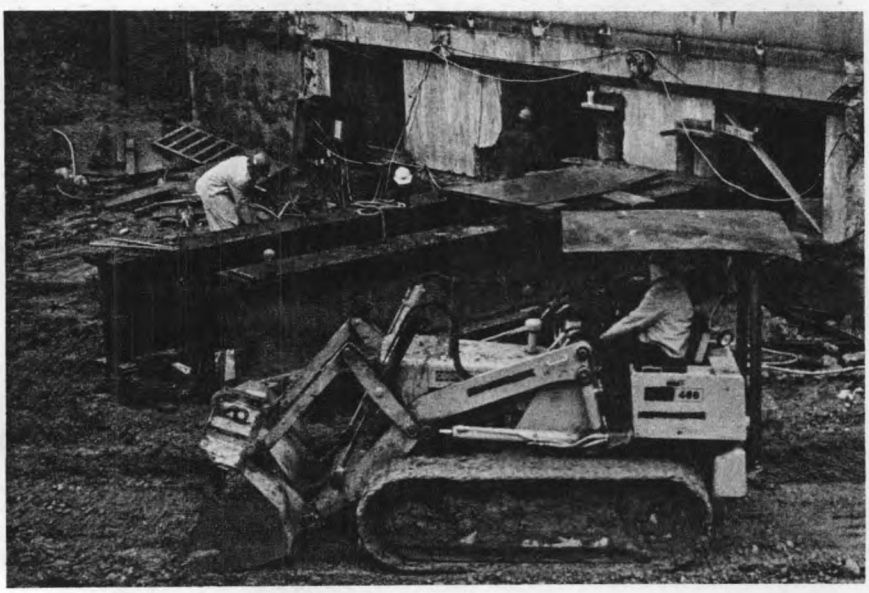
Many men having mechanical aptitude enter this occupation as oilers (operating engineer's assistants) or as helpers to heavy equipment repairmen. These workers learn to repair and maintain machinery. In time, they may receive operating instruction on the equipment from experienced operators.

Some men having mechanical experience, such as that obtained from operating farm equipment, may get jobs operating the simpler construction machines. The all-round knowledge necessary to obtain continuous employment is obtained best through a formal apprenticeship program.

Employment Outlook

Employment of construction machinery operators is expected to increase rapidly through the 1970's. Thousands of additional job opportunities will result from the replacement of experienced workers who transfer to other fields of work, retire, or die. Retirements and deaths alone are expected to provide a few thousand job openings annually.

The rapid rise in employment of operating engineers will occur mainly because of the anticipated growth in construction activity and the growing volume of highway construction resulting from the long-range multibillion dollar highway program (see discussion, p. 375). Job opportunities also will result



from the need to maintain and repair the highway system.

The increasing use of construction machinery shows every indication of continuing. More specialized machines, particularly earth-moving and smaller machines for small construction projects, are expected to be used. The increasing mechanization of materials movement in factories and mines also should result in growing employment of operating engineers outside of construction.

Technological improvements are expected to limit somewhat the growth in employment of construction machinery operators. For example, mobile truck cranes now can lift 125 tons to a height of 330 feet (equivalent to a 33-story building) and travel at speeds up to 35 m.p.h. Scrapers in use can scoop and carry from 75 to 150 tons of dirt in one load. Many types of laborsaving equipment, which combine the functions of several conventional machines, are expected to gain widespread use in the next decade. One example is the slipform paver that spreads, vibrates, forms, and finishes concrete paving in one continuous operation. Also, a pipelaying machine digs a trench, lowers the pipe into the trench, and fills the trench after the pipes are connected.

Electronic controls on construction equipment are being used increasingly. Electronic grade controls on highway paving equipment results in smoother pavements and greater efficiency.

Earnings and Working Conditions

Operating engineers have a more complicated wage structure than any other construction trade. Hourly rates are established for operators of machines of different types, for machines of the same type but different capacity, for the same machine in different types of construction, and for the same work in different parts of the country.

Crane operators, who generally are among the highest paid construction machinery operators, had union minimum hourly rates ranging from $4.70 in Birmingham, Ala., to $8.35 in Trenton, N.J., on July 1, 1970, according to a national survey of building trades workers in 68 large cities. The rates for bulldozer operators ranged from $3.90 in Norfolk and Richmond, Va., to $7.85 in Cleveland, Ohio. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for crane operators and bulldozer operators in 12 of the 68 cities selected to show wage rates from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation.

City	Rate per hour	
	Crane operator	Bulldozer operator
Baltimore	$6.02	$5.22
Boston	6.94	6.82
Cincinnati	6.94	6.74
Denver	5.25	5.25
Erie	7.58	7.58
Houston	5.60	5.60
Los Angeles	6.91	6.91
Milwaukee	7.04	6.79
Omaha	6.13	5.78
Phoenix	6.74	6.50
San Diego	6.76	6.66
Tampa	6.06	4.85

The operating engineer works outdoors; consequently, he usually works steadily during the warmer months and experiences slow periods during the colder months. 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.

A large proportion of operating engineers are members of the International Union of Operating Engineers.

Sources of Additional Information

For further information regarding operating engineer apprenticeships or work opportunities in this occupation, inquiries should be directed to 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 Apprenticeship and Training, U.S. Department of Labor. In addition, the local office of the State employment service 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 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. 840.131, .381, .781, .884, and .887 and 841.781)

Nature of the Work

Painting and paperhanging are separate, skilled building trades, al-

though many craftsmen in these trades do both types of work. Both apply finishes to walls and other building surfaces. However, the materials they use, and the method of application, differ.

The painter applies coats of paint or other materials to either interior or exterior building surfaces (and other structures), for the purpose of decorating or protecting them. Other finishes can include varnish, stains, enamel, and lacquer. On the other hand, the paperhanger covers interior walls and ceilings of rooms with decorative wallpaper, fabric, vinyls, or other materials.

One of the primary duties of the painter—especially if he is repainting—is to prepare the surface to be painted. He must remove loose paint, either by scraping or by heating with a blowtorch and then scraping. He must also remove grease, fill nail holes and cracks, sandpaper rough spots, and brush off dust. Usually, in painting new surfaces, he must cover them with a prime coat or sealer to provide a suitable surface or base. He applies paint to many kinds of materials, including wood, structural steel, and clay products, generally by using a brush, spray gun, or roller.

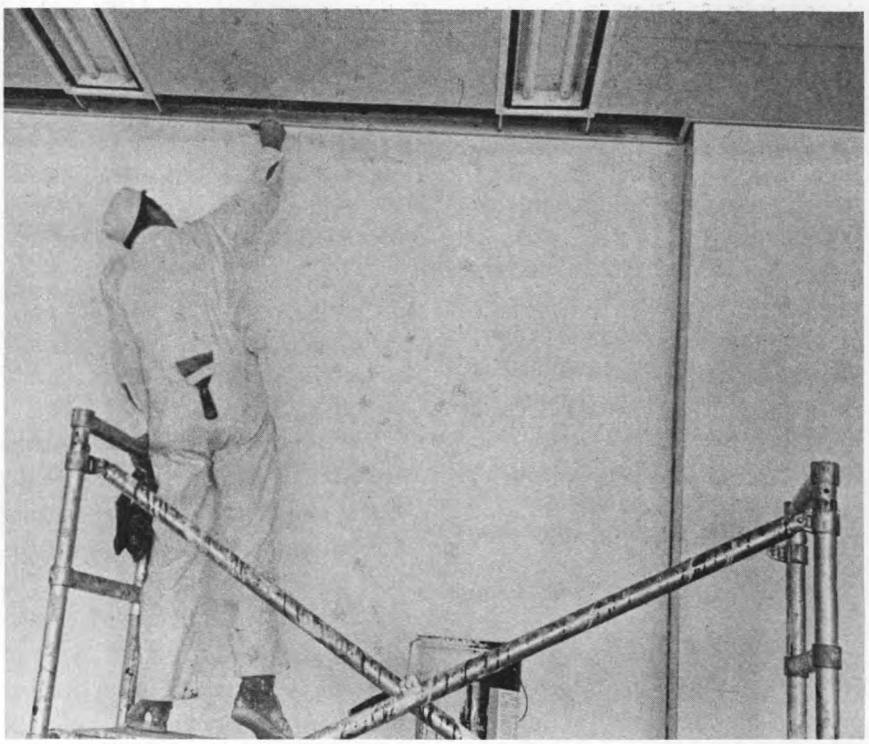
A painter must be skilled in handling brushes and other painting tools so that he can apply paint thoroughly, uniformly, and rapidly to any type of surface. He must be able to mix paints and match colors, using a knowledge of paint composition and color harmony. He also must know the characteristics 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 spray guns to paint those surfaces or objects on which it is difficult to use a brush, such as lattices, cinder and concrete block, and metal fencing. They use them also on large areas that can be sprayed with a minimum of preparation. The painter also sometimes uses a roller (a rotating applicator covered with soft material), rolling the applicator over the surface to be covered.

Painters must know how to erect the scaffolding from which they often work, 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 other structures.

The paperhanger's first step is preparing the surface which he will cover. In undertaking new work, he applies "sizing," a prepared material that makes the plaster less porous and assures better sticking of the paper to the surface. In doing redecorating work, he may have to remove old paper by soaking or—if there are many layers—by steaming. Frequently, it is also necessary for paperhangers to do minor plaster patching in order to get a smooth base for the covering material

After he has prepared the wall, the paperhanger measures the area to be covered. He first cuts a length from the roll of wallpaper, and carefully positions the patterns so they will match at the ceiling and baseboard. He next mixes a paste and applies it to the reverse side of the paper. He then places the paste-coated paper strip on the wall, smoothing it into place with his hand and a dry brush. The paperhanger removes air bubbles by smoothing the paper strip toward the outer edges. In this final step, the craftsman matches the adjacent edges of the patterned paper, cuts and fits the horizontal edges at ceiling and base; smooths the seams between strips with a roller or other special tool; and makes a thorough inspection for air bubbles and other



imperfections in the work. Then he is ready to place the next wallpaper strip. When working with wall coverings other than paper, the paperhanger follows the same general procedure.

Places of Employment

Many painters and paperhangers work for contractors engaged in new construction. Substantial numbers of painters and paperhangers also are employed by contractors to do repair, alteration, or modernization work on existing structures. Hotels, office buildings, shipyards, utility companies, manufacturing firms, schools and other government units, and other organizations that own or manage extensive property holdings commonly employ maintenance painters. When interior redecorating involves wall papering, as in hotels or apartment buildings, maintenance painters also may do the required paperhanging.

Training, Other Qualifications, and Advancement

Most training authorities, including the National Joint (labor-management) Painting and Decorating Apprenticeship and Training Committee 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, have learned the trade informally, working as helpers or handymen to experienced craftsmen or by observing them or being taught by them. 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 are required to be between 16 and 25 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 should not be allergic to paint fumes or to the other materials used in these trades, such as varnish, turpentine, and lacquer.

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. Many apprenticeships combine painting and paperhanging. In a typical 3-year training program, the apprentice learns, among other things, to use, care for, and handle safely the tools, machines, equipment, and materials commonly used in the trade. He must also learn how to prepare surfaces (including sizing, sandpapering, and patching walls); match and mix colors; and apply various types of interior and exterior materials (including stain, lacquer, enamel, oil, and varnish). He must also learn how to erect scaffolding.

In addition, the apprentice receives related classroom instruction in such diverse subjects as color harmony; paint chemistry; estimating costs; and making, mixing, and matching paints. He also learns the relationship between painting and paperhanging and the work performed by the other building trades craftsmen.

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 foreman. They also may advance to jobs as estimators for painting and decorating contractors —computing material requirements and labor costs. Some may become superintendents on large contract painting jobs, or they may establish their own businesses as painting and decorating contractors.

Employment Outlook

Employment of painters—estimated at about 385,000 in 1970—is expected to increase rapidly through the 1970's. In addition to employment growth, thousands of job openings will arise from the replacement of experienced painters who transfer to other occupations, retire, or die. Retirements and deaths alone are expected to provide more than 10,000 job openings annually.

The large rise anticipated in construction activity (see discussion, p. 375) is expected to result in a growing demand for painters. Moreover, recently developed paints, such as polyester and vinyl coatings and epoxys, that are heat-, abrasion-, and corrosion-resisting 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 commercial firms.

Technological developments are expected to limit the growth of employment among painters. New types of paint that are more easily applied and have improved "covering power" have made it easier for inexperienced workers to do work that is acceptable to some customers. Other paints now being introduced promise to lengthen the "life" of present-day paints. Spray paint-

ing requires fewer painters to do the same amount of work. In addition, many items formerly painted at the building site now come from a factory with a prime coat and often with a final coat. Aluminum building products, which often require no painting, have been used increasingly in recent years.

Employment of paperhangers—estimated at about 5,000 in 1970—is expected to increase by a few thousand through the 1970's. In addition, some job openings will result from the replacement of experienced paperhangers who transfer to other occupations, retire, or die. Retirements and deaths alone are expected to result in a few hundred job openings annually.

Growth in the employment of paperhangers is expected to result mainly from the anticipated increase in construction activity. Also, more widespread use of fabric, plastic, and other types of wall covering applied by paperhangers should contribute to the demand for these workers. On the other hand, the use of paints for interior walls, as well as wallpapers designed for easier application by "do-it-yourselfers," will tend to limit the employment growth of paperhangers.

Earnings and Working Conditions

Union minimum hourly wage rates for painters and paperhangers in 68 large cities averaged $5.95 and $6.02, respectively, on July 1, 1970, according to a national survey of building trades workers. In comparison, the average rate for all journeymen in the building trades was $6.54 an hour. Among individual cities surveyed the minimum hourly rates for painters ranged from $3.65 in Richmond, Va., to $7.06 in Cleveland, Ohio. The rates for paperhangers ranged from $3.65 in Richmond, Va., to $7.09 in Dayton, Ohio. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance or pension funds, for painters and paperhangers in 12 of the 68 cities selected to show wage rates from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation.

City	*Rate per hour*	
	Painters	*Paperhangers*
Atlanta	$5.95	$6.20
Boston	6.08	...
Chicago	6.35	6.35
Cincinnati	6.23	6.83
Detroit	7.00	7.00
Houston	5.34	5.44
Newark	6.00	...
New Orleans	4.38	4.38
Philadelphia	5.22	5.34
Salt Lake City	4.87	5.07
San Diego	6.49	6.99
Spokane	6.17	6.17

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 from ladders and scaffolds.

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 further information regarding painting and paperhanging apprenticeships or other work opportunities in these trades, inquiries should be directed to 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 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 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

The plasterer is the building craftsman who applies a plaster coating to interior walls and ceilings to form fire-resistant and relative sound-proof surfaces, which then may be decorated with paint or wallpaper covering. They also apply more durable cement plaster or stucco to exterior walls, and form and cast ornamental designs in plaster.

In interior work, the plasterer usually applies three distinct coats of plaster—scratch, brown, and finish, to ceilings and walls. On wire or metal lath (backing to which plaster readily adheres), he applies the initial or scratch coat directly, then scratching it with a special rak-

ing tool before it "sets" (hardens). He then allows it to set a day or more before applying the brown coat, or second layer of plaster. On gypsum lath or masonry walls, he may use the same procedure; however, the brown coat can usually be applied immediately after the scratch coat has been completed.

The plasterer uses a hawk (a square plate of lightweight metal with a handle, about 14 by 14 inches), which holds several trowelfuls of material, and a trowel to apply the wet material. While applying the brown coat, the plasterer plumbs and straightens corners, angles, and wall and ceiling surfaces, using a straightedge, rod, or beveledge. The craftsman then uses a darby (a wood or metal float with handles, about 4 by 42 inches) to bring the main body of the walls and ceiling to a smooth and uniform finish. The brown coat is allowed to start its initial set and is then floated (rubbed lightly using a circular motion) using a wood hand float with slightly protruding nails. The nails scratch the undercoat which, in turn leaves the undercoat coarse and provides greater adhesion for the final finish coat.

Before applying the finish, or white coat, the craftsman must allow the brown coat to dry for several days. During cold weather, use of heat may be necessary to prevent the freezing and failure of materials, and to aid the plaster in drying. When the plasterer considers the brown-coated walls ready for the final coat, he mixes the white coat on a plaster board. He mixes only enough material, however, to cover an area to which he can apply a proper finish. The "white coat" is a relatively thin covering, which the craftsman must apply carefully and quickly, and finish smoothly with a trowel, brush, and water before the mixture has time to set. This covering sets very quickly, and in a few days dries to a very durable and hard finish.

The craftsman may finish wall surfaces in a number of ways by using different tools, methods, or materials. In place of a white coat as described above, he may use a variety of decorative textures, such as stipple (dots), swirl, and sand finishes, or colored interior stucco finishes.

A plasterer may perform more complex types of plastering work, such as decorative and ornamental plastering. For example, he may be called upon to mold or form intricate ornamental designs such as cornices, paneling, or recesses for indirect lighting. Plasterers who do this type of work must be able to follow blueprints and other specifications furnished by the architect.

In exterior stucco work, the plasterer applies a mixture of portland cement and sand to masonry, expanded metal, or metal wire lath in the same manner as he would in plastering interior surfaces. The finish coat usually consists of either a mixture of white cement and sand or a patented finish material, which may both be applied in a variety of colors and textures. Also, marble or gravel chips may be imbedded into the soft plaster to form a textured surface.

Apprentice plasterers work with journeymen so that they may acquire a full knowledge of the craft and develop the necessary skills. Laborers (hod carriers) also work with plasterers, mixing base coat materials and some finish materials, and carrying them to the plasterer. They also erect scaffolding when needed.

In recent years, plasterers have been making increasing use of machines that spray plaster on walls, ceilings, and structural sections of buildings. These machines are particularly desirable when used to apply the newly developed lightweight plasters. Machines used to mix plaster have been in general use for many years.

Places of Employment

Most plasterers work on new construction. In addition, these craftsmen work on extensive building alterations, particularly where special architectural and lighting effects are part of the building modernization. Some work for plasterers is found in the repair and maintenance of older buildings.

Training, Other Qualifications, and Advancement

Most training authorities, including the National Plastering Industry Joint (labor-management) Apprenticeship and Training Committee, recommend completion of a 3- or 4-year apprenticeship as the best way to learn plastering. However, many workers in this trade have acquired some plastering skills by working as helpers or laborers, ob-

serving or being taught by experienced plasterers.

Apprentice applicants in this trade generally are required to be between 17 and 25, but this requirement may be waived for veterans. Good physical condition and manual dexterity are important assets.

Apprenticeship programs generally consist of 6,000 to 8,000 hours (3 or 4 years) of on-the-job training, in addition to at least 144 hours of related classroom instruction annually. In a typical 4-year training program, the apprentice learns, among other things, to use and handle the tools of the trade, and the properties and appropriate handling of the different kinds of materials and mixtures used in plastering. In addition, he learns how to apply scratch (first) coat and brown (second) coat; aline walls and beams to given measurements; apply white coat and sand finish; install acoustical plaster and stucco, and acoustical tile, cork, and similar materials; use machines to apply and finish plaster; and lay out arches and ceilings. He also learns texture finishing.

The apprentice receives classroom instruction in such subjects as drafting, blueprint reading, and mathematics applicable to layout work. In the classroom and on the job, the apprentice becomes familiar with the work of other trades so that he may determine, for example, whether lathing, or other preparatory work is satisfactory.

Plasterers may advance to foreman, superintendent, or estimator for a plastering contractor. Many plasterers are self-employed and they may employ other plasterers.

Employment Outlook

A slow increase in the employment of plasterers—estimated at about 35,000 in 1970— is expected during the 1970's. In addition, replacement of experienced plasterers who transfer to other fields of work or who retire or die will provide many job openings for new workers. Retirements and deaths alone are expected to result in several hundred job openings annually.

The growth in employment of these workers will result primarily from anticipated large increases in construction activity. (See discussion, p. 375.) In addition, recent changes in plastering materials and improvement in methods of applying these materials are creating work opportunities for plasterers by increasing the scope of the craft. For example, improved lightweight plasters are being used increasingly because of their excellent soundproofing and fireproofing qualities. Also, expanding job opportunities for plasterers is the growing use of curved surfaces and ceilings made of plaster, both to achieve a form of architectural treatment and also special lighting and acoustical effects. Plastering and fireproofing by machine have been widespread. Still other developments are the increasing use of "plaster veneer" or "high density" plaster, a thin, extremely hard material used to create a finished surface, and "marblecrete," a type of stucco in which varicolored marble chips have been imbedded.

However, the growth in employment resulting from these favorable developments will be countered by the continuing use of nonplaster (dry-wall) construction, installed by craftsmen other than plasterers.

Earnings and Working Conditions

Union minimum hourly rates for plasterers averaged $6.35, compared with $6.54 for all journeymen in the building trades, on July 1, 1970, according to a national survey of building trades workers in 68 cities. Among individual cities surveyed, the minimum hourly rates for plasterers ranged from $4.25 in Charlotte, N.C., to $8.56 in Cleveland, Ohio. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for plasterers in 12 of the 68 cities selected to show wage rates from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation.

City	*Rate per hour*
Birmingham	$4.82
Chicago	7.00
Dayton	6.95
Detroit	6.84
Grand Rapids	6.77
Little Rock	5.04
Madison	6.20
New Haven	6.55
New Orleans	5.20
Philadelphia	6.19
Sacramento	6.30
Spokane	6.49

Plastering requires considerable standing, stooping, and lifting. Plasterers work both outdoors doing stucco work, and indoors plastering walls and ceilings and forming and casting ornamental designs.

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 further information regarding plastering apprenticeships or other work opportunities in the trade, inquiries should be directed to 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 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 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, 20 E St. NW., Washington, D.C. 20001.

National Bureau for Lathing and Plastering, 938 K St. NW., Washington, D.C. 20001.

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

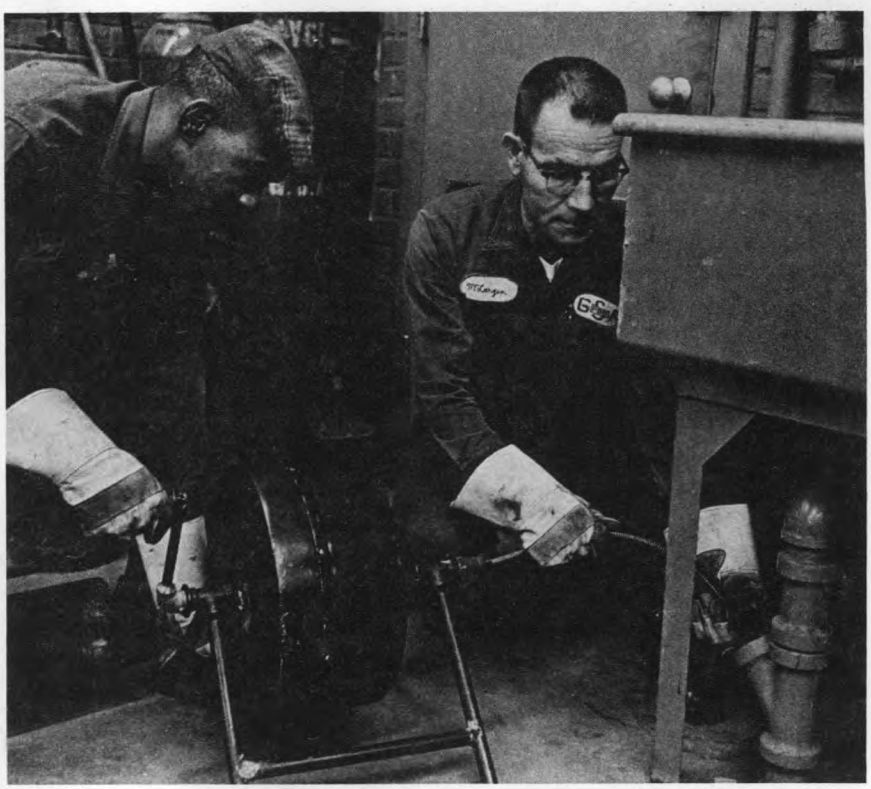
Plumbers and pipefitters are craftsmen who install pipe systems that carry water, steam, air, or other liquids or gases needed for sanitation, industrial production, or other uses. They also alter and repair existing pipe systems and install plumbing fixtures, appliances, and heating and refrigerating units.

Although plumbing and pipefitting are sometimes considered to be a single trade, journeymen can specialize in either craft, particularly in large cities. Water, gas, and waste disposal systems, especially those connected to public utility systems, are installed by plumbers. These installations are made in residential and commercial buildings, schools, industrial plants, and other structures. In homes, for example, 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, especially those in industrial and commercial buildings and defense establishments such as missile launching and testing sites. Pipefitters, for example, install ammonia-carrying pipelines in refrigeration plants, complex pipe systems in oil refineries and chemical and food-processing plants, and pipelines for carrying compressed air and industrial gases in many types of industrial establishments.

Some plumbers and pipefitters specialize in gas fitting, steam fitting, or sprinkler fitting. Gas fitters install and maintain the gas fittings and the central gas main extensions that connect the main gas line with those leading to homes. Steamfitters assemble and install steam or hot water systems for commercial and industrial uses. Sprinkler fitters install and maintain all types of fixed piping fire extinguishing systems.

Plumbers and pipefitters use a



Plumbers use auger to clean waste line.

variety of skills when installing pipe systems. For example, they bend pipe and weld, braze, calk, solder, or thread joints. After a pipe system is installed, the plumber or pipefitter tests for leaks by filling the pipes with liquid or gas under pressure.

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 are employed by plumbing and pipefitting contractors in new construction activity, 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 establishments. Pipefitters, in particular, are employed as maintenance personnel in the petroleum, chemical, and food-processing industries where the industrial operations include the processing of fluids through pipes.

Training, Other Qualifications, and Advancement

Most training authorities, including the national joint labor-management apprenticeship committees for the plumbing and pipefitting industries, 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, have acquired plumbing and pipefitting skills informally by working for several years with craftsmen, and by observing and receiving instruction from them. Many of these persons have gained some knowledge of their trade by taking trade or correspondence school courses.

Apprentice applicants generally are required to be between 16 and 25, and in good physical condition. A high school education or its equivalent, including courses in mathematics, physics, and chemistry, is generally recommended. Applicants often are required to take aptitude tests, particularly to determine whether they have the high degree of mechanical aptitude required in this field.

Most apprentice training programs for plumbers and pipefitters are conducted under written agreements between the apprentices and local joint apprenticeship committees, composed of union and management representatives, who supervise the training. The apprenticeship committee determines the need for apprentices in the locality, establishes minimum apprenticeship standards of training and, if necessary, schedules a rotating work program. This program is designed to give the apprentice diversified training by having him work for several plumbing or pipefitting contractors.

The apprenticeship program for plumbers or for pipefitters usually consists of 10,000 hours of on-the-job training, in addition to at least 144 hours of related classroom instruction annually. In a typical 5-year training program, the plumber or pipefitter apprentice learns, among other things, how to use, care for, and handle safely the tools, machines, equipment, and materials used in the trades. They also learn welding and soldering techniques

and general repair work; the use of ladders and the erection and dismantling of scaffolding; and the proper use of plastic and glass piping. The plumber apprenticeship program includes training in the basic skills of the trade and in the installation of sewers, drains, and services outside the building; private water supply and drainage systems; building water supply systems; building drainage and vent systems; water heaters and treatment equipment; appliances; the testing, repair, and maintenance of these systems and equipment; and also in estimating the materials required. The pipefitter apprenticeship program includes training in the installation and maintenance of radiators, pumps, boilers, stokers, oil burners, and gas furnaces; hot water, steam panel, and radiant-heating systems; air-conditioning and powerplant piping systems; and pneumatic control systems and instrumentation.

The apprentice receives related classroom instruction in subjects such as drafting and blueprint reading, mathematics applicable to layout work, applied physics and chemistry, and local building codes and regulations that apply to the trade.

Hourly wage rates of apprentices in these trades usually start at 40–50 percent of the journeyman rate and increase in each 6-month period until a rate of 85–90 percent is reached during the last period of the apprenticeship.

To obtain a journeyman's license which some communities require, a person must pass a special examination to demonstrate knowledge of the trade and of the local building codes.

Some journeymen plumbers and pipefitters may become foremen for plumbing or pipefitting contractors. Many journeymen go into business for themselves. As they expand their activities, they may employ other workers and become plumbing and pipefitting contractors. In most localities, contractors are required to obtain a master plumber's license.

Employment Outlook

Employment of plumbers and pipefitters—who numbered about 350,000 in 1970—is expected to rise rapidly through the 1970's. In addition to new jobs created by employment growth, thousands of job opportunities will arise to replace experienced plumbers and pipefitters who transfer to other fields of work, retire, or die. Retirements and deaths alone are expected to result in several thousand job openings annually.

The most important factor that will contribute to the projected rise in employment is the anticipated large increase in construction activity. (See discussion, p. 375.) Furthermore, plumbing and heating work is expected to become more important in many types of construction. For example, the trend toward more bathrooms per dwelling unit is likely to continue. The installation of appliances, such as washing machines for clothes or dishes, gas dryers, and waste disposals, also will continue. The number of automatic heating system installations probably will increase. Also, in industry generally, plumbers and pipefitters will be required for necessary installation and maintenance work. For example, the chemical industry, which uses extensive pipework in its processing activities, is expected to expand its facilities. Those industries that are automating more of their production activities will require more pipefitting work. The increasing industrial activities related to nuclear energy and the greater use of refrigeration and air-conditioning equipment also will result in more work for plumbers and pipefitters. Finally, maintenance and repair, and modernization of existing plumbing or heating systems will create additional employment opportunities for these craftsmen.

Technological developments are expected to limit the growth in the number of jobs for plumbers and pipefitters. For example, prefabricated plumbing assemblies can now be installed as a unit, reducing the amount of on-site plumbing required. Packaged gas vents also are available. Ventpipe sections come in standardized lengths that can be fastened together by locking joint bands, thus eliminating cementing operations. Some builders are preassembling their own waste, vent, and other systems components. This work—usually performed by the employers' regular crew in well-equipped shops set up near the building site—can be performed during inclement weather or other "slow" periods.

Earnings and Working Conditions

Union minimum hourly wage rates for plumbers and for pipefitters averaged $7.01 and $6.93, respectively, on July 1, 1970, according to a national survey of building trades workers in 68 large cities. At the same time, the average hourly rate for all journeymen in the building trades was $6.54. Among individual cities surveyed, the union minimum hourly wage rates for plumbers ranged from $5.00 in Norfolk, Va., to $9.42 in Oakland, Calif.; pipefitters' rates ranged from $5.00 in Norfolk, Va.,

to $9.42 in Oakland, Calif. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for plumbers and pipefitters in 12 of the 68 cities selected to show wage information from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation. Annual earnings of workers in this field are among the highest in the building trades because plumbing and pipefitting are affected less by seasonal factors than are most other building crafts.

City	*Rate per hour*	
	Plumbers	*Pipefitters*
Atlanta	$6.85	$6.85
Boston	6.70	6.60
Columbus	8.63	8.63
Dallas	6.21	6.21
Kansas City	7.60	7.42
Memphis	6.44	6.40
Newark	7.25	7.45
Phoenix	6.70	6.70
Pittsburgh	6.81	6.44
Sacramento	7.33	7.33
Shreveport	6.09	6.09
Tulsa	6.21	6.16

The work of plumbers and pipefitters is active and sometimes strenuous, as in other building trades. They frequently must stand for prolonged periods and occasionally work in cramped or uncomfortable positions.

Workers in this trade risk the danger of falls from ladders, cuts from sharp tools, and burns from hot pipes or steam. The number of injuries per million man-hours worked by employees of plumbing, heating, and air-conditioning contractors in the contract construction industry has been lower than that for contract construction as a whole, but higher than the average for production workers in manufacturing industries.

A large proportion of 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 further information regarding plumber or pipefitter apprenticeships or work opportunities in these trades, inquiries should be directed to 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 be a source of information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities. Some local employment service offices provide such services as screening applicants and giving aptitude tests.

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; 843.844; and 866.381)

Nature of the Work

Roofers apply composition roofing and other materials, such as tile and slate, to the roofs of buildings. They also waterproof and dampproof walls and other building surfaces.

In applying composition roofing, the roofer first places over-lapping strips of asphalt or tar impregnated felt over the entire surface. He then applies a coating of coal tar pitch, asphalt, or other bituminous material. This process is repeated until at least three layers of felt are in place. Finally, he applies a surfacing of coal tar pitch, or asphalt and gravel, or a smooth surface asphalt to protect the roofing materials from the weather.

Other types of composition roofing, such as roll roofing and asphalt shingles, overlap and are fastened to the roof base with nails or asphalt cement. If necessary, material is cut to fit corners, pipes, and chimneys. Wherever two roof surfaces intersect, the roofer cements or nails flashing (strips of felt or metal) to make the intersections (joints) watertight.

Roofers also use metal, tile, and slate for the more expensive types of roofs. Metal roofs are constructed by soldering metal sheets together and nailing them to the wood sheathing. In installing tile and slate roofs, the roofer places a covering of roofing felt over the wood sheathing. He punches holes in the slate or tile that he nails to the sheathing. Each row of slate or tile overlaps the preceding row. Finally, the roofer covers the exposed nailheads with roofing cement to

Roofers apply tar prior to spreading gravel.

avoid rusting and water leakage around the nailheads. Handtools usually are used in applying roof surfaces—for example, hammers, roofing knives, mops, pincers, and calking guns.

Roofers also waterproof and dampproof structures other than roofs, such as masonry, concrete walls, or swimming pools and other tanks. The roofer prepares surfaces to be waterproofed by removing rough projections and roughing glazed surfaces, using a hammer and chisel or rubbing brick. He then applies a coat of liquid compound with a brush. He also may paint or spray surfaces with a waterproofing material or nail waterproofing fabric to surfaces. When dampproofing, he usually sprays a coating of tar or asphalt on interior or exterior surfaces to avoid the penetration of moisture.

Places of Employment

Roofers work for roofing contractors on new building construction. They also do maintenance and repair work, especially on composition roofing. A few roofers are self-employed, doing either roofing on small, new buildings or repairs and alterations. Roofers also work for government agencies or business establishments that do their own construction and repair work.

Training, Other Qualifications, and Advancement

Most training authorities, including the National Joint (labor-management) Apprenticeship and Training Committee for the Roofing Industry, recommend completion of a 3-year apprenticeship program, covering all types of roofing work, as the best way to learn this trade. A substantial proportion of workers, however, have acquired roofing skills informally, by working as helpers or handymen, observing or being taught by experienced roofers.

Apprenticeship applicants are required to be at least 18 and not over 30 years of age; 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 related classroom instruction. In a typical training program, the apprentice learns, among other things, to use, care for, and handle safely the tools, equipment, and materials commonly used in the trade; work with composition, tar, and asphalt; prepare roof surfaces for covering; apply pitch and other materials; spread gravel; install slate, tile, and

terra cotta; and dampproof and waterproof structures.

The trainee receives related classroom instruction in such subjects as blueprint reading and mathematics applicable to layout work.

Hourly wage rates for apprentices usually start at 65 percent of the journeyman rate and increase periodically until 90 percent of the journeyman rate is reached 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—who numbered about 60,000 in 1970—is expected to increase rapidly through the 1970's. In addition to new jobs created by employment growth, thousands of job opportunities will result from the replacement of journeymen who transfer to other occupations, retire, or die. Retirements and deaths alone are expected to result in several hundred job openings annually.

Employment of roofers is expected to increase mainly because of the anticipated rapid increase in construction activity. (See discussion, p. 375.) New construction and repairs on existing structures will provide most of the work for these craftsmen. However, dampproofing and waterproofing are expected to provide an increasing proportion of roofers' work.

Although the projected increase in construction activity will result in rising employment of roofers, employment growth will be limited by the increasing use of spray-on or fluid roofing systems; improved roofing materials and roofing techniques that increase the "life" of roofs; improved tools, such as nailing machines; and more efficient materials handling equipment.

Earnings and Working Conditions

Union minimum hourly wage rates for composition roofers averaged $6.17, on July 1, 1970, according to a national survey of building trades workers in 68 large cities. For slate and tile roofers, the rate was $5.81. By comparison, the average for all journeymen in the building trades was $6.54 an hour. Among individual cities surveyed, the minimum hourly rates for composition roofers ranged from $3 in Norfolk, Va., to $7.57 in Detroit, Mich. Slate and tile roofers had hourly rates ranging from $3 in Norfolk, Va., to $8.07 in Detroit, Mich. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for roofers in 12 of the 68 cities selected to show wage information from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation.

City	*Rate per hour*	
	Composition	*Slate and tile*
Atlanta	$4.35	$4.60
Boston	6.55	6.55
Cleveland	7.56	7.56
Dallas	4.70	4.85
Kansas City	5.32	5.32
Milwaukee	5.97	6.12
New Orleans	5.10	5.10
New York City	6.70	6.80
Pittsburgh	6.80	6.80
San Diego	5.25	5.25
Spokane	5.80	5.80
Syracuse	6.95	6.95

Roofers' work, like that of other building tradesmen, is sometimes strenuous. It involves prolonged standing, as well as climbing, bending, and squatting. These workers risk injuries from slips or falls from scaffolds or roofs. They may have to work outdoors in all types of weather, particularly when doing repair work. Roofing work may be especially hot during the warmer months.

A large proportion of roofers are members of the United Slate, Tile and Composition Roofers, Damp and Waterproof Workers Association.

Sources of Additional Information

For further information concerning roofing apprenticeships or other work opportunities in this trade, inquiries should be directed to 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. In addition, the local office of the State employment service may be a source of 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.

United Slate, Tile and Composition Roofers, Damp and Waterproof Workers Association, 1125 17th St. NW., Washington, D.C. 20036.

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 used in ventilating, air-conditioning, and heating systems. They also fabricate and install a wide variety of other products made from thin metal sheets, such as roofing and siding, partitions, store fronts, and metal framework for neon signs. Skilled construction sheet-metal workers should not be confused with assembly-line factory operatives who also make sheet-metal products, but can perform only a few specific operations.

In heating or air-conditioning duct work, the sheet-metal worker lays out and plans the job and determines the size and type of sheet metal to be used. The ducts are often fabricated at the sheet-metal shop. Sheet-metal workers cut the metal with hand snips, power-driven shears, and other cutting tools. They shape the metal with a variety of machines, hammers, and anvils; then weld, bolt, rivet, solder, or cement the seams and joints. However, fabricated ducts in standard sizes often are available and require little additional fabrication at the work site. In the installation of ducts, components are fitted together; hangers and braces installed for support; and points soldered, connected, or welded. Some journeymen specialize in shopwork or on-site installation. However, skilled workers must know all aspects of the trade.

Places of Employment

Sheet-metal workers 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. In residential construction, these workers also may work for roofing contractors who specialize in metal roofing work. Many of these craftsmen work for government agencies or business establishments that do their own construction and alteration work. Others are self-employed, mainly on repair work or on smaller types of installation.

In addition to construction-related work, thousands of skilled sheet-metal workers are employed in nonconstruction; for example, the railroad, aircraft, or shipbuilding industries. Some are employed in small shops manufacturing specialty products, such as custom kitchen equipment for hotels and restaurants. Firms making blowers, exhausts, electrical generating and distributing equipment, food products machinery, steam engines, and turbines also employ skilled sheet-metal workers.

Training, Other Qualifications, and Advancement

Most training authorities, including the National Joint (labor-management) Apprenticeship and Training Committee for the Sheet Metal Industry, 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 of the trade informally, by working as helpers or handymen, observing or being

taught by experienced craftsmen. Many of these persons have gained additional knowledge of the trade by taking correspondence or trade school courses.

Apprenticeship applicants generally are required to be between 17 and 23, but special consideration may be given for military service. A high school education or its equivalent is required. Good physical and mechanical aptitude are necessary assets.

The apprenticeship program usually consists of 8,000 hours (4 years) of on-the-job training, in addition to related classroom instruction. In a typical training program, the apprentice learns, among other things, to use, care for, and handle safely the tools, machines, equipment, and materials commonly used in the trade. Also, he learns how to do welding, soldering, and seaming; air-conditioning, heating, and ventilating work; residential installations such as roofing, gutters, and downspouts; and architectural and industrial sheet-metal work. In addition, he learns general work processes such as cutting, forming, folding, grooving metal material, bending edges, and punching and drilling holes.

The trainee receives related classroom instruction in subjects such as drafting, blueprint reading, and mathematics applicable to layout work. In addition, he learns the relationship between sheet-metal work and other building trades.

Hourly wage rates for 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.

Sheet-metal worker drills sheeting.

Employment Outlook

Employment of sheet-metal workers—who numbered about 60,000 in 1970—is expected to increase rapidly through the 1970's. In addition to new jobs created by employment growth, thousands of job opportunities will result from the replacement of journeymen who transfer to other fields of work, retire, or die. Retirements and deaths alone are expected to result in several hundred job openings annually.

The projected increase in employment of sheet-metal workers is expected mainly because of the anticipated large expansion in residential, commercial, and industrial construction. (See discussion, p. 375.) In addition, year-round, central air-conditioning systems are expected to be installed in a greater number of homes, office buildings, schools, hospitals, department stores and factories. Many of these installations will be in existing structures. Sheet-metal work should also result from growth in the number of large refrigeration systems. Such equipment will be needed in the production and storage of growing quantities of food and other perishable items required by an expanding population. The shops that fabricate sheet-metal products used in construction also are expected to require more of these skilled craftsmen.

Prefabrication is not likely to affect the growth of employment in this occupation as much as in most other building trades, because much sheet-metal work is custom made. The fabrication of ducts and fittings for ventilating installations is limited by the need to tailor these installations to meet a wide variety of structural conditions, such as the dimensions of the building and the space allowed for ducts, and also by the cost of storage space needed to store prefabricated ducts and fittings.

Earnings and Working Conditions

Union minimum hourly wage rates for sheet-metal workers averaged $6.75, compared with $6.54 for all journeymen in the building trades on July 1, 1970, according to a national survey of building trades workers in 68 large cities. Among individual cities surveyed, the minimum hourly rates for sheet-metal workers ranged from $4.65 in Norfolk, Va., to $8.81 in Cleveland, Ohio. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for sheet-metal workers in 12 of the 68 cities selected to show wage information from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation.

City	*Rate per hour*
Albuquerque	$5.88
Boston	7.33
Buffalo	7.35
Cincinnati	6.79
Des Moines	6.27
Houston	5.69
Kansas City	6.78
Pittsburgh	7.23
Sacramento	7.00
San Diego	7.34
Tampa	5.85
Washington, D.C.	6.50

Many sheet-metal workers spend considerable time at the construction site, where they may work either indoors or outdoors. Other sheet-metal workers may work primarily indoors, doing fabricating and layout work.

When installing gutters, skylights, and cornices, they may work high above the ground level. When installing ventilation and air-conditioning systems, they may work in awkward and relatively inaccessible places. Sheet-metal workers run the risk of cuts and burns from the materials, tools, and equipment used in their trade.

A large proportion of sheet-metal workers are members of the Sheet Metal Workers' International Association.

Sources of Additional Information

For further information regarding sheet-metal apprenticeships or other work opportunities in this trade, inquiries should be directed to 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 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 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. 861.131 and .781)

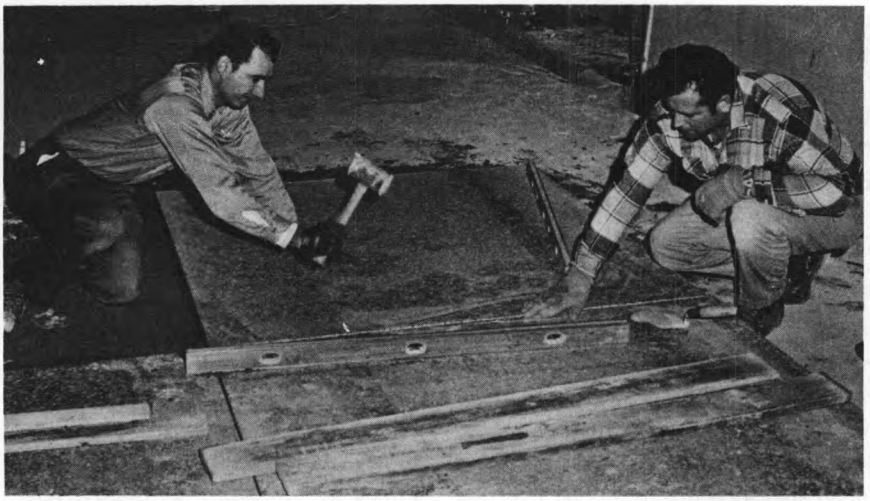
Nature of the Work

Stonemasons build the stone exteriors of structures. They work primarily with two types of stones—natural cut stone, such as marble, granite, limestone, or sandstone; and artificial stone, which is made to order from cement, marble chips, or other types of masonry materials. Much of the work of these craftsmen is the setting of cut stone for comparatively high-cost structures, such as office buildings, hotels, churches, and public buildings.

The stonemason often works from a set of drawings in which each stone has been numbered for identification. A helper locates the pieces needed and brings them to the mason. A derrickman using a hoist may be required to lift large stones into place. The stonemason sets the stone in mortar and moves it into position with a mallet, hammer, or crowbar. He alines the stone with a plumb line and finishes the joints between the stones with a pointing trowel. When necessary, he may fasten the stone to supports with metal ties, anchors, or by welding.

Occasionally, the stonemason may have to cut stone to an exact size. To do this, he must determine the grain of the stone selected and strike blows along a predetermined line with a stonemason's hammer. Valuable stones are often cut with an abrasive saw to make them fit.

Stonemasons also do some stone veneer work, in which cut stone is applied in various patterns to the exterior of a building. In some sections of the country, stone is used extensively to veneer homes. In one



Stone masons adjust stone floor panel.

specialized branch of the trade known as alberene stone setting, stonemasons 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 stone cutting, pneumatic tools are used, such as hammers, drills, and brushing tools. Special power tools smooth the surface of large stones. An abrasive saw is used for fine cutting.

Places of Employment

Stonemasons work most often on new construction, particularly on the more expensive residential and commercial and public buildings. A few also work for government agencies or business establishments that handle their own construction and alteration work. Stonemasons are employed mainly in the larger urban areas. In many areas which have no stonemasons, bricklayers perform the work.

Training, Other Qualifications, and Advancement

Most training authorities, including the National Joint (labor-management) Bricklaying Apprenticeship Committee, recommend the completion of a 3-year apprenticeship program as the best way to learn stonemasonry. A substantial proportion of stonemasons, however, have picked up the trade by working as helpers, observing or being taught by experienced stonemasons.

Apprenticeship applicants generally are required to be between 17 and 24; a high school education or its equivalent is desirable. Good physical condition is an important asset.

The apprentice training program for stonemasons generally requires 6,000 hours (3 years) of on-the-job training, in addition to related classroom instruction. During the apprenticeship, the trainee learns to use, care for, and handle safely the tools, machines, and materials of the trade. He must also learn to lay out and install walls, floors, stairs, and arches. The apprenticeship program in this occupation is similar to that for bricklayer. (See discussion, p. 380.)

Stonemasons may advance to jobs as foremen. They may also become estimators for stonemasonry contractors. Estimators compute labor and material requirements for competitive job bidding. A few of these craftsmen may start their own contracting business.

Employment Outlook

Little increase in the employment of stonemasons is expected through the 1970's, in spite of the anticipated large expansion in construction activity. (See discussion, p. 375.) Less use of stone masonry work is expected because modern architectural design has emphasized simple lines, little ornamentation, and large window areas. Replacement needs will provide a small number of job opportunities for new workers each year.

Earnings and Working Conditions

Union minimum hourly wage rates for stonemasons averaged $6.73, compared with $6.54 for all journeymen in the building trades, on July 1, 1970, according to a national survey of building trades workers in 68 large cities. Among individual cities surveyed, the minimum hourly rates for stonemasons ranged from $4.95 in Jacksonville, Fla., to $8.16 in Cleveland, Ohio. Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for stonemasons in 12 of the 68 cities selected to show wage rates from various areas and regions of the country, on July 1, 1970, ap-

pear in the accompanying tabulation.

City	Rate per hour
Albuquerque	$6.31
Birmingham	5.55
Boston	7.25
Chicago	7.22
Des Moines	6.43
Houston	5.90
Knoxville	6.02
Los Angeles	5.95
Phoenix	6.80
Pittsburgh	7.51
Seattle	7.20
Washington, D.C.	6.80

Since most stonemasonry is done outdoors, working hours are often lost because of inclement weather. The work of the stonemason is active and sometimes strenuous, as it involves lifting heavy materials.

A large proportion of stonemasons are members of the Bricklayers, Masons and Plasterers' International Union of America.

Sources of Additional Information

For further information regarding apprenticeships for stonemasons or other work opportunities in this trade, inquiries should be directed to 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 be a source of 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. 801.131, .134, .281, .381, .781, .884; 809.130, .131, .134, .380, .381, .781, .884, .887; and 869.883)

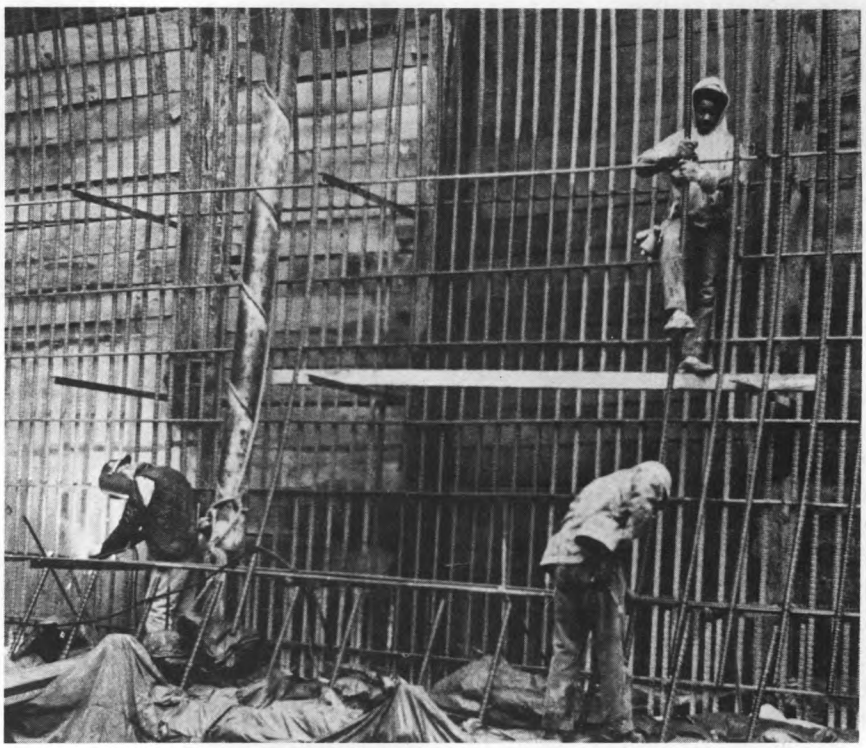
Nature of the Work

Ironworkers erect, assemble, or install fabricated metal products mainly in industrial, commercial, and large residential buildings. They also rig heavy construction machinery (prepare the machinery for moving with the proper lines, cables, and accessories) and deliver the machinery to new sites. In addition, ironworkers do alteration work, such as installing steel stairs or adding window guards to existing buildings, and repair or remodel existing structures, such as replacing metal bridge parts.

Ironworkers comprise four related trades—structural ironworkers, rigger and machine mover, ornamental-ironworker, and reinforcing-ironworker (rodman). Many craftsmen 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 including metal storage tanks and overhead crane runways that support heavy equipment. They install floor decking and the doors and frames of vaults.

In erecting a steel framework, structural-ironworkers push, pull, or



Rodmen position reinforcing bars.

pry fabricated steel beams and girders into proper position while hoisting equipment hold steel parts. Next, they temporarily connect all steel members with bolts, use plumb bobs and levels to aline 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. Structural-ironworkers often rig, as well as erect, steel structures.

Riggers and machine movers (D.O.T. 869.883) set up and rig hoisting equipment to erect and dismantle structural steel frames and move heavy construction machinery and equipment. They study the size, shape, and weight of the object to be moved; choose the lines and cables with which the object can be safely moved; and select the 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 unusual 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, iron ladders (such as those used extensively in powerhouses and chemical plants), metal window sash and doors, grilles and screens (such as those used in bank tellers' compartments and elevators), metal cabinets, and safety deposit boxes. They also install lampposts, gates, fences, and decorative ironwork on balconies.

In addition to iron and steel, ornamental-ironworkers work with prefabricated alumimum, brass, and bronze metal shapes, frames, and panels. Examples are recently-developed curtain-wall and window-wall, and the many types and designs of ornamental and functional building facades which are bolted or welded to a building or other structure.

Reinforcing-ironworkers (rodmen) (D.O.T. 801.884) set steel bars in concrete forms to reinforce concrete structures. They 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 concrete form according to blueprints, specifications, or verbal instruction. The rodmen use steel pliers and other tying tools to wire the rods securely in place. Some concrete reinforcing is a coarse mesh made of welded wire (usually 6- by 6-inch grids). When using mesh, the rodmen measure the surface to be covered, cut and bend the mesh to the desired shape, and place the mesh over the area to be reinforced. When the concrete crew pours the slab, hooked rods are used to position the wire mesh in the freshly poured mixture.

Places of Employment

About 85,000 structural- and ornamental-ironworkers were employed in 1970. Thousands of additional workers were employed as riggers, machine movers, and reinforcing-iron workers.

A large proportion of these craftsmen are employed by general contractors on large building projects, by 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 construction work. Few of these craftsmen 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 are required to be between 18 and 30. Good physical condition is required. A high school education or its equivalent is desirable.

The apprenticeship program for ironworkers usually consists of 6,000 hours (3 years) of on-the-job training, given either by the foreman or an experienced journeyman. In a typical training program, the apprentice learns, among other things, to use, care for, and handle safely the tools, machines, equipment, and materials commonly used in the trade; read blueprints and working drawings; form, shape, drill, tap, and erect and assemble various metal structures; lay out and assemble various metal structures; lay out and assemble steel stairs, fire escapes, grilles, railings, fences, doors, and related metal structures; and erect, place, and tie reinforcing iron. He also learns arc and gas welding; acetylene cutting; rigging, bolting, and riveting; and how to repair and alter metal structures.

The apprenticeship program generally includes a minimum of 144 hours a year of related classroom instruction in subjects such as drafting, blueprint reading, and mathematics applicable to layout work.

Areawide apprenticeship programs, sometimes covering an en-

tire State or region, are found extensively in ironworking trades. They are supervised by joint apprenticeship committees composed of representatives of the International Association of Bridge, Structural and Ornamental Iron Workers' local unions and local management groups.

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 in these trades is expected to increase rapidly through the 1970's. In addition to new jobs created by employment growth, the replacement of experienced ironworkers who transfer to other occupations, retire, or die will provide a few thousand job opportunities each year. Retirements and deaths alone are expected to result in several hundred job openings annually.

A continued rapid rise in employment of these workers is expected principally because of the anticipated large increase in construction activity. (See discussion, p. 375.) The job outlook in these trades also will be affected favorably by the increased use of structural steel in smaller buildings. Also, the development of lightweight and specialty steels has improved the competitive position of steel as a construction material and resulted in increasing job opportunities for structural-iron workers. Work opportunities for ornamental-ironworkers will result from the growing use of ornamental panels of aluminum, porcelainized steel, or other metals which are attached to the exterior wall of large buildings; and by the use of metal frames to hold large glass installations. The demand for riggers and machine movers is expected to increase because of the expanding use of heavy construction machinery. The use of prestressed concrete in a growing variety of structures will increase job opportunities for reinforcing-iron workers.

Technological developments are expected to limit employment growth of ironworkers. For example, a compact squirt-welding machine has greatly reduced the time needed for field welding. Structural steel frames are being assembled on the ground and hoisted into vertical position to reduce iron work above ground. Prestressed steel beams making possible longer spans with less steel are being used increasingly in bridge construction. Also available are almost completely prefabricated and painted short-span bridges made of prestressed steel, which can be erected in 1 day. Also, prefabricated reinforcing mats or fabrics which reduce on-site rod bending, tying, and welding are being used increasingly in highways and buildings. In addition, manufacturers are designing an increasing variety of ornamental metal products for more efficient on-site installation.

Earnings and Working Conditions

Union minimum hourly wage rates for structural-ironworkers and rodmen averaged $6.72 and $6.64, respectively, on July 1, 1970, according to a national survey of building trades workers in 68 large cities. The average for all journeymen in the building trades surveyed was $6.54. Among individual cities, the minimum hourly rate for structural-iron workers ranged from $4.88 in Lubbock, Tex., to $8.60 in Chicago, Ill. The rates for rodmen ranged from $4.87 in San Antonio, Tex., to $8.60 in Chicago, Ill. The rates for ornamental-ironworkers, riggers, and machine movers are generally about the same as those for structural-ironworkers.

Straight-time hourly earnings, excluding fringe benefits or payments to health, insurance, or pension funds, for structural-ironworkers and rodmen in 12 of the 68 cities selected to show wage rates from various areas and regions of the country, on July 1, 1970, appear in the accompanying tabulation.

City	*Rate per hour*	
	Structural-Iron-workers	*Rodmen*
Atlanta	$5.60	$5.60
Baltimore	6.91	6.91
Boston	7.64	7.64
Cleveland	7.95	7.95
Denver	6.25	6.25
Detroit	7.25	6.86
Los Angeles	6.48	6.37
Minneapolis-St. Paul	6.95	6.95
Philadelphia	7.07	7.70
St. Louis	6.53	6.53
San Diego	6.48	6.37
Tulsa	5.75	5.75

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 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 the frequency of accidents.

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.

A large proportion of workers in these trades are members of the International Association of Bridge, Structural and Ornamental Iron Workers.

Sources of Additional Information

For further information concerning apprenticeships or other work opportunities in these trades, inquiries should be directed to 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 or 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 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 ironworkers may be obtained from:

Associated General Contractors of America, Inc., 1957 E St. NW., Washington, D.C. 20006.

DRIVING OCCUPATIONS

More than 2.5 million truck, bus, and taxicab drivers were engaged in moving passengers and goods over highways and city streets in 1970. They transported thousands of products used in homes, schools, and factories, and also transported millions of people every day.

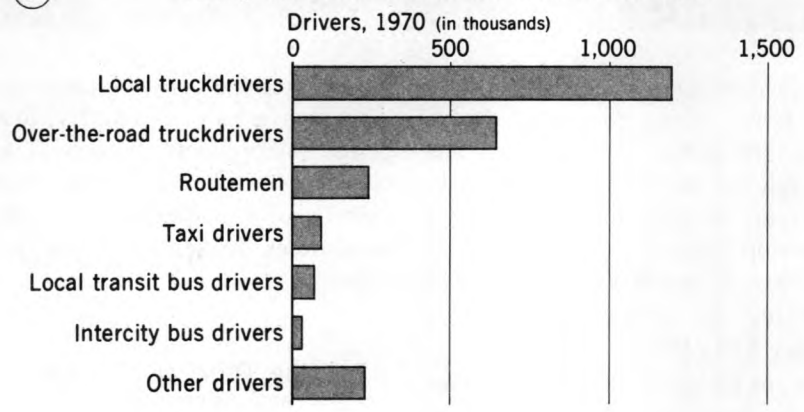
Some men employed in the driving occupations drive practically all their working time. Others are occupied much of the time in loading and unloading goods, making pickups and deliveries, and collecting money. Still others, like the routeman, spend a good deal of their time selling. The individual statements that follow deal only with employment opportunities for those whose principal occupation is driving intercity and local trucks and buses and taxis. For example, they do not cover schoolbus drivers, chauffeurs, part-time taxi drivers, ambulance drivers, or employees whose driving is incidental to their regular duties.

Many driving jobs require a high degree of responsibility. Drivers, for the most part, operate large and expensive equipment which they must drive carefully, obeying safety regulations and traffic laws, to deliver their passengers and freight safely. These men are free from direct supervision.

During the 1970's, employment of local and over-the-road truckdrivers is expected to expand as a result of increases in the freight moved by motor carrier. Employment in other driving jobs is not expected to change much in the years ahead. Normal turnover in this large occupational field also will provide many job opportunities each year.

Driving jobs offer excellent opportunities for young men who are not planning to attend college and have no interest in or aptitude for craft or technical occupations. The pay of most drivers is relatively high, and working conditions are fairly good. Many young men also will enjoy the freedom from close supervision and the frequent contacts with people, which are characteristic of most of these jobs.

(26) **Nearly half of all drivers are local truckdrivers**



SOURCE: BUREAU OF LABOR STATISTICS

OVER-THE-ROAD TRUCKDRIVERS

(D.O.T. 903.883; 904.883; 905.883; and 909.883)

Nature of the Work

The men at the wheel of the big trucks on highways and turnpikes are the top professional drivers. They drive the largest and most expensive equipment and receive the highest wages of all drivers. They are on their own practically all the time and have much responsibility. The work requires initiative, because they must transport goods of great value which must be delivered safely and on time.

Most over-the-road drivers operate gasoline or diesel-powered tractor-trailers. They deliver goods over long distances—frequently driving at night.

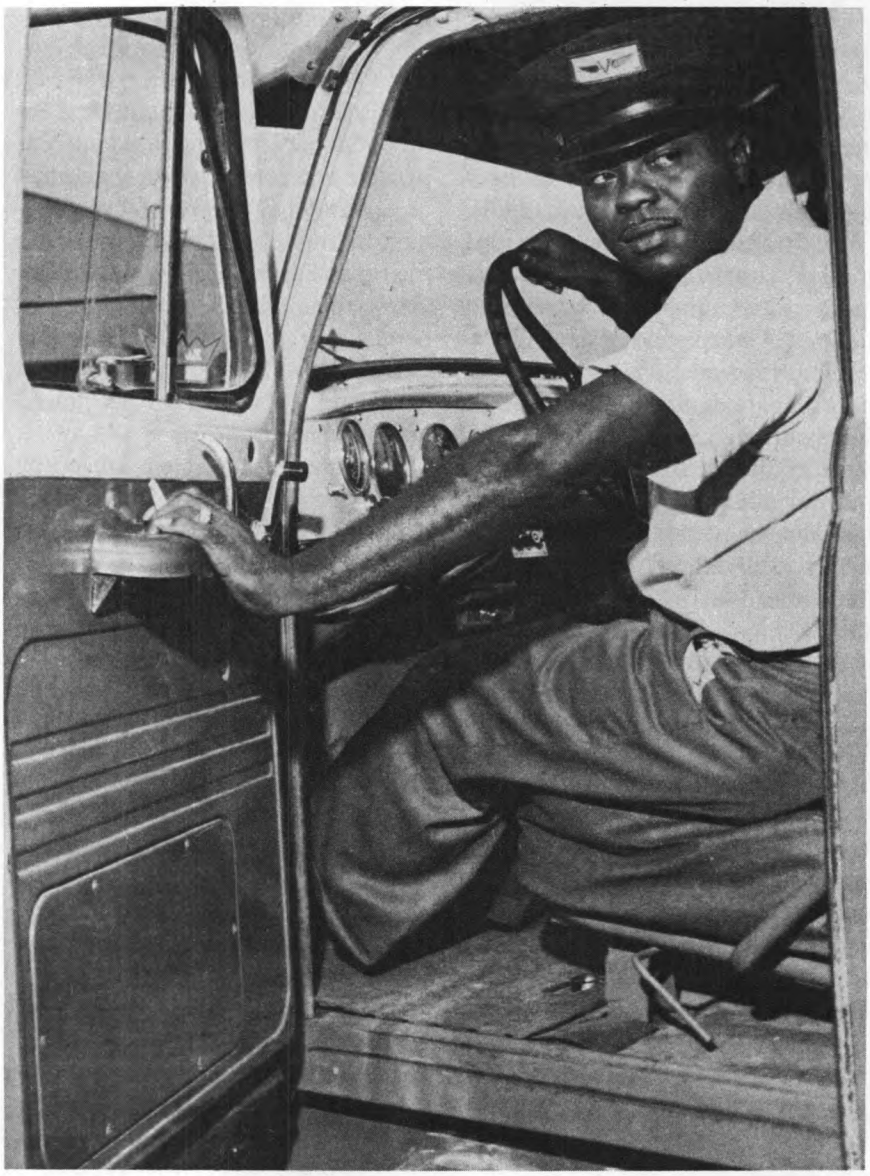
Unlike the local truckdriver who spends considerable time in loading and unloading, the over-the-road driver (sometimes called intercity line-haul or long-haul driver) drives practically all of his working time. He sometimes may handle the freight. Some drivers, for example, may have to unload the goods they deliver to stores at night when receiving crews are not available. Drivers of long-distance moving vans generally have to load or unload their cargoes with the assistance of local helpers.

The truckdriver must back up big trailers to loading platforms; this requires the ability to maneuver the trailers while driving in reverse. He must also be able to judge distance accurately while driving around cor-

ners or through narrow passageways.

Because the over-the-road truckdriver spends most of his time driving, safe driving practices and courtesy are of the utmost importance. Everyone has seen the emergency warning signals set out by a driver near his disabled truck. Many motorists have noted the courtesy of truckdrivers who pull off the road at the top of the hill to allow the accumulated traffic to pass.

U.S. Department of Transportion (U.S. DOT) regulations require drivers to inspect their trucks before and after trips and make out reports on the condition of the vehicle at the end of the run. Drivers also are required to keep a daily log of their activities. If a driver has an accident, he must make out a detailed report. These regulations also prescribe special safety precautions concerning packing and loading flammable, explosive, or otherwise hazardous materials, and over-the-road driving of trucks containing these materials.



Where Employed

An estimated 655,000 over-the-road drivers were employed throughout the United States in 1970. Many work out of large cities such as Chicago and Los Angeles; however, some large companies have their operating headquarters in small towns.

Over-the-road drivers are employed by private and for-hire carriers. Private carriers are companies, such as chain food stores or manufacturing plants, which use their own or leased trucks to transport their goods. For-hire carriers are either common carriers (trucking companies serving the general public) or contract carriers (trucking firms hauling goods under contract for certain companies). Although the drivers on long intercity runs are employed more often by common carriers, an increasing number in recent years have been working for private or exempt (from U.S. DOT regulation) carriers, or for specialized carriers handling large pieces of machinery, explosives, or missiles. On shorter hauls, many drivers are employed by contract and common carriers to make deliveries of machinery, food, petroleum products, household appliances, and other items, from plants to warehouses and from warehouses to large volume purchasers.

Training, Other Qualifications, and Advancement

Regulations of the U.S. DOT establish minimum qualifications for

over-the-road drivers engaged in interstate or foreign commerce. The driver must be at least 21 years of age and able-bodied. His vision should be at least 24/40 with or without glasses; good hearing also is necessary. He must be able to read and speak English; have at least 1 year's driving experience, which may include driving private automobiles; and have a good driving record.

He is required also to complete successfully a road test that demonstrates his driving skills and a written test that indicates an adequate knowledge of driving regulations. Most States require truckdrivers to have a chauffeur's license, which is a commercial driving permit obtained from State Motor Vehicle Departments.

Most fleet operators have higher hiring standards than those described above. Many firms will not hire drivers under age 25; some specify height and weight limitations. Many require at least a grade school education; others require 2 years of high school. Some companies employ only applicants who have had several years of experience in handling vehicles of the type they would be required to drive.

The standards for over-the-road drivers generally are higher than those for local truckdrivers. Furthermore, these standards are more strictly adhered to than those for local drivers, whose standards may be lowered when there are not enough applicants for jobs.

Tractor-trailers usually cost between $25,000 and $40,000, and the load inside may be worth more than $100,000. The owners of such valuable equipment, therefore, employ experienced drivers who also can accept great responsibility.

Driver training is a common method of preparing for truckdriving jobs. Many training authorities and employers recommend taking the driver-training courses offered by high schools. If such a course is not available, the driving schools which operate in most large cities are recommended. A high school course in automotive mechanics also is helpful.

A small number of private technical-vocational schools offer truck driving courses. Students receive instructions on driving large vehicles in close quarters and on the highway, with emphasis on safe driving practices. Instructions also are given on care of equipment and freight, and compliance with Federal, State, and local regulations. Truck driving experience is also helpful.

Long-haul driving is a senior driving job, and most of these drivers have had previous experience in local trucking. Usually, they enter this occupation by first driving small trucks. Then, after gaining experience, they get jobs driving the larger and more complicated trucks. A young person also may begin as a helper to a local truckdriver, assisting him in loading and unloading the truck, occasionally doing some relief driving.

All employers are interested in obtaining good, safe, reliable drivers, but the methods of selection and training vary. Some have formal tests and training programs. Others hire on the basis of personal interviews; their training programs may consist of a "break-in" period during which the new employee observes and works with an experienced driver.

Applicants for jobs as over-the-road drivers are required to pass a physical examination which is usually paid for by the employer. Many firms also give written traffic and driving knowledge tests. Some employers give tests to measure factors such as sharpness and field of vision, reaction time, ability to judge speed, and emotional stability. The last step in the selection of drivers is the road test. The applicant is expected to demonstrate his ability to handle, under a variety of driving conditions, a vehicle of the type and size he will operate in regular service. A few States require such a test before licensing a driver to operate a tractor-trailer.

A new driver may be given a brief indoctrination course covering company policy and the preparation of various forms used on the job. He then will make one or more training trips with an instructor or an experienced driver.

Drivers employed by common carriers frequently start on the "extra board," bidding for regular runs on the basis of seniority as vacancies occur. (The extra board is a list of men, assigned in rotation, who substitute for regular drivers or who make extra trips when necessary.) Drivers for private carriers are more likely to begin with assigned regular routes.

Opportunities for promotion in this occupation are limited. A few drivers may advance to jobs as safety supervisors, driver supervisors, and dispatchers. However, these jobs are often unattractive to over-the-road truckdrivers, since the starting pay is usually less than the pay on truckdriving jobs. Most drivers can expect to advance only on the basis of seniority to driving runs that provide increased earnings or preferred schedules and working conditions.

Employment Outlook

Employment of over-the-road truckdrivers is expected to increase moderately through the 1970's.

Substantial growth in the volume of intercity freight is anticipated, resulting from increased commercial and industrial activity and the continued decentralization of industry. A large number of job openings also will be created by transfers from this field of work to other occupations.

Another reason for expected increases in freight carried by over-the-road trucks is the general economic growth of the Nation, and this trend is expected to continue. Many factories, warehouses, and stores are being located at great distances from each other in suburban or semirural areas where rail facilities are nonexistent or extremely limited. The intercity highway building program has aided the trucking industry in this regard. Furthermore, the growth of chainstores and the trend to smaller inventories and decentralization of factories require daily coordination of shipping; this can be handled best by trucks.

Improvements in trailer design to handle certain kinds of freight such as frozen goods and livestock for extended distances has expanded the opportunities for over-the-road trucking.

Demand for trucking services may increase in the future as a result of new trucking methods which promise reduced handling and shipping time and reduce freight costs for small loads. One example is the increasing use of "double-bottoms" —two trailers hitched in tandem to a tractor. When two trailers are used, they can be unhitched at the truck terminal and promptly delivered to different customers, thus eliminating the need to unpack a larger trailer, separate its contents, and repack on local delivery trucks.

Handling time also is being reduced through the practice of packing all freight destined for a single customer or area into large containers or cargo cages which can be handled at the truck terminal more conveniently and quickly than individual packages.

Some recent freight transportation innovations will limit somewhat the anticipated increase in trucking business and driver employment. For example, the movement of highway trailers on railroad flatcars, ocean vessels, and aircraft saves the cost of driver, fuel, and tractor, and appears to have prospects for considerable expansion. To compensate for job displacement that may arise from these innovations, there is a growing practice under labor-management agreements to provide for retirement at an earlier age.

Further limitations on employment expansion among over-the-road drivers are related to changes in State laws. State limitations on truck weight, size, and speed are becoming less restrictive as a result of the construction of better highways and improved travel arteries inside the cities. The movement of bigger loads at higher average speeds could result in a need for fewer drivers than would otherwise be required.

Earnings and Working Conditions

Most over-the-road drivers earned more than $200 a week in 1970. Drivers employed by Class I common carriers of general freight (carriers with gross operating revenues of $1 million or more a year) had estimated annual average earnings of $12,600 in 1970. More experienced over-the-road drivers can earn considerably more than this average. The rates are fairly uniform because this is a highly unionized field, and union-employer contracts are generally master agreements covering all employers within a region—an area including a number of States. The earnings of an individual driver are affected by factors such as mileage driven, number of hours worked, type of equipment driven or the weight of the loads carried, and type of "run" (whether or not pickup or delivery en route is required). Earnings also are affected by the nature of the cargo carried, with premium rates paid for transporting flammable or otherwise hazardous commodities.

Some private carriers pay their drivers on the same basis as their other employees—a monthly, weekly, or daily wage. Generally, such a wage is for a specified number of hours, and, if the driver works additional hours, he receives extra pay.

Motor carriers engaged in interstate or foreign commerce are subject to the U.S. DOT rules governing hours of work and other matters. These regulations limit the hours over-the-road drivers may work in order to be certain the driver receives a reasonable amount of rest. For example, no driver may be on duty for more than 60 hours in any 7-day period, but for carriers operating every day of the week, the driver may remain on duty for a maximum of 70 hours in any period of 8 consecutive days. The regulations also provide that no driver may drive more than 10 hours without first having an off-duty period of at least 8 hours. For drivers who drive less than 10 hours, but perform other work for the motor carrier in a garage, warehouse, or other place, the regulations prohibit resumption of driving after any combination of driving time and other on-duty work which totals 15 hours, unless the driver has first had at

least 8 hours off duty. Many drivers, particularly on the very long runs, work fairly close to the maximum hours permitted. A workweek of at least 50 hours is very common.

Most drivers receive pay for 6 or more National, State, and local holidays. They also have paid vacations, usually from 1 to 4 weeks, depending upon their length of service. Health insurance and pension plans, paid for by the employers, are very common.

Over-the-road truckdrivers often are required to spend time away from home—particularly when they drive long runs. The driver often starts out in the evening and arrives at the terminal in the other city the following morning. In such instances, the company provides lodging for him either in a company dormitory or a hotel. In the evening, he starts on his return trip and arrives at the home terminal the following morning. He may make two or three such round trips a week.

Some companies use two-man sleeper teams on their very long runs. One drives while the other sleeps in a berth behind the cab.

Although earnings on sleeper runs are the highest in this field of work, few drivers stay with this type of run very long. The work is very tiring and requires being away from family and friends for days and even weeks. However, many drivers go back to sleeper runs after they have had a rest or have done some relay driving.

The earnings of drivers of long-distance moving vans are quite high, but their hours are long and the work is strenuous. They drive more miles than the average over-the-road driver and also work more hours in loading and unloading goods.

Largely because of intensive safety programs and drivers' skill, the accident rate in over-the-road trucking is low. Injuries occur less frequently than in other forms of motor transportation.

The physical strain of over-the-road truckdriving has been reduced by more comfortable seating, better highways, and more stringent safety regulations. Sitting in one place for hours at a time, however, is tiring and the nervous strain of sustained driving at night also is fatiguing.

Most over-the-road drivers are members of the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America (Ind.). Some drivers of private carriers belong to unions representing the plant employees of the companies for which they work.

Sources of Additional Information

Information on career opportunities may be obtained from:

American Trucking Association, 1616 P St. NW., Washington, D.C. 20036.

LOCAL TRUCKDRIVERS

(D.O.T. 900.883; 902.883; 903.883; 906.883; and 909.883)

Nature of the Work

Much of the food, clothing, and other products required by consumers is transported by trucks. The men who move these goods from terminals, warehouses, mines, and factories to wholesalers, retailers, and consumers in the local area must be skilled drivers to avoid accidents on congested city streets. They also must be able to maneuver big trucks or tractor-trailers into tight parking spaces, through narrow alleys, and up to loading platforms. (Telephone linemen, repairmen, and many thousands of other workers for whom driving is incidental to their primary duties are not included in this discussion.)

When the local truckdriver reports to work at the terminal or warehouse, he receives his assignment to make deliveries, pickups, or both. He also receives the delivery forms he will need and checks the condition of his truck. His truck generally is loaded for him by platform men. If he does the loading himself, however, and must make many deliveries, he arranges the items in proper sequence so that there will be a minimum of handling. At the customer's place of business, the driver generally loads and unloads the merchandise himself. If he has heavy loads such as machinery, or if he has many deliveries to make during the day, he may have a helper to assist him. The driver of a moving van usually has a crew of helpers to assist him in loading and unloading household or office furniture.

At the delivery points, the driver gets customers to sign receipts and freight bills, and he sometimes collects money for freight, c.o.d. deliveries, and other charges. At the end of his day, he turns in all receipts and cash collected and records his time and the deliveries made. He also reports whatever maintenance or repair is needed before his truck is used again.

Some of these workers drive special types of trucks, such as dump or oil trucks, which require the operation of mechanical levers, pedals, or other equipment. If they haul heavy machinery, they operate mechanical hoists to load and unload the machines.

Places of Employment

Over 1.2 million workers were employed as local truckdrivers in 1970, mostly in and around large metropolitan areas; however, they work in all localities.

A large majority of local drivers work for businesses which deliver their own products and goods—such as department stores, meatpackers and other food processors, wholesale distributors, grocery chains, petroleum companies, and construction companies. Many others are employed by local for-hire operators—trucking companies which serve the general public or specific companies under contract. Some are employed by the Federal Government, particularly the Post Office Department, and by States and municipalities. A large number are in business for themselves.

Training, Other Qualifications, and Advancement

Qualifications for local truckdrivers vary considerably, depending upon factors such as the type of equipment to be operated and the nature of the employer's business. Generally, applicants must be 21 years of age or older. Some employers prefer applicants who have completed 2 to 4 years of high school. The applicant must be physically able to lift heavy objects and otherwise be in good health. He should have good hearing and good vision, with or without glasses. Since a driver often deals directly with the public, employers look for people who are tactful and courteous.

An applicant must have a chauffeur's license, which is a commercial driving permit. Familiarity with traffic laws and safety measures is necessary, and some previous experience in driving a truck is helpful. A young person may obtain such experience by working as a truckdriver's helper. Employers also give consideration to driving experience gained in the Armed Forces.

Since he will be responsible for costly vehicles and cargo, a truckdriver must be cautious, alert, and able to judge distances and to coordinate his reactions to avoid accidents in congested traffic. To demonstrate these qualifications, an applicant's driving ability is tested, and he may have to pass a written examination as well as a general physical examination. Employers generally will check applicants for traffic and police records.

Training given to new drivers is often informal and may consist only of riding with and observing an experienced driver on the job. Additional training may be given if they are to drive a special type of truck. Some companies give a brief indoctrination course which lasts 1 or 2 days and covers general duties, the efficient operation and loading of a truck, company policies, and the preparation of delivery forms and company records.

Although most new employees are assigned immediately to regular driving jobs, some start as extra drivers, covering the routes of regular drivers who are ill or on vacation, or making extra trips when necessary. They receive regular assignments when openings occur.

Local truckdrivers may transfer to jobs as dispatchers or advance to jobs such as terminal managers or supervisors, or to traffic work—for example, in planning delivery schedules. However, these jobs are relatively few. For the most part, advancement for a local truckdriver

consists of earning higher hourly wages by driving heavy or special type truck loads instead of light trucks or by transferring to over-the-road truckdriving.

An experienced truckdriver who has some business ability and ambition can start his own trucking company, when he has sufficient capital to purchase expensive trucking equipment and to meet other business expenses. Truckers who own one or two vehicles continue to account for a sizable proportion of local for-hire trucking businesses.

Employment Outlook

A moderate increase in the employment of local truckdrivers is anticipated through the 1970's because of the expected increase in volume of freight. Many new workers also will be needed to replace drivers who transfer to other fields of work, retire, or die. Retirements and deaths alone will result in more than 15,000 job openings each year for local truckdrivers.

The rise in total business activity anticipated in the years ahead will increase the volume of freight. Since trucks carry virtually all freight for local distribution and do not compete for hauling with other types of carriers, this anticipated increase in total intercity and local freight volume will expand local trucking business and, thereby, truckdriver employment. The continued growth of suburban areas will contribute to the employment of more drivers.

Some recent developments may offset somewhat the growth in the number of local truckdrivers that would otherwise occur with an increase in freight volume. For example, the trend toward larger deliveries to relatively fewer retail outlets is the result of the growth of chainstores and shopping centers. (On the other hand, as suburban areas expand, local truckers tend to service a wider area, increasing the travel time per truck.) The introduction of new equipment, such as power tailgates for loading and unloading also may affect the number of drivers who will be needed to deliver large and heavy loads. Also, the use of radio telephones to instruct drivers en route will reduce the time needed for deliveries. Innovation in local trucking will continue to be limited, however, by narrow city streets, heavy traffic, and local city ordinances controlling the size and weight of local delivery trucks. However, urban renewal and urban highway building projects may improve driving conditions.

Earnings and Working Conditions

On the average, hourly union wage scales were $4.41 for local truckdrivers and $3.91 for helpers on July 1, 1970, according to a survey in 68 large cities. Average hourly pay scales for drivers ranged from $5.17 in Sacramento, Calif., to $3.63 in Washington, D.C. However, wage scales vary, even in the same city, depending on the type of trucking service (such as general freight hauling or local moving and storage), the types of product hauled, and the size and type of truck operated.

As a rule, local truckdrivers are paid by the hour and receive extra pay for working overtime, usually after 40 hours. Some drivers are guaranteed minimum daily or weekly earnings. Local truckdrivers frequently work 48 hours or more a week and thus often drive 6 days a week. Although daytime work is customary, nightwork or early morning work is sometimes necessary, particularly for drivers handling foodstuffs for chain grocery stores, produce markets, or bakeries. Most drivers deliver over regular routes or runs, although some may be assigned different routes when they report to work each day.

Local truckdrivers generally have paid vacations of 1 or 2 weeks after a year of service and up to 4 weeks after 15 years. In addition, they usually receive pay for seven or more National, State, and local holidays.

A majority of local truckdrivers belong to unions. Most of them belong to the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America (Ind.). Some local truckdrivers employed by private carriers are members of unions representing the plant workers of their employers.

Practically all unionized local truckdrivers and their helpers are covered by life and health insurance and pension plans which are almost always paid for by the employer. When uniforms are required, the cost usually is paid for entirely or partly by the employer, who also may provide for their upkeep.

Local truckdrivers, because they drive in heavy traffic, are subject to nervous strain. The actual operation of a truck has become less physically demanding because of improvements such as power steering and more comfortable seating. However, when local drivers make many deliveries during a day, their work can be exhausting. Some drivers may develop physical disorders, such as back strain and hernia. Local truckdrivers, however, do have certain work advantages, such as steady employment. Unlike over-the-road drivers, they usually

work a regular day-time schedule and return home in the evenings.

ROUTEMEN

(D.O.T. 292.358)

Nature of the Work

Routemen are as much salesmen as they are drivers. In fact, 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 drive panel or light trucks over an assigned route, selling and delivering goods, or providing services such as collecting and delivering laundry and dry cleaning, to retail establishments (wholesale routemen) or directly to the public (retail routemen). Wholesale routemen usually drive heavier trucks. These trucks are refrigerated when dairy products or frozen foods are carried.

Before starting on his daily route, the routeman loads or supervises the loading of his truck. The amount of merchandise in his truck generally is checked by another employee. Some routemen deliver merchandise previously ordered and obtain orders for future delivery. Others make immediate sales from the stock in the truck. In either case, they must collect payments and keep records of their transactions. When they check in at the plant after completing their routes, they empty their trucks and turn in their collections to the cashier. The retail routemen serving homes make from 5 to 10 times as many stops as the wholesale routemen who serve stores and other business establishments.

Routemen's work varies according to the industry in which they are employed, the type of routes they have (retail or wholesale), and the company employing them. Some specific examples, however, may describe in a general way what most routemen do.

A typical day for a dry-cleaning routeman begins when he picks up cleaned garments at the processing plant and loads his truck, which is equipped with carrying racks. He delivers the garments to homes or business establishments and picks up soiled clothing. He marks the soiled articles so that they may be identified at the plant. Sometimes, he makes notes of the type of stains or of special processes to be used such as waterproofing. Each cleaned garment has an itemized bill attached so that he can collect the amount of money due.

Although all routemen must be able to get along well with people, it is particularly important for the dry-cleaning and laundry routeman. His reaction to complaints and requests for special services may be the difference between increasing business or losing customers. Periodically, he calls at homes and business establishments along his route which are not using his company's services to try to get their trade.

A wholesale routeman may deliver bakery products to grocery stores. His truck is loaded the night before or early in the morning, and he checks to see whether he has the proper variety and quantity of products before starting on his route. He stops at from 10 to 50 grocery stores. At each stop he brings the orders of bread and other bakery products into the store and arranges them on the display racks in the best possible display space he can secure. Together with the store owner or manager, he checks the merchandise he has delivered. He also credits the store for the value of the stale bread and cakes left over from the previous delivery.

This routeman prepares a list of products he plans to deliver the next day. This list represents his estimate of the amount of bakery products that will be sold by the grocery stores. From time to time, he calls on grocers along his route, who are not his customers, and tries to get orders from them.

The vending machine routeman, although he merchandises his products through machine, must try to anticipate customers' needs for service and preferences for merchandise. In trying, continually, to find profitable new locations for the vending machines he services, the routeman approaches the managers of various businesses about the placement and relocation of his machines. He caters to the customers' demand by noting their preferences for merchandise sold at each machine location and stocks each machine with items that sell best.

The vending machine routeman also must make certain that his machines are supplied adequately with merchandise, that they function properly, and that they are clean and attractive. At each location, the routeman checks the items remaining in the machine and the money deposited in the cash box to determine that what has been sold is accounted for. He tests stock delivery and change-making mechanisms to make sure that items and change are dispensed properly when coins are inserted; he may make minor adjustments to machines that are not working properly. He cleans the machine, removing waste, spillage, and accumulated dust, and then re-

places depleted stock. The routeman keeps an exact record of the merchandise that goes into each machine and a precise account of how much money is removed.

Places of Employment

About 240,000 routemen worked for a wide variety of businesses in 1970. Since most of them were employed by companies which distributed food products or provided personal services, they worked in small towns as well as in large cities throughout the country. The greatest concentration of employment, however, was in dairies, bakeries, food and beverage distributors, and drycleaning plants in the large cities.

Some were engaged in wholesale distribution of goods and services to stores and other business establishments. The majority, however, distributed goods and services to homeowners and apartment dwellers. Many companies employed both wholesale and retail routemen.

Training, Other Qualifications, and Advancement

In addition to being a good driver, a routeman must have sales ability. To induce people to buy, he must have a thorough knowledge of the product or service he is selling and a persuasive personality. Other important sales qualifications are a pleasant voice, ability to speak well, and a neat appearance. He also needs to have self-confidence, initiative, and tact.

He 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.

Applicants for jobs as vending machine routemen should have some mechanical ability. Routemen are expected to check the operation of automatic dispensing machines and make necessary adjustments and minor repairs. In case of major malfunctions in equipment, they should be able to report the nature of the trouble.

Most employers require their routemen to be high school graduates, preferably 25 years of age or older. Many large companies give applicants aptitude and other psychological tests to determine whether they will make good salesmen and safe drivers. Those who handle a great deal of money may have to be bonded.

Training for entering the occupation can be obtained through high school courses in salesmanship, public speaking, driver-training, bookkeeping and business arithmetic. School-and-work programs in retail and wholesale merchandising are helpful to a person interested in entering this occupation. 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). For this job, employers usually hire persons 18 years of age or over who have a driver's license. Helpers are not likely to be used in the dairy or vending machine industries, however. Still another way of becoming a routeman is to get a job (plant or office) in a bakery, dairy, laundry, or drycleaning establishment. After learning something about the business, a young person may transfer to a job as a routeman when an opening occurs.

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 to familiarize them with all the processing operations so that they can answer customers' questions intelligently and be better salesmen.

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 the experience gained in route selling.

Employment Outlook

The total number of routemen is expected to change little in the 1970's, although job opportunities will vary among different types of employers. There will be a few thousand additional openings for new workers each year as experienced workers transfer to other fields of work, retire, or die.

The number of retail routemen declined in the decade following World War II, particularly among drivers handling milk and dairy products. However, the decline appears to have run its course, and some employment upturn is likely. The convenience of home delivery to suburban families consuming large quantites of milk and dairy products makes such service popular, despite the growth of local shopping centers. For laundry and drycleaning retail routemen, the

outlook is for an increase in employment, in line with population growth, especially in areas with a large concentration of apartment houses. The increasing number of married women working outside the home will result also in the commercial handling of more laundry or cleaning work.

Employment of wholesale routemen probably will remain at about present levels or decline slightly. Although large supermarkets have been replacing small neighborhood stores, more supermarkets are being built in the suburban areas. The number of routemen will not increase correspondingly, however. There has been a growing trend toward larger delivery trucks. Moreover, in recent years, some manufacturers and wholesale food companies have replaced their routemen with salesmen who cover assigned territories by automobile, and truckdrivers who make the deliveries.

On the other hand, opportunities for employment as vending machine routemen will be excellent through the 1970's because of the expected rapid increase in the volume of machine-vended merchandise. Some of the factors expected to stimulate the industry's growth are the development of new and improved machines and the greater use of automatic food service in industrial plants, schools, hospitals, department stores, and other high-traffic areas.

Earnings and Working Conditions

Most routemen receive a minimum salary plus a percent of the sales they make. Thus, the earnings of routemen are determined largely by their selling ability and initiative. According to limited information available in 1970, wholesale routemen in the dairy and baking industries had minimum weekly salaries ranging from $100 to $170. Including commissions on sales, many of these routemen earned $200 a week and more. Wholesale routemen usually earn more than retail routemen because they sell much larger quantities of products. However, they receive a lower commission on each sale.

The number of hours worked by routemen varies. Some work only about 30 hours a week; others may work as many as 60 hours or more a week, depending upon whether the individual has a well-established route or whether he is trying to build up a new one, whether he has a retail or a wholesale route, and how ambitious he is. For some, the hours of work generally are limited by union-management contract. In other cases, the contract specifies merely the earliest hour that work may begin and the latest quitting time. The hours may also vary according to seasonal peaks and lows. During the spring-cleaning season, for example, drycleaning routemen may work about 60 hours a week; in the winter, they may work less than 30 hours a week.

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 provide hospitalization and medical benefits; some have pension plans.

The routeman is on his own to a great extent. He does not work under strict supervision and, within certain broad limits, may decide how fast he will work and where and when he will have his lunch or rest period. This freedom of action and the daily meeting and dealing with people on the route appeal to many young men. On the other hand, a retail routeman has to make deliveries in bad weather and do a great deal of lifting, carrying, and walking up and down stairs. He also may have to work unusual hours. For example, retail routemen delivering milk generally work in the very early morning hours.

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.

INTERCITY BUSDRIVERS

(D.O.T. 913.363 and 913.463)

Nature of the Work

The drivers of the buses that travel between cities are selected on the basis of their driving skill, driving record, emotional stability, and courtesy. A driver's duties generally begin when he reports to the terminal for his assignment. Before beginning his scheduled trip, he inspects the bus carefully at the terminal or garage. He checks the fuel, oil, water, and tires, and makes certain that the bus is carrying safety equipment, such as fire extinguishers, first-aid kit, flags, and flares. The driver also picks up the tickets, change, report blanks, and other items needed for his trip.

The driver moves his empty bus from the terminal or garage to the

proper loading platform, where he takes on his passengers. He collects fares—tickets usually—from the passengers as they board the bus and announces the destination, route, time of arrival, and other information concerning the trip. The driver also loads or supervises the loading of baggage and package express into the baggage compartment. He also collects cash fares from passengers who board the bus between stations where tickets are sold.

The driver operates the bus carefully at speeds which will enable him to arrive at and leave regular bus stops according to established time schedules. On many runs, he also stops momentarily at other designated points to discharge or pick up passengers, and load or unload baggage and package express wherever necessary. He announces regular stops and rest or lunch stops. The driver also regulates lighting, heating, and air-conditioning equipment for the passengers' comfort. In an emergency, he sometimes is required to make minor road repairs, such as changing tires, for which he generally receives extra pay.

Upon arriving at his final destination, the driver unloads or supervises the unloading of the remaining baggage. He prepares reports on mileage, time, and fares, as required by company rules. He also keeps a log of hours as required by the U.S. Department of Transportation (U.S. DOT). The driver must make a complete report if an accident or unusual delay occurs.

Places of Employment

Approximately 25,400 intercity busdrivers were employed by about 1,050 bus companies in 1970. About three-fourths of these drivers worked for Class I intercity companies—those with annual revenues of over $200,000. Intercity busdrivers are employed in the many small communities served by bus, as well as in the larger cities where home and regional offices and major terminals of bus companies are located.

Training, Other Qualifications, and Advancement

All intercity busdrivers are required to meet minimum age, health, and experience qualifications established by the U.S. DOT. The minimum age requirement is 21 years. The applicant must be able-bodied and have good hearing and at least 20/40 eyesight, with or without glasses. He must have at least 1 year's driving experience (through all four seasons) with a good driving record and must be able to read and speak English.

Many intercity bus companies, however, have considerably higher requirements. Most of these companies prefer applicants to be at least 24 years of age and have a high school education or its equivalent. Applicants often are given comprehensive examinations to determine their driving skill, intelligence, temperament, and personality.

Young persons interested in becoming busdrivers should have good foot-hand-and-eye coordination, be able to judge distances accurately, and react quickly. An even temperament and emotional stability are other important qualifications because busdrivers work under considerable tension when they operate large vehicles in heavy and swiftly moving traffic. Since they represent their companies in dealing with passengers, busdrivers also must be courteous and tactful.

Although previous experience in the operation of a truck or bus is not required, it is preferred by some employers. In most States, the law requires that a trainee for a busdriver's job must have or obtain a chauffeur's license, which is a commercial driving permit.

Most intercity bus companies conduct training programs for beginning drivers. These programs, which usually last from 2 to 6 weeks but can extend to 3 months, include both classroom and driving instruction. In the classroom, the trainee is instructed in company and U.S. DOT rules; State and municipal regulations; safe driving practices; rates, schedules, and timetables; and dealing with the public. He also is taught how to keep clerical records, inspect the bus, and make minor emergency repairs.

The trainee then rides with a regular driver to observe safe driving practices and other aspects of the job. He also makes trial runs, without passengers, to demonstrate his driving skill. After satisfactorily completing the training, which includes final driving and written examinations, the new driver begins a "break-in" period. During this period, working under strict supervision, he makes regularly scheduled trips with passengers.

New workers start out on the "extra board," which is a list of drivers on call who are given temporary assignments. While on the extra board, the new driver may substitute for a regular driver who is ill or on vacation, drive a second or overload section, make an extra trip if necessary, or drive chartered buses. Extra drivers may have to wait several years before they have the necessary seniority to receive a regular assignment. However, if it becomes necessary for a company to lay off some of its drivers, the

extra drivers will be the first to lose their jobs and the last to be rehired. In almost all companies, it is necessary for a beginning employee to serve a probationary period lasting, as a rule, from 30 to 90 days.

Opportunities for promotion generally are somewhat limited, particularly in small companies. An experienced driver may be promoted to a job as dispatcher, supervisor, or terminal manager. For most drivers, advancement consists of receiving better assignments with higher earnings as their seniority increases.

Employment Outlook

The number of intercity busdrivers is expected to increase slowly through the 1970's because of further increase in intercity bus travel. Also, several hundred additional openings will be available each year in this relatively small occupation as replacements for drivers who transfer to other fields of work, retire, or die.

Population growth and higher consumer incomes during the years ahead should result in an increase in travel generally. Some part of this increase is expected to be by bus. New and improved highways are expected to enhance travel by bus by making possible a reduction in schedule running time for bus travel.

Earnings and Working Conditions

The wages of intercity busdrivers typically are computed on a mileage basis. Rates ranged from 10 to 15 cents a mile in 1970. Drivers (including extra men) employed by Class I intercity bus companies had estimated annual average earnings of $10,800 in 1970. Many regular drivers employed by these companies earned considerably more than $10,000 a year.

Most regular drivers are guaranteed specified wages in terms of miles or hours per pay period. For all work other than their regular assignments or "tours of duty," they receive additional pay, customarily at premium rates.

Extra drivers usually are paid by the hour when they are on call but not driving, and are paid the regular mileage rate when actually driving. Drivers usually start at a minimum rate and receive increases at intervals of 6 months or a year. The maximum rate generally is reached at the end of 2 years. Extra men generally earn slightly less than regular drivers but, if enough work is available, they may earn as much or more than regular drivers. Extra drivers receive a weekly or biweekly guarantee either in minimum hours, mileage, or earnings.

Most drivers who work for the large companies average between 32 and 36 hours driving time a week. Driving schedules may range from 6 to 10 hours a day and from 3½ to 6 days a week.

U.S. DOT regulations limit the hours of work of intercity busdrivers. According to these regulations, intercity drivers may drive no more than 10 hours without having at least 8 hours off. Drivers also are limited to 60 hours of "on-duty" time in a 7-day period; those who work for carriers that operate every day of the week, however, are limited to 70 hours in an 8-day period. "On-duty" is the period from the time the driver is required to report for work until he is relieved. For those who drive less than 10 hours but perform other work for the bus company, the regulations prohibit resumption of driving after any combination of driving and other on-duty time which totals 15 hours, unless the driver first has had at least 8 hours off duty.

Most intercity busdrivers belong to the Amalgamated Transit Union. The Brotherhood of Railroad Trainmen, and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America (Ind.) also have organized intercity busdrivers in some areas.

Labor-management contracts covering many intercity busdrivers provide for health and life insurance paid for by the employer, whereas pension plans under such agreements are usually financed jointly by the workers and their employers.

Drivers are given vacations with pay ranging from 1 to 5 weeks, depending on the company for which they work and their length of service. Many also receive a minimum of 8 paid holidays. When away from home terminals overnight, drivers employed by some companies receive pay for food and lodging.

Driving an intercity bus usually is not physically burdensome, but it is demanding and requires steady nerves. The busdriver is given a great deal of independence in his job and is solely responsible for the safety of the passengers and bus. Many drivers enjoy working without direct supervision and take pride in assuming these responsibilities. Some drivers enjoy the opportunity to travel and to meet the public.

Among the less desirable aspects of this job are weekend and holiday work and the necessity of being away from home for varying periods. Also, extra drivers are on call at all hours and may be required to work at any time on very short notice. In addition, drivers that have little seniority sometimes may be laid off when business declines.

Sources of Additional Information

For information regarding job opportunities for an intercity busdriver, a young man should apply to intercity bus companies or the local office of the State employment service.

LOCAL TRANSIT BUSDRIVERS

(D.O.T. 913.363 and 913.463)

Nature of the Work

Local busdrivers transport millions of Americans to and from work, schools, and homes every day. These drivers follow definite time schedules and routes over city and suburban streets to get passengers to their destinations on time.

The local busdriver's workday begins when he reports to the terminal or garage. There, he is assigned his bus and receives his change, tokens, transfers, passes, and any other items needed. Before starting the run, the driver usually is required to check the tires, brakes and lights. Some very small local bus companies also may require him to check the water, oil, and fuel.

On most runs, the driver makes regular stops every block or two, where he operates the controls of the bus doors to enable passengers to enter and leave the vehicle. As the passengers board the bus, the driver collects cash fares, tokens, tickets, or transfers, and also issues transfers, and in many places, sells tokens, and makes change. The local busdriver often answers questions concerning schedules, routes, transfer points, and street numbers, and sometimes is required to call out the name of the street at each regular bus stop. He also regulates heating, air conditioning, and light equipment to keep the passengers comfortable.

At the end of his day's run, the busdriver turns in a trip sheet which usually includes a record of fares received, trips made, and any delays in schedule. In case of an accident or unusual delay, the driver must make out a comprehensive report on its nature and cause.

Places of Employment

In 1970, nearly 69,000 busdrivers were employed by about 1,090 local transit bus companies. A small proportion of these drivers were women. Approximately one-half the total worked in large cities where the transit system was publicly owned, such as Boston, Chicago, Cleveland, Detroit, Los Angeles, Miami, New York, Pittsburg, St. Louis, and San Francisco. In addition to those employed by the local transit bus industry, some local

drivers work for charter and sightseeing lines, government agencies, and companies which specialize in operating schoolbuses. (There are also more than 200,000 schoolbus drivers, most of whom are part-time drivers.) A few drivers are employed by Federal, State, and local governments.

Although many drivers work in major metropolitan areas such as New York, Chicago, and Detroit, some are employed in almost every community in the Nation.

Training, Other Qualifications, and Advancement

Applicants for busdriver positions should be between the ages of 21 and 40, of average height and weight, and have good eyesight—with or without glasses. The applicant must be in good health, have no physical disabilities, and must be able to pass the written and physical examinations given by most employers. He must be able to judge distance accurately, have good hand-eye coordination, and have quick reflexes. Because the driver often works under pressure and deals with many different personalities, an even temperament and emotional stability are important. Although educational requirements are not high, many employers prefer applicants that have a high school education or its equivalent.

A motor vehicle operator's permit and, generally, 1 or 2 years of driving experience on some type of motor vehicle are basic requirements. A good driving record is essential because a busdriver is responsible for the safety of his passengers. Most States require busdrivers to have a chauffeur's license which permits the holder to operate commerical motor vehicles. This license may be obtained either during or immediately after the driver's training period. Some employers prefer drivers who have had experience operating a truck or bus.

Most local transit companies conduct training courses which may last several weeks and include both classroom and driving instructions. In the classroom, the trainee is taught company rules, safety regulations, and safe driving practices. He is taught how to keep records and how to deal tactfully and courteously with passengers. The trainee's driving instruction consists of supervised trips both with and without passengers. At the conclusion of his training, the new driver often is required to pass a written and final driving examination before he starts on a run.

After passing the examinations, he is placed on the "extra" list. While on this list, he substitutes for regular drivers who are ill or on vacation and also makes extra trips in the morning or evening rush hours. He also may drive charter or sightseeing runs and other extra runs such as special service buses for public meetings and sporting events. In almost all companies it is necessary for a beginning employee to serve a probationary period—generally lasting for 30 to 90 days. He may remain on the extra list until he has the necessary seniority to obtain a regular run. It may take from several months to several years before he is assigned a regular run.

Promotional opportunities in regular driving jobs generally are limited. Experienced drivers may advance to jobs such as instructor, dis-

patcher, road supervisor, and, sometimes, executive. Promotion in municipally owned bus systems is usually by examination. The opportunities for advancement of most drivers are limited to assignments to more desirable runs. Only after acquiring sufficient seniority do the drivers receive these assignments.

Employment Outlook

There will be a small number of opportunities for new workers to enter this occupation each year through the 1970's, even though employment of local busdrivers is expected to continue to decline (but at a slower rate than in the past). These openings will result from the need to replace drivers who transfer to other fields of work, retire, or die. Retirements and deaths alone may account for about 1,200 openings each year.

In recent years, the volume of passenger traffic handled by the local transit bus industry has declined significantly. The main cause of this decline has been the rapid rise in the number of private automobiles and their increasing use in both city and suburban areas. Another factor has been the rapid growth of suburbs, most of which have a wide variety of stores, theaters, restaurants, and other services in their shopping centers. Because most suburban shopping centers have good parking facilities and are reached easily by automobile, many suburban residents have found it unnecessary to use public transportation for shopping or other activities. The increasing numbers of people employed in suburban areas are likely to rely more on private automobile transportation than those employed in downtown areas.

In addition, increasing traffic congestion and parking problems in most downtown sections have led to the decline of many central business districts. This decline, in turn, has resulted in some curtailment of downtown bus service between rush hours.

As local transit bus traffic declined steadily in recent years and bus schedules and routes were curtailed or entirely eliminated, the employment of busdrivers also declined. The decline in employment was limited, however, partly because transit companies are not completely free to curtail or eliminate unprofitable routes, since the companies are usually regulated by State or municipal authorities.

Downtown traffic congestion and parking problems will continue to encourage bus travel in downtown areas, and the growing need for bus service for school children in the suburbs is an additional factor which may slow the downward trend in busdriver employment. Some increase in the number of publicly owned companies may occur. This increase would favorably affect busdriver employment, since such companies often provide service on unprofitable routes in the public interest.

Earnings and Working Conditions

Local transit busdrivers are usually paid by the hour, and earnings vary according to locality, length of service, size of company or city, and length and type of run. Nearly all companies pay the maximum job rate after 12 months' service. According to a survey of basic hourly wage scales set by union-employer contracts for busdrivers in 66 large cities, the average hourly rate was $3.99 on July 1, 1970. Hourly scales were highest in the larger cities in the Great Lakes, Pacific, New England, and Middle Atlantic regions. Among the cities surveyed, the hourly pay scales for experienced busdrivers ranged from $2.26 in Topeka, Kansas to $4.60 in Boston, Mass. Wage scales for beginning drivers were generally 5 to 15 cents an hour less.

Most busdrivers have a standard work schedule of 8 hours a day, 40 hours a week. For additional work, drivers usually receive 1½ times their hourly rates. In many companies, drivers often work in excess of their standard work schedule, thereby increasing their weekly earnings. Drivers on the extra list generally are guaranteed a minimum number of hours of work or a minimum weekly salary.

The workweek for regular drivers usually consists of any 5 consecutive days; Saturdays and Sundays are counted as regular workdays. Most transit companies run some buses in the evening and a few companies operate 24 hours a day. Therefore, some drivers have to work at night. To accommodate the varying demands of commuter travel, it is necessary for many local transit busdrivers to work "swing shifts." On these runs the operator drives for several hours, is off duty for a period of time, then returns to work for several hours. If the total elapsed time between the beginning and end of a swing shift exceeds 10 or 11 hours, the driver generally receives extra pay. Other assignments are "straight runs" which are unbroken except for meal periods. Some union contracts require 50 to 60 percent of all assignments to be straight runs.

Nearly all local transit busdrivers are covered by labor-management contracts which provide for life and health insurance, and pension plans; the major pension plans are

financed jointly by the workers and their employers, while many life and health insurance plans are paid for solely by the employer. Drivers also are given vacations with pay ranging from 1 to 5 weeks or more, depending on the length of service, and usually 6 or 7 or more paid holidays a year.

Although driving a bus is not physically exhausting, busdrivers are exposed to the nervous tension which arises from driving a large vehicle on heavily congested streets and dealing with many types of passengers. In addition to driving a bus, they must collect fares, answer questions, see that passengers are clear of the doors, and request riders to move to the rear.

Among the more favorable aspects of this job is steady year-round employment once a driver receives a regular assignment. Busdrivers are usually free of direct supervision—which many drivers also find desirable. Drivers take pride in being solely responsible for the safety of the passengers and bus and in acting as the bus company's representative to the general public.

Most busdrivers are members of the Amalgamated Transit Union. Drivers in New York City and several other large cities belong to the Transport Workers Union of America. The Brotherhood of Railroad Trainmen and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America (Ind.) also have organized some local transit busdrivers.

Sources of Additional Information

For information on employment opportunities for local busdrivers, inquiry should be made at the transit company in the local area or to the local office of the State employment service.

TAXI DRIVERS

(D.O.T. 913.363)

Nature of the Work

In practically all communities, taxicabs are an essential part of the regular transportation system. They offer a type of individualized service not otherwise available, since they operate without the fixed routes and schedules of public buses. As a result, the taxidriver can offer a flexible independent service to individual customers, which provides most of the advantages they would have in using their own private automobiles.

Taxicab drivers, in addition to providing transportation, also perform other services. For example, they assist passengers in and out of the cab, handle their luggage, and also may pick up and deliver packages. In some communities, cabs are used for transporting crippled children to and from school. Cabdrivers occasionally provide sightseeing tours for out-of-town visitors.

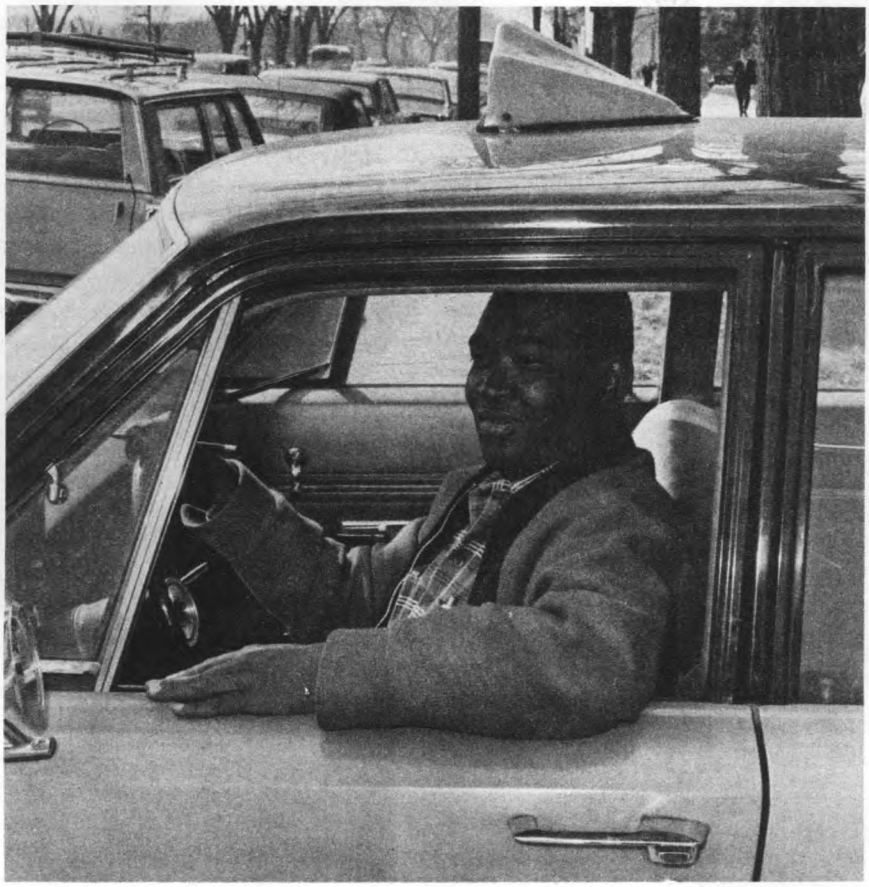
Drivers get their "fares" or passengers in one or more ways. The majority of taxicab fleets are equipped with two-way radio systems over which requests for taxicabs are transmitted to the driver. These companies also have cabstands at which drivers may wait for phone calls from their central dispatching office, which will direct them to pick up passengers. Many drivers wait in front of theaters, hotels, bus terminals, railroad stations, and other buildings which may have large numbers of prospective passengers. In small cities and in suburban areas, drivers may work from a central location, such as a terminal, to which they return after each trip. The driver also may pick up passengers while he is returning to his stand or station. A good driver keeps himself informed on what is happening in the city, where crowds will gather (for example, at theaters, and baseball and football games) and when the crowds will disperse, so that he can be on hand to pick up passengers.

Drivers usually are required to keep records, such as the date, time, and place passengers were picked up, and the destination, time of arrival, and amount of fare collected. If the cabdriver owns his own cab or if he rents a cab over an extended period of time, he must clean the cab periodically, as required by regulations in many municipalities. In large cab companies, this job generally is performed by cleaners employed by the company.

Places of Employment

In 1970, about 100,000 taxi drivers, including a small number of women, were employed full time in the taxicab industry, which is made up of both privately owned cabs and fleets of company-owned vehicles. In addition, perhaps as many were employed part time.

Although taxicab drivers are employed in every metropolitan area in the country, the greatest concentration of these workers is found in large cities. New York City, Washington, D.C., Chicago, Philadelphia, Boston, New Orleans, Detroit, St. Louis, and Baltimore lead in the employment of cabdrivers.



Training, Other Qualifications, and Advancement

To become a taxi driver in most large cities, it is necessary to have, in addition to a State-issued chauffeur's license, a special taxicab operator's license issued by the local police, safety department, or Public Utilities Commission. Although licensing requirements vary considerably among cities, in general, applicants must be over 21 and in good health, have a good driving record, and have no criminal record. A driver's record is checked for arrests, both locally and through the Federal Bureau of Investigation (FBI).

Most large communities require an applicant for a taxi driver's license to pass a written examination on taxicab and traffic regulations. The examination may include questions on street locations, insurance regulations, accident reports, lost articles, zoning or meter rules, and passenger pickup and deliveries. In some cities, the cab company will teach the driver-applicant taxicab regulations and the location of streets and important buildings. In other cities, the driver may prepare himself for the license examination. After the driver has passed the examination, he pays an annual license fee, generally ranging from 50 cents to $5.

Although formal education is seldom required, many companies prefer applicants for a taxi driving job to have at least an eighth-grade education. A neat, well-groomed appearance is desirable, as is the ability to deal tactfully and courteously with all types of people. Good eye-hand-and-foot coordination is desirable because taxi drivers often must operate their cabs in fast moving and heavy traffic.

Opportunities for advancement for taxi drivers are extremely limited. Promotion to the job of dispatcher is often the only possible advancement. Some drivers, however, have become road supervisors, garage superintendents, or claims agents. Many drivers who work for companies try to purchase their own cabs so that they can become their own employers. In some large cities, however, the number of cabs is restricted by ordinances, which may limit the opportunity to own cabs in such areas.

Employment Outlook

There will be many opportunities for new workers to become taxi drivers throughout the 1970's, primarily because of the high turnover in this occupation. The number of taxi drivers has been slowly declining during the past decade, and this trend is expected to continue through the 1970's.

In the past, the employment of taxi drivers has been affected adversely by the increased use of privately owned automobiles, rented cars, and the continuing population shift to the suburbs where most people drive their own cars.

The high turnover in this occupation results from the lack of assurance of a steady income, the long hours, and the stopgap nature of this employment for some workers when better jobs are not available. Transfers from this occupation are expected to be the major reason that employment opportunities will be available for many new workers

who wish to enter this field of driving.

Earnings and Working Conditions

Most taxi drivers employed by taxicab companies are paid a percentage—usually between 40 and 50 percent—of the total fare. Drivers also frequently receive tips, ranging from 10 to 20 percent of the fare. In 1970 many taxicab drivers earned between $2.00 and $3.00 an hour, including tips. Some taxi drivers covered by union-employer contracts have guaranteed minimums up to $60 or $70 a week.

Many drivers rent their cabs from the company by the day for a set price. Any receipts above the cab rental and other operating expenses are retained by the drivers.

A large percentage of full-time taxi drivers work 9 or 10 hours a day for 6 days a week. They usually begin work between 6 a.m. and 8 a.m. Many drivers work nights, starting between 3 p.m. and 5 p.m. Some drivers work on Sundays and holidays.

Many college students have been able to work their way through school by driving cabs on a part-time basis and during summer and spring holidays. Some workers also become part-time drivers to supplement their regular income.

Driving a taxicab is not physically strenuous. Most drivers do not change tires or do other heavy repair work. Drivers, however, are subject to nervous tension from driving in heavy traffic in all kinds of weather, and dealing with different types of passengers.

Many drivers find the lack of direct supervision by an employer one of the more desirable aspects of their job. However, they may be subject to municipal regulations which govern their personal appearance, the fares they charge, and their driving practices.

Taxi drivers in many of the large cities belong to labor unions, particularly those drivers who work for the large taxicab companies. The main union in this field is the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America (Ind.).

Taxi drivers usually work long hours and do not receive overtime pay. Many of them do not receive fringe benefits, such as pensions and severance pay, that workers in many other occupations receive. When economic conditions decline, their earnings generally are reduced because of increased competition for less business.

FORGE SHOP OCCUPATIONS

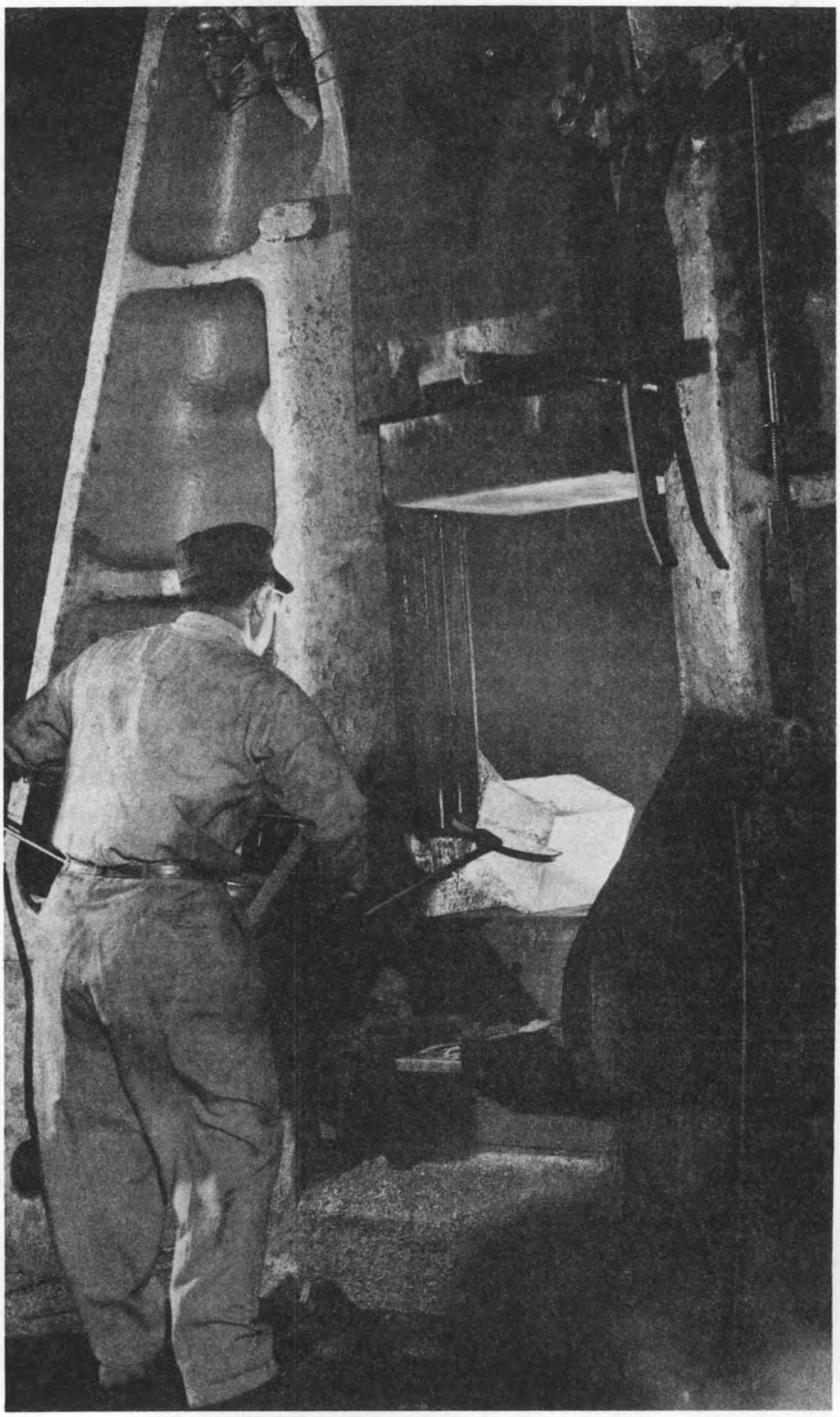
For centuries, blacksmiths have been forging, one of the principal methods of working and shaping metals. The modern forge shop, by substituting heavy power equipment and precision die blocks for the blacksmith's hand hammer and anvil, can do the work much more rapidly and accurately.

Forged metal is exceptionally strong and is used for many products that must withstand great stress. Examples of forged products include automobile crankshafts, gears, wrenches, scissors, and many aircraft, missile, and spacecraft parts. The great bulk of forging tonnage is made of steel, but aluminum, brass, bronze, copper, titanium, beryllium, and most other metals also are forged. Forgings range in weight from fractions of a pound to many tons.

This chapter describes the major kinds of forging production occupations; it does not discuss machining, maintenance, custodial, or other workers who are employed in forge shops but who are not directly engaged in the forging process. (For a detailed description of the duties, working conditions, and job prospects for blacksmiths, who do work similar to that of many forge shop workers, see the statement on Blacksmiths.)

Nature of the Work

Before metal can be shaped by hammers and presses, workers known as heaters must first heat it in intensely hot furnaces. Then drop hammer operators, hammersmiths, press operators, upsetter operators, and other workers manipulate the glowing hot metal between a pair of metal forms, called dies, that are attached to power hammers or presses. The hammers or presses pound or squeeze the metal with tremendous force to form it into the shape desired. Finally, trimmers, grinders, and other workers remove rough edges and excess metal from



forgings, and perform other finishing operations.

Two kinds of dies are used for forging—the impression (closed) die, which has a cavity shaped to the form of the metal part to be forged, and the open die, which is flat and more closely resembles the blacksmith's hammer. Impression dies are used where the need for large quantities of identical forging (for example, automobile crankshafts) justifies their expense. Open dies are used to produce relatively small numbers of forged parts, or to forge objects too large for impression dies.

The basic equipment used by forge shop workers consists of various types of power hammers, power forming and trimming presses, dies, and furnaces. They also use handtools, such as hammers and tongs, and measuring devices, such as calipers, scales, and rules. A forging hammer or press generally is operated by a crew of from 2 to 10 men. The number of men in the crew depends on the size and type of equipment operated and the size and shape of the part to be formed. Crews may specialize in the operation of a particular kind of hammer or press. The work performed by workers in the major forge shop occupations is as follows:

Hammersmiths (D.O.T. 612.381) supervise the operation of open-die power hammers that pound pieces of hot metal, called blanks or stock, into desired shapes. The precision of parts forged with such equipment is greatly dependent on the skill of the hammersmith. He must interpret blueprints, drawings, and sketches to determine how to work the metal under the hammer and determine the force of the hammer so that the piece being forged will be shaped to specifications. He also must decide whether the metal needs additional heating and when and how to use various forming tools under the hammer to produce angles and curves.

The hammersmith supervises a crew consisting of a hammer driver, or hammer runner, who operates controls of the hammer to regulate the force of the forging blow; a craneman, who transfers metal blanks from furnace to hammer and manipulates metal under the hammer; a heater, who heats metal to correct forging temperatures; and one or more helpers.

Hammer operators (D.O.T. 610.782), often called hammermen, are skilled forgemen who operate impression-die power hammers. Generally, the larger the hammer and the larger or more intricate the shape of the metal object to be formed, the greater the skill required of the operator. With the assistance of helpers and heaters, the hammerman sets and aligns dies in the hammer. He controls the force of the forging blow, manipulates metal under the hammer, and determines whether the metal needs additional heat.

Press operators (D.O.T. 611.782 and .885) operate huge presses equipped with either open or impression dies. Their work differs from that of the hammersmith or hammer operator mainly in that they shape and form hot metal by pressing or squeezing rather than by hammering or pounding. They must know how to regulate the pressure of their machines and position metal stock between the dies. In some cases, operators need to know how to control the heating of metal. Their duties also may include setting up dies in the presses.

Skills of open-die press operators are similar to those of hammersmiths. Both types of workers manipulate metal blanks between two open dies; both must be able to understand blueprints, drawings, or sketches in order to transform heated metal into finished forgings; and both may supervise crews composed of an assistant operator, a craneman, a heater, and several helpers.

Impression-die press operators work to more exacting specifications than press operators using open dies, but do not need as much manipulating skill because the die impression determines the shape of the forging. The impression-die press operator may supervise a small crew or work alone.

Upsetters (D.O.T. 611.782), also called upsettermen, operate machines that shape hot metal by applying pressure through the horizontal movement of one impression die against another. With the help of a heater and several helpers, the upsetter performs such duties as alining dies, positioning metal stock between the dies, adjusting the machine's pressure on the metal stock, and controlling the heating of the metal. Deep-socket wrenches, aircraft engine cylinders, bolts, and valves are examples of products made on upset machines.

Heaters (D.O.T. 619.782) control the supply of fuel and air in furnaces to obtain the temperature and atmosphere required for the metal being forged. Temperature gauges and observation of the metal's color help the heater determine when the correct temperature has been reached. Heaters use tongs or mechanical equipment to transfer heated metal from the furnace to the hammer or press. They also keep furnaces clean.

Inspectors (D.O.T. 612.281) check forgings for size, shape, quality, and other specifications. Some inspectors examine forged pieces for flaws and faulty work-

manship while the forgings are still hot; others inspect forgings after they have been trimmed and cleaned. Inspection may be done visually and/or with gauges, micrometers, calipers, and other measuring devices. Checking for flaws also may be done with machines that test strength and hardness, and with magnetic and electronic testing devices.

Die sinkers (D.O.T. 601.280) are highly skilled workers who make the impression dies used on forging hammers and presses. Working from a blueprint, template, or drawing, a die sinker traces the outline of the object to be forged on two matched blocks of steel. He then forms the shape of this object in the steel die blocks by using milling machines and other machine tools such as EDM (electric discharge machinery) and ECM (electro chemical machinery). He uses scrapers, hand grinders, and other handtools to smooth and finish the die cavity. Finally, by using the completed dies, he makes a sample cast of the finished cavity, and checks all measurements with a micrometer and other precision instruments.

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 mechanically powered abrasive wheels. *Sandblasters* and *shotblasters* (D.O.T. 503.887) operate sandblasting or shotblasting equipment to clean and smooth 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 attain certain desired conditions or properties in the metal, such as hardness.

Places of Employment

Approximately 65,000 production workers were employed in forge shops in 1970. Nearly three-fourths of these workers were employed in independent shops—those that produce forgings for sale. The remainder worked in forging departments of plants that use forgings in their final products, such as automobiles, farm machinery, handtools, and structural and ornamental metal products.

Employment of forge shop workers is concentrated mainly in Ohio, Wisconsin, Michigan, Illinois, Indiana, Pennsylvania, Massachusetts, California, and New York. Forge shops usually are located near steel producing centers, which provide steel for forgings, as well as near metalworking plants, which are the major users of forged products.

Training, Other Qualifications, and Advancement

Most forge shop workers learn their skills through on-the-job training and work experience. They generally join a hammer or press crew as a helper, or, in some plants, as a heater. As they acquire experience, they progress to more skilled jobs. Advancement to the skilled job of hammersmith, for example, requires several years of on-the-job training and experience.

A few forge shops offer apprentice training programs for crafts such as die sinker, heat treater, hammer operator, hammersmith, and press operator. The programs, which generally last 4 years (in the case of die sinkers, from 4 to 8 years), give the apprentice a combination of classroom training and practical experience in using the tools and equipment of the trade. For example, hammersmith apprentices learn about the properties of metals and how to operate power hammers and furnaces, use handtools and welding equipment, and read blueprints.

Training requirements for inspectors vary. Those who inspect rough forgings visually or with simple gauges usually can perform their jobs after only a few weeks of on-the-job training. Those who examine parts forged to more exact specifications and operate more complicated testing equipment may need some technical background in blueprint reading and mathematics and may be given several months of on-the-job training.

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

Because forge shop work sometimes involves lifting and moving heavy forgings and dies, workers must be strong. However, cranes are used for moving very large objects. Forge shop workers must have the stamina to work under hot and noisy conditions.

Employment Outlook

Production worker employment in forge shops is expected to increase slowly through the 1970's. Most job openings will arise from the need to replace experienced workers who retire, die, or transfer to other fields of work.

Employment is expected to increase because industries that use forgings in their final products—particularly the industrial machinery and automobile industries—will expand as the Nation's general economic activity rises. However, employment is expected to increase more slowly than forge shop production because continued improvements in forging techniques and equipment and more efficient plant operations will result in greater output per worker. Forge shop employment has been sensitive to changes in general business conditions, and it is expected that substantial year-to-year changes in the level of employment will continue.

Earnings and Working Conditions

Average earnings of forge shop production workers are higher than those for manufacturing production workers as a whole. In 1970, production workers in iron and steel forging plants earned an average of $172.40 a week, or $4.31 an hour, compared with average weekly earnings of $133.73, or $3.36 an hour, for production workers in all manufacturing industries.

Collective bargaining contracts negotiated between employers and unions provide for various fringe benefits, such as holiday pay, vacation pay, and retirement pensions. Most union-management agreements provide for 8 or 9 paid holidays a year and up to 5 weeks' vacation, depending on length of service. Other important provisions include life insurance benefits financed by the employer, as well as accident and sickness, hospital, and surgical benefits.

Working conditions in forge shops have improved in recent years. Many firms have installed heat deflectors and ventilating fans to reduce heat and smoke and have attempted to reduce machine concussion, noise, and vibration. Although the rate of disabling work injuries in forge shops is higher than the average for all manufacturing, employers and unions attempt to eliminate injuries by promoting safety training and the use of protective equipment, including face shields, ear plugs and muffs, safety glasses, metal-toe shoes, instep guards, metal 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 individual forge shops; locals of the labor unions noted above; and from:

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

Open Die Forging Institute, 440 Sherwood Rd., La Grange Park, Ill. 60525.

MACHINING OCCUPATIONS

Almost every product made by American Industry contains metal parts or is manufactured by machines made of parts. Many of these metal parts are shaped to precise dimensions by skilled and semiskilled machining workers who use a wide variety of machine tools. Machining workers make up the largest single occupational group in the metal-working trades. In 1970, about 1.2 million workers were employed as machinists, tool and die makers, instrument makers, machine tool operators, and setup men.

Nature of the Work

The principal job of most machining workers is to operate machine tools. A machine tool is a stationary, power-driven machine that holds both the piece of metal to be shaped and a cutting instrument, or "tool," and brings them together so that the metal is cut to the desired shape. In some cases, the cutting tool is moved, and the metal is held stationary; in others, the metal is moved against a stationary tool.

The most common types of machine tools are lathes, grinding machines, drilling and boring machines, milling machines, shapers, broachers, and planers. Lathes turn and shape metal against a sharp cutting tool. Grinding machines smooth metal parts by means of power-driven abrasive wheels. Drilling machines make holes in metal. Boring machines enlarge holes already drilled. Milling machines cut or remove excess metal with tools that have several cutting edges. Shapers, planers, and broachers are machine tools that produce flat surfaces. In addition to these common machining methods, several new metal shaping techniques have been introduced in recent years. For example, metal can now be shaped using chemicals, electricity, magnetism, sound, light, and liquids under controlled conditions.

Accuracy is of prime importance for most machining work. Motors, farm machinery, and typewriters are included among the wide variety of products made of metal parts that must be made to precise dimensions so that they are interchangeable and can be easily assembled for mass-production purposes. Metal parts sometimes are machined to tolerances of 10 millionths of an inch. Machining workers follow directions generally given in the form of a drawing or blueprint, upon which exact dimensions of the finished part are specified; some instructions may be less detailed. Machining workers frequently use micrometers and other precision-measuring instruments to check the accuracy of their work against the required specifications.

In addition to operating machine tools, skilled tool and die makers, instrument makers, and machinists spend a considerable portion of their time doing precision handwork, such as laying out and assembling metal parts. After the separate parts have been machined, they use files, scrapers, emery cloths, and miscellaneous small handtools in filing, scraping, and polishing the parts for exact fit in the final assembly.

All-round machinists are skilled workers who can operate most types of machine tools. Machine tool operators commonly operate only one kind of machine tool. Tool and die makers specialize in making dies for use with 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 made of metal or other materials. Setup men adjust machine tools so that semiskilled machine tool operators can run the machines. (Detailed discussions of the types of work performed by workers in each of these machining occupations are presented later in this chapter.)

Since continuous attention is required when machine tools are in operation, the work may be tedious, especially on simple and repetitive machining jobs. However, where the work is varied and complex and standards of accuracy high, a worker may experience the satisfaction that comes to a capable and conscientious craftsman in a highly skilled trade.

Location of Machining Work

An estimated 530,000 machinists; 425,000 machine tool operators; 165,000 tool and die makers; 70,000 setup men; and 8,000 instrument makers were employed in 1970. About four-fifths of all machining workers were employed in the metal-working industries, mostly in the machinery, except electrical; transportation equipment; fabricated metal products; and electrical machinery and equipment industries. Many thousands also were employed in repair shops of railroads and maintenance shops of factories that make textiles, paper, glass, or chemicals. A small number worked in research laboratories and shops that fabricate models of new products.

Machining workers are employed in every State and in almost every city in the country. However, more

than half of all machining workers are employed in California, Ohio, New York, Michigan, Illinois, and Pennsylvania. Other States having large numbers of machining workers are New Jersey, Massachusetts, Indiana, Connecticut, Wisconsin, and Texas. Most instrument makers are employed in New York City, Chicago, and a few other large cities.

Training, Other Qualifications, and Advancement

The common method of entering skilled machining occupations is through apprenticeship—a period of formal on-the-job training during which the new worker learns all the aspects of his trade. He is taught to operate machine tools and to use handtools and measuring instruments. In addition to shop training, the apprentice is given classroom instruction in blueprint reading, mathematics, and related subjects. In choosing apprentices, employers usually prefer young men who have a high school or trade school education. Some companies use aptitude tests to help determine whether applicants for machining jobs have the necessary mechanical ability and the temperament to perform this exacting work. Machining workers also must have good vision and superior judgment of depth and distance.

Most semiskilled machine tool operators—and some machinists, tool and die makers, and instrument makers—"pick up" the skills of their trade informally through experience on several jobs. They generally start in the less skilled machining jobs working under the supervision of experienced craftsmen. They gradually advance to more skilled jobs as they acquire experience and knowledge. Some workers improve their skills and increase their chances for advancement by taking courses in blueprint reading, electronics, hydraulics, and shop mathematics. An increasing number of machining workers are participating in intensive training programs provided by machinery manufacturers or sponsored by labor unions. Some of these programs train machining workers to maintain and repair numerically controlled machine tools.

Programs to train unemployed and underemployed workers, primarily for entry jobs in the machining occupations, were operating in many cities in 1970 under the Manpower Development and Training Act. The majority of these programs, which continue up to a year, were for machine tool operators, but some were for other machining occupations. The programs stressed the fundamentals of machine tool operation. Graduates of these programs may eventually become skilled machining workers by gaining additional training and experience.

Although women sometimes are employed as machine tool operators, relatively few are employed in skilled machining occupations.

Machining workers have several advancement opportunities. For example, many can advance to foremen. Individuals having extensive machine shop experience may, with specialized training, become programers who prepare the coded paper tapes used to operate numerically controlled machines. Tool and die makers and instrument makers can advance to technical positions such as tool and die designer or instrument technician. Machining workers also can open their own tool and die shops or machine shops.

Employment Outlook

There will be thousands of job openings for machining workers through the 1970's. Most of these openings will result from the need to replace experienced workers who transfer to other fields of work, retire, or die. Replacement needs will be a particularly important factor in the skilled machining occupations, which have a relatively high proportion of older workers. Transfers of semiskilled machine tool operators to other occupations are fairly common, and some openings also will result from these transfers. Other openings are expected to result from the anticipated slow increase in the demand for these workers, assuming the realization of relatively full employment nationally and high rates of economic growth necessary to achieve this goal.

Employment in the various machining occupations is expected to increase at different rates. For example, the number of instrument makers is expected to increase rapidly, whereas little or no change is expected in the employment of machine tool operators. Laborsaving technological changes are expected to slow the employment growth of most machining occupations.

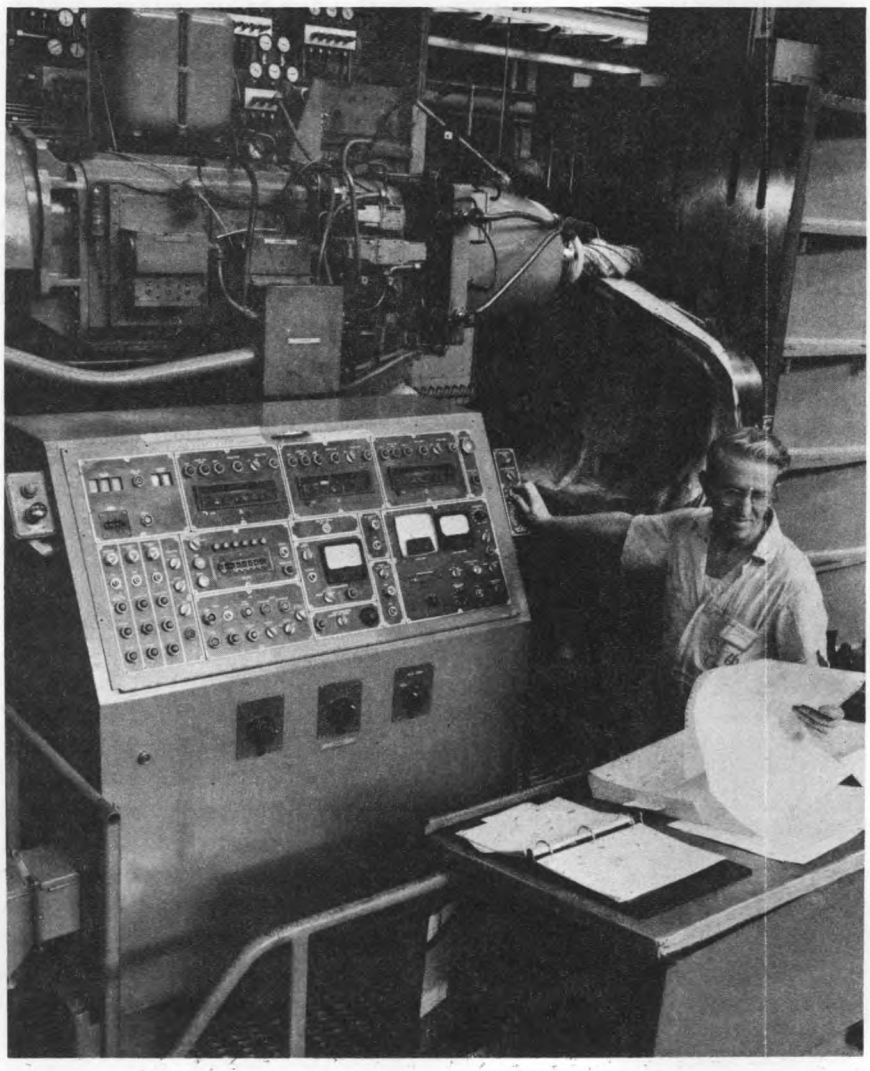
The anticipated increase in the employment of machining workers is expected to result from the rapid rise in the demand for machined products. Increases in population and in the number of households, plus higher levels of personal disposable income, are expected to result in a large increase in the demand for consumer products, such as automobiles, heating and air-conditioning equipment, and household appliances, in the production of which machining is involved. Higher levels of corporate income and ris-

ing expenditures for industrial plant capacity should stimulate the demand for machine tools, engines, pumps, instruments, and other industrial equipment.

Employment of machining workers is not expected to expand as fast as the demand for machined products because technological developments will increase output per worker. For example, automated machining lines, in which machine tools are linked together for production operations, are being used increasingly. The cutting and feeding speeds of machine tools also are increasing. New processes that will be used more frequently in the future for metal removal include chemical and electrical milling, electrical discharge and ultrasonic machining, and machining by electron beams and lasers. The use of powdered metals and advances in metal forming, both of which significantly reduce the amount of machining necessary to produce a final product, also may gain more widespread application in the future.

Of all the technological changes that are expected to affect the future employment of workers in machining occupations, the greatest impact is expected to arise from the expanding application of numerically controlled machine tools. The use of numerically controlled machine tools broadly involves the following sequence of operations: Engineers or draftsmen translate part dimensions and tolerances, cutter shapes and sizes, cutting paths and sequences, and other data into numbers or codes representing numbers. These numbers are punched on tapes or cards which are inserted into electronic or mechanical devices that translate numbers into motions or actions, such as drilling or cutting. The machine tool operator simply installs the tool, inserts and removes the work-piece, and changes the tapes or cards.

The growing use of numerically controlled machine tools will limit the employment growth of some machining workers, particularly semiskilled operators. On the other hand, the more sophisticated applications of these machine tools will require some operators to have greater skill and knowledge of machining operations.



Numerically controlled machines increase efficiency of machine workers.

Earnings and Working Conditions

The earnings of skilled machining workers compare favorably with those of other skilled industrial workers. Tool and die makers and instrument makers are the highest paid workers in the machining group and are among the highest paid skilled workers in manufacturing. Earnings information for the individual machining occupations is presented later in this chapter.

Most machine shops are relatively clean and well lighted. Because they work with high speed machine tools and sharp cutting instruments, workers in these occupa-

tions need good safety habits. Persons working around machine tools are prohibited from wearing loose fitting clothing. They frequently wear safety glasses and other protective equipment.

Machining work usually is not physically strenuous. The machine tools do the actual cutting while the machining worker sets the machine, watches the controls, and checks the accuracy of the work. The workers, however, usually stand at their jobs most of the day and move about frequently.

Companies that employ machining workers generally provide paid holidays and paid vacations. Life insurance, hospitalization, medical and surgical insurance, sickness and accident insurance, and pensions also are often provided.

The great majority of workers in machining occupations are members of unions. Among the labor organizations in this field are 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, 2139 Wisconsin Ave. NW., Washington, D.C. 20007—whose members build a large percentage of all machine tools used in this country—will, on request, supply information on career opportunities in the Machine Tool Industry.

The National Tool, Die and Precision Machining Association, 1411 K St. NW., Washington, D.C. 20005, 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.

Many State employment service local offices 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, 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, 1200 15th St. NW., Washington, D.C. 20005.

ALL-ROUND MACHINISTS

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

Nature of the Work

The all-round machinist is a skilled worker who uses machine tools to make metal parts. A machinist can set up and operate most types of machine tools. His wide knowledge of shop practice and the working properties of metals, plus his understanding of what the various machine tools can accomplish, enable him to turn a block of metal into an intricate part meeting precise specifications.

Variety is the main characteristic of the work of an all-round machinist. He plans and carries through all operations needed in turning out machined products. He may switch frequently from the production of one kind of product to another. An all-round machinist selects the tools and material required for each job and plans the cutting and finishing operations in order to complete the finished work according to blueprint or written specifications. He makes standard shop computations relating to dimensions of work, tooling, feeds, and speeds of machining. He often uses precision-measuring instruments, such as micrometers and gages, to measure the accuracy of his work to thousandths or even millionths of an inch. After completing machining operations, he may finish the work by hand, using files and scrapers, and then assemble the finished parts with wrenches and screwdrivers. The all-round machinist may also "heat treat" cutting tools and parts to improve machinability.

Machinists employed in maintenance departments to make or repair metal parts of machines and

Machinist drills to close tolerance.

equipment also have a broad knowledge of mechanical principles. They sometimes adjust and test the parts they have made or repaired for a machine.

In plants that produce large numbers of metal products, some highly skilled machinists specialize in layout work. These specialists (layout men) mark specifications on metal so that machine tool operators can perform the proper machining operations.

Places of Employment

Almost every factory using a substantial amount of machinery employs all-round machinists to keep its mechanical equipment operating. Some all-round machinists work in the production departments of metal-working factories where large quantities of identical parts are produced; others work in machine shops where a limited number of varied products are made. Most all-round machinists work in the following industries: Machinery, including electrical; transportation equipment; fabricated metal products; and primary metals. Among the other industries employing substantial numbers of these workers are the railroad, chemical, food processing, and textile industries. The Federal Government also employs all-round machinists in Navy yards and other installations.

An important advantage of this occupation is that machinists can be employed in almost every locality and industry because their skills are required to maintain all types of machinery.

Training, Other Qualifications, and Advancement

According to most training authorities, a 4-year apprenticeship is the best way to learn the machinist trade. Many machinists, however, have qualified without an apprenticeship by learning the trade through years of varied experience in machining jobs. Some companies have training programs which qualify some of their employees as machinists in less than 4 years.

A young person interested in becoming a machinist should be mechanically inclined and temperamentally suited to do highly accurate work that requires concentration as well as physical effort. A high school or vocational school education, including courses in mathematics, physics, or machine shop training, is desirable. Some companies require their experienced machinists to take additional courses in mathematics and electronics, at company expense, so that they can service and operate the numerically controlled machine tools coming into greater use. 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. Shop training includes learning the operation of various types of machine tools. The apprentice also is taught chipping, filing, hand tapping, dowel fitting, riveting, and other hand operations. In the classroom, the apprentice studies blueprint reading, mechanical drawing, shop mathematics, and shop practices.

Numerous promotional oppor-

tunities are available to all-round machinists. Many advance to foreman of a section or to other supervisory jobs. Others who receive additional training may become tool and die makers or instrument makers. A skilled machinist has excellent opportunities to advance into other technical jobs in machine programing and tooling. Machinists also can open their own machine shops.

Employment Outlook

The number of all-round machinists is expected to increase slowly through the 1970's, as a result of the anticipated expansion of metalworking activities. (See discussion, p. 450.) However, most job openings will arise from the need to replace experienced machinists who transfer to other fields of work, retire, or die.

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 where machine tools often are linked together by transfer equipment. In such plants, a breakdown of one machine may stop many other machines.

Earnings and Working Conditions

The earnings of all-round machinists compare favorably with those of other skilled factory workers.

Maintenance machinists employed in various industries in 77 metropolitan areas surveyed in 1969–70 received average straight-time hourly earnings ranging from $2.89 in Greenville, S.C., to $4.86 in Detroit, Mich. Average straight-time hourly earnings of maintenance machinists employed in the following cities were:

Atlanta	$4.03
Birmingham	4.22
Chicago	4.49
Cincinnati	4.14
Detroit	4.86
Greenville	2.89
Houston	4.38
Los Angeles–Long Beach	4.53
Memphis	3.86
Milwaukee	4.76
Minneapolis–St. Paul	4.44
New York	4.47
Portland, Oreg.	4.50
Rockford, Ill.	3.85
San Francisco–Oakland	4.75
Worcester	3.85

Machinists must follow strict safety regulations when working around high-speed machine tools. The greater use of safety glasses and other protective devices in recent years has reduced the accident rate for these workers.

See introductory section of this chapter for a discussion of nonwage benefits received by machining workers, unions that organize these workers, and sources of additional information.

MACHINE TOOL OPERATORS

(D.O.T. 600.280; 601.280; 602.280 through .885; 603.280 through .885; 604.280 through .885; 605.280 through .885; and 606.280 through .885)

Machine tool operators shape metal to precise dimensions by the use of machine tools. Most operators can operate only one or two types of machine tools; some can operate several. Many operators are semiskilled machine tenders who perform simple, repetitive operations that can be learned quickly. Other operators, however, are skilled workers who can perform complex and varied machining operations.

A typical job of a semiskilled operator is to place rough metal stock in a machine tool on which the speeds and operation sequence have already been set by a skilled worker. The operator watches the machine and calls his supervisor when it is not functioning correctly. Special, easy-to-use gages help him to measure the work quickly and accurately. The operator who has limited training may make minor adjustments to keep his machine tool operating, but he depends on skilled machining workers for major adjustments.

Machine tool operator positions multiple spindle drilling machine.

The work of skilled machine tool operators usually is limited to a single type of machine and involves little or no hand fitting or 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 con-

trols, and selects the proper cutting instruments or tools for each operation. He must be able to use all the special attachments of his machine because adjustments during machining operations and changes in the setup may be required. Upon completing his work, he measures tolerance limits with micrometers, gages, and other precision-measuring instruments to see whether the work meets specifications. The skilled machine tool operator also may select cutting and lubricating oils used to cool metal and tools during machining operations.

Lathes, drill presses, boring machines, grinding machines, milling machines, and automatic screw machines are among the machine tools used by machine operators. 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

Machine tool operators are employed mainly in factories that manufacture fabricated metal products, transportation equipment, and machinery in large quantities. Skilled machine tool operators work in production departments, maintenance departments, toolrooms, and job shops. Because of their limited training, few semiskilled operators work in maintenance departments or in job shops.

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 learner 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 how long it takes to become a machine tool operator. Semiskilled machine tool operators generally learn their jobs within a few months. However, it usually takes 1½ to 2 years of on-the-job training and experience to become a skilled machine tool operator. Some skilled machine tool operators' jobs are filled by men who have completed machinists' apprenticeships. Some companies have formal training programs to acquaint new employees with the details of machine tool operation and machining practice.

Although there are no special educational requirements for semiskilled operator jobs, young persons seeking such jobs can improve their job opportunities by completing courses in mathematics and blueprint reading. In hiring beginners, employers often look for persons who have mechanical aptitude and some experience working with machinery.

Skilled machine tool operators can advance to jobs as all-round machinists and tool and die makers. They also may advance to jobs in machine programing and maintenance.

Employment Outlook

The number of machine tool operators is expected to show little change through the 1970's, despite the anticipated expansion of metalworking activities. (See discussion, p. 450.) However, tens of thousands of workers will be hired to replace experienced machine tool operators who transfer to other jobs, retire, or die.

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 the increasingly widespread use of numerically controlled machine tools will result in greater output per worker and tend to limit employment growth. (For the role of numerically controlled machines, see the discussion in the introductory section of this chapter under "Employment Outlook.") Other factors that may contribute to the slow growth in this occupation are the new processes that are becoming increasingly important in metal removal, such as chemical milling, electrical milling, electrical discharge and ultrasonic machining, and machining by electron beams and lasers. Advances in metal forming and the use of powdered metals also may limit employment growth since they reduce the amount of machining necessary to produce 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 hourly or incentive rates, or on the basis of a combination of both methods. In 40 selected metropoli-

tan areas surveyed in 1969–70 machine tool operators received straight-time hourly earnings ranging from $3.33 in Green Bay, Wis., to $4.87 in Detroit, Mich. Average straight-time hourly earnings of machine tool operators employed in the following cities were:

Boston	$3.79
Buffalo	4.48
Chicago	4.38
Cincinnati	4.36
Cleveland	4.24
Dallas	3.37
Detroit	4.87
Green Bay	3.33
Houston	3.76
Los Angeles–Long Beach	4.32
Milwaukee	4.63
New York	3.81
Pittsburgh	4.02
Portland, Oreg.	3.96
St. Louis	4.44
San Francisco–Oakland	4.60
Worcester	3.42

Machine tool operators are required to wear protective glasses and to avoid wearing loose-fitting garments when working around high speed machine tools. Increasing emphasis upon these and other safety regulations has reduced the accident rate for these workers.

See introductory section of this chapter for a discussion of nonwage benefits received by machining workers, unions that organize these workers, and sources of additional information.

TOOL AND DIE MAKERS

(D.O.T. 601.280, .281, .380, and .381)

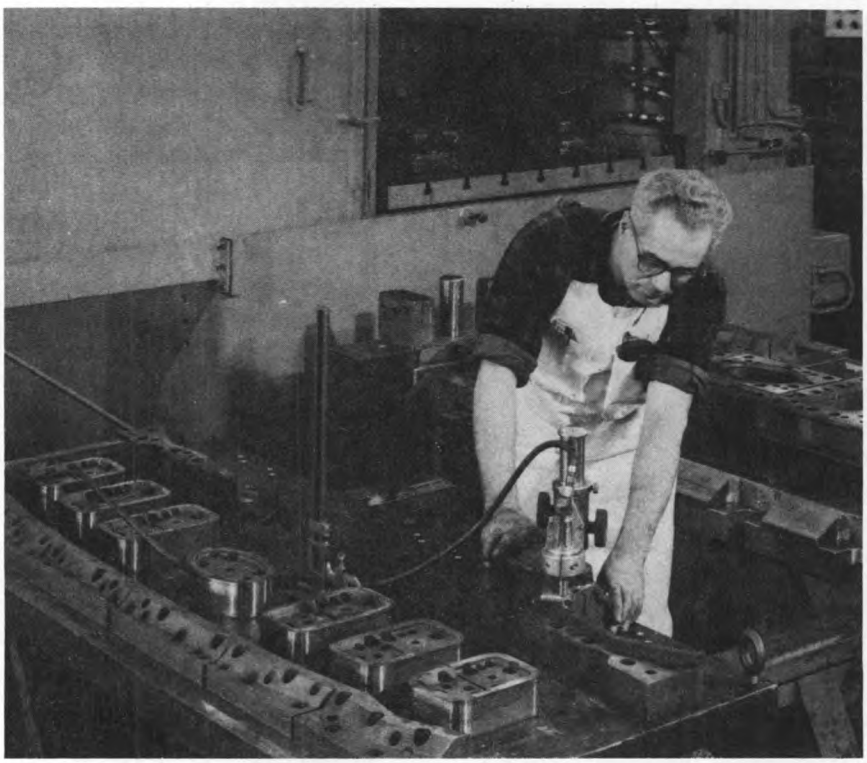
Nature of the Work

Tool and die makers are highly skilled, creative workers whose products—tools, dies, and special guiding and holding devices—are the basis of mass production in metalworking industries. Toolmakers specialize in producing jigs and fixtures (devices required to hold metal while it is being shaved, stamped, or drilled). They also make gages and other measuring devices that are used in manufacturing precision metal parts. Die makers construct metal forms (dies) which are used in stamping and forging operations to shape metal. They also make metal molds used in diecasting and in molding plastics. Tool and die makers also repair worn or damaged dies, gages, jigs, and fixtures. Some tool and die makers help design tools and dies.

In comparison with most other machining workers, tool and die makers have a broader knowledge of machining operations, shop practices, mathematics, and blueprint reading, and can work to closer tolerances and do more precise handwork. Tool and die makers use almost every type of machine tool and precision-measuring instrument. They work with all metals and alloys commonly used in manufacturing and must be familiar with the machining properties of these various metals.

Places of Employment

The largest numbers of tool and die makers are employed in plants producing manufacturing, construction, and farm machinery and equipment. The automobile, aircraft, and other transportation equipment industries also employ large numbers of tool and die makers. Several thousand of these



Tool and die maker finishes die with grinding wheel.

craftsmen work in small tool and die jobbing shops, making tools, dies, and other machine tool accessories for use in metalworking factories. Companies manufacturing electrical machinery and fabricated metal products are other important employers of tool and die makers. Many nonmetalworking industries also employ them.

Training, Other Qualifications, and Advancement

Tool and die making requires several years of varied training and experience which can be obtained through formal apprenticeship or equivalent on-the-job training. Since this work is highly skilled, persons planning to enter the trade should have a good working knowledge of mathematics and physics as well as considerable mechanical ability, finger dexterity, and an aptitude for doing very 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.

A tool and die apprenticeship ordinarily lasts 4 or 5 years. Most of the time is devoted to practical shop training, which includes learning how to use the drill press, milling machine, lathe, grinder, and other machine tools. The apprentice also learns inspection work plus the use of handtools in fitting and assembling tools, gages, and other mechanical equipment. Tool and die maker apprentices study heat treating and other metalworking processes. Classroom training is becoming increasingly important and includes shop mathematics, shop theory, mechanical drawing, tool designing, and blueprint reading. After apprenticeship, several years' experience often is necessary to qualify for more difficult tool and die work. Some companies have separate apprenticeship programs for toolmaking and die making.

Many metal machining workers have become tool and die makers without completing formal apprenticeships. After acquiring years of experience as skilled machine tool operators or as machinists plus additional classroom training, these men have developed into all-round workers who can skillfully perform tool and die making.

The increasing complexity of modern machinery and metalworking equipment is raising the technical requirements for tool and die making. A knowledge of mathematics, the basic sciences, electronics, and hydraulics will give young persons entering this occupation greater opportunities to advance their careers.

Men who have had tool and die training often advance to supervisory and administrative positions in industry. Many tool and die makers become tool designers. Some open their own tool and die shops.

Employment Outlook

Employment of tool and die makers is expected to increase slowly through the 1970's. However, most job opportunities will become available as experienced tool and die makers transfer to other fields of work, retire, or die.

The anticipated long-range expansion in the machinery, electrical equipment, transportation equipment, and other metalworking industries will result in a continued need for tool and die makers to make the tools and dies used to produce the large numbers of identical metal parts required in these industries. They also will be needed to help put many technological developments into effect. However, the expanding use of electrical-discharge machines and numerical control machines has significantly changed tool making processes. Numerically controlled machining operations require fewer of the special tools and jigs and fixtures that are made by tool and die makers. In addition, numerically controlled machines could replace many of the conventional machines now used in manufacturing tools, jigs, and fixtures, thus increasing output per tool and die maker.

Tool and die makers, as a group, have a longer working life than many other workers in the labor force. Their jobs require extensive skill and knowledge that can be acquired only after many years of experience. For this reason, companies are reluctant to lay off tool and die makers, even when production is decreased. Tool and die makers also have greater occupational mobility than other less skilled workers. They can transfer to jobs as instrument makers or machinists.

Earnings and Working Conditions

Tool and die makers are among the highest paid machining workers. Those employed in various industries in 66 metropolitan areas surveyed in 1969–70 were paid average straight-time hourly earnings ranging from $3.45 in Chattanooga, Tenn., to $5.29 in San Francisco–Oakland and San Jose, Calif. Straight-time hourly earnings of tool and die makers employed in the following cities were:

Atlanta	$4.55
Baltimore	4.33

Birmingham	3.66
Boston	4.13
Buffalo	4.63
Chattanooga	3.45
Chicago	4.84
Cleveland	4.51
Dallas	4.26
Detroit	5.08
Houston	4.03
Los Angeles–Long Beach	4.71
Milwaukee	4.89
Minneapolis–St. Paul	4.48
Newark–Jersey City	4.36
New York	4.35
Philadelphia	4.19
St. Louis	4.86
San Francisco–Oakland	5.29
San Jose	5.29
Worcester	3.62

See introductory section of this chapter for a discussion of nonwage benefits received by machining workers, unions that organize these workers, and sources of additional information.

INSTRUMENT MAKERS (MECHANICAL)

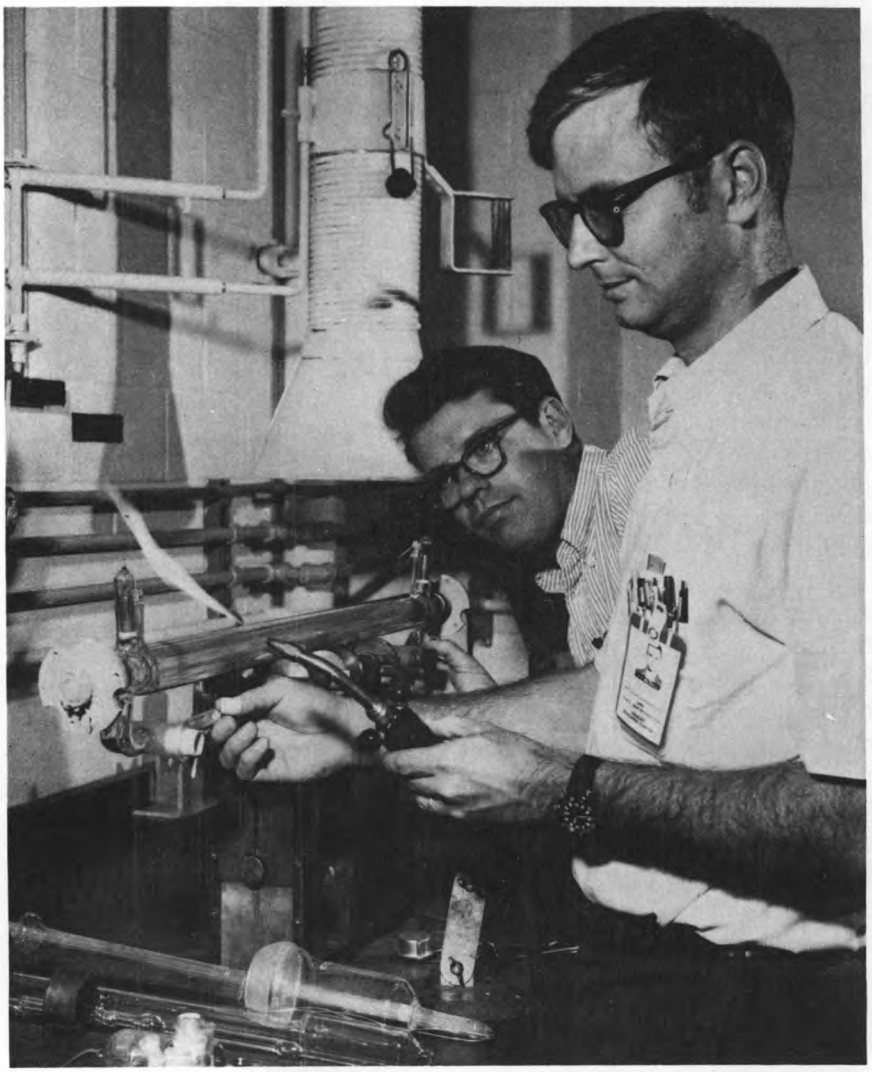
(D.O.T. 600.280)

Nature of the Work

The expanding use of instruments in production, research, development, and testing work is making the work of the instrument maker increasingly important. Instrument makers (also called experimental machinists and modelmakers) work closely with engineers and scientists in translating designs and ideas into experimental models, special laboratory equipment, and custom instruments. They also modify existing instruments for special purposes. Experimental devices constructed by these craftsmen are used, for example, to regulate heat, measure distance, record earthquakes, and control industrial processes. The mechanical instrument parts and models made by these workers range from simple gears to intricate parts of navigation systems used in guided missiles.

Instrument makers fabricate metal parts by operating machine tools, such as lathes and milling machines, and by using 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, profilometers, and dial indicators, as well as standard optical measuring instruments.

Instrument makers work from rough sketches, verbal instructions, or ideas, as well as detailed blueprints. Thus, in making parts, they frequently use considerable imagination and ingenuity. Instrument makers sometimes work on parts that must not vary from specifications by more than ten millionths of an inch. To meet these standards,



Instrument maker constructs glass part for scientific instrument.

they commonly use special equipment or precision devices, such as the electronic height gage, which are used only infrequently by other machining workers. They also work with a variety of materials, including plastics and rare metals such as titanium and rhodium.

An instrument maker may construct instruments from start to finish—making and assembling all the parts and testing finished instruments for proper operation. However, in large shops or where electrical or electronic components are to be incorporated into an instrument, they frequently work with other instrument makers, such as electronic specialists, each making a part of a complicated instrument.

Because they usually work on their own and have highly developed manual skills and reasoning abilities, instrument makers have considerable prestige among their fellow employees.

Places of Employment

Many instrument makers are employed by firms which manufacture instruments. Research and development laboratories also employ instrument makers to make the special devices required in scientific research. The Federal Government employed several thousand instrument makers in 1970.

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.

Most instrument makers learn their trade through apprenticeships which generally last 4 or 5 years. A typical 4-year instrument maker apprenticeship program consists of approximately 8,000 hours of shop training and about 570 hours of related classroom instruction. The apprentice's 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, electronics, and fundamental instrument design. The apprentice must learn enough shop mathematics to plan his work and use handbook 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 studied 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 and almost always 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. He must understand the principles of the instrument's operation. Because of the nature of his work, the instrument maker has to be very conscientious and take considerable pride in creative work.

As the instrument maker's skill improves and as he broadens his knowledge, he may advance to increasingly responsible positions. Up to 10 years' experience is required to rise to the top skill level of instrument making. 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

The employment of instrument makers is expected to increase rapidly through the 1970's, as a result of anticipated expansion of metalworking activities and the growing use of instruments in manufacturing processes and research and development work. (See discussion, p. 450.) However, this occupation is relatively small and few openings will result in any one year.

Growing numbers of instrument makers will be needed to make models of new instruments that may be mass-produced in the future, and also to make custom or special purpose instruments that are not needed in large numbers. Many devices made by these craftsmen will

be needed in the expanding field of industrial automation. Also, many new precision instruments, which will be even more versatile and sensitive than those in current use, can be expected to emerge from growing research and development programs of universities, Government agencies, private laboratories, and manufacturing firms.

Earnings and Working Conditions

Earnings of instrument makers compare favorably with those of other highly skilled metalworkers. In 1970, instrument makers generally earned between $3.50 and $5.30 an hour for a standard workweek.

Instrument shops usually are clean and well lighted. Room temperatures usually are controlled in shops where precision measuring instruments are used. Instrument assembly rooms are usually clean and are sometimes known as "White Rooms," where almost sterile conditions are maintained.

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

See introductory section of this chapter for a discussion of nonwage benefits received by machining workers, unions that organize these workers, and sources of additional information.

SETUP MEN (MACHINE TOOLS)

(D.O.T. 600.380; 604.280 and .380; 605.380; and 619.380)

Nature of the Work

The setup man, often called a machine tool job setter, is a skilled specialist employed in plant and machine shops that do machining in large volume. His main job is to set up machine tools—that is, to get machine tools ready for use by semiskilled operators. He also may explain to these workers the operations to be performed, and show them how to check the accuracy of their work. Usually a setup man is assigned a number of machine tools which often are of one type, such as turrent lathes. However, he may set up several different kinds, such as milling machines and automatic screw machines. 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. The setup man may make additional adjustments later to maintain standardized production.

Setup man prepares jig borer.

Places of Employment

Most setup men are employed in factories that manufacture fabricated metal products, transportation equipment, and machinery. These workers usually are employed by large companies that employ many semiskilled machine tool operators. They usually are not employed in maintenance shops or in small jobbing shops.

Training and Other Qualifications

To become a setup man, a worker usually must qualify as an all-round machinist or skilled machine tool operator. A setup man must be thoroughly trained in the operation of one or more kinds of machine tools. He must read blueprints and make computations in selecting speeds and feeds for machine tools. The ability to communicate clearly is important since he must explain to a semiskilled machine tool operator how to perform machining operations and how to check machining accuracy. Above all, a setup man must be skilled in selecting the sequence of operations so that metal parts will be made exactly to specifications. Openings for setup men

usually are filled from within a shop by promotion or reassignment.

Employment Outlook

Employment of setup men is expected to increase moderately through the 1970's, as a result of the anticipated expansion of metalworking activities. Additional job opportunities will arise from the need to replace experienced setup men who retire, die, or transfer to other fields of work.

The use of numerically controlled machine tools may change the duties of setup men. In the future, setup men may only preset tools, instruct operators, and check the first few parts that are produced. Since setup men are skilled workers, their chances for advancement or transfer into other jobs, such as parts programmer, will remain good.

Earnings and Working Conditions

The earnings of setup men compare favorably with those of other skilled machining workers. In 1970, setup men generally earned between $3 and $5 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 which have sharp-cutting instruments when he makes the trial runs to test the accuracy of the setup.

See the introductory section of this chapter for a discussion of non-wage benefits received by machining workers, unions that organize these workers, and sources of additional information.

MECHANICS AND REPAIRMEN

Mechanics and repairmen—the skilled workers who keep our automobiles, airplanes, industrial machinery, household appliances, and similar equipment operating properly—make up one of the fastest growing occupational groups in the Nation's labor force. This occupational field offers a variety of career opportunities to young men who are mechanically inclined and are willing to invest a few years in learning a trade.

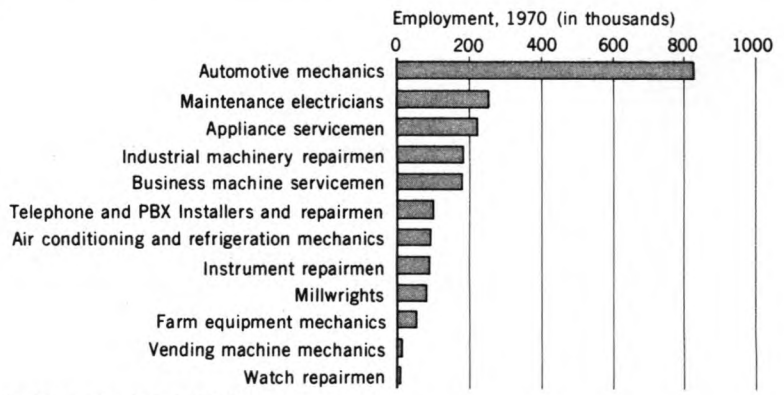
Employment of mechanics and repairmen totaled nearly 2.8 million in 1970. More than one-third (840,000) of these were automotive mechanics, such as automobile mechanics, truck or bus mechanics, and automobile body repairmen. Other large occupations—each employing more that 100,000 workers—were appliance servicemen, business machine servicemen, industrial machinery repairmen, aircraft mechanics, and television and radio service technicians. (See Chart 27) Employment in some occupations, including vending machine mechanic, electric sign serviceman, bowling-pin-machine mechanic and X-ray equipment serviceman, was relatively small.

In addition to the nearly 2.8 million mechanics and repairmen employed in 1970, about 450,000 workers were employed in four mechanics and repairmen related occupations: maintenance electrician, telephone repairman, millwright, and watch repairman. Altogether, these 3.2 million maintenance and repair workers represented about 3 out of every 10 skilled workers.

Nearly 30 percent of the mechanics and repairmen were employed in manufacturing industries, and the majority of these were employed in plants that produce durable goods such as transportation equipment, machinery, primary metals, and fabricated metal products. About 20 percent of the mechanics and repairmen were employed in retail trade—mainly by firms that sell and service automobiles, household appliances, farm equipment, and other mechanical equipment. Another 20 percent were employed in shops that specialize in servicing such equipment. Most of the remaining mechanics and repairmen were employed in the transportation, construction, and public utilties industries, and by Government at all levels.

Most employment opportunities for mechanics and repairmen occur in the more populous and industrialized States. About half of them work in eight states: California, New York, Pennsylvania, Texas, Illinois, Ohio, Michigan, and New Jersey.

(27) **Employment in selected maintenance and repair occupations**



*INCLUDES CENTRAL OFFICE CRAFTSMEN.
SOURCE: BUREAU OF LABOR STATISTICS

Training, Other Qualifications, and Advancement

Many mechanics and repair men learn their skills on the job or through apprenticeship training. Some acquire their basic training in vocational and technical school, or attend such schools to increase their skills. Others qualify by taking correspondence courses. Training and experience in the armed services also may help young men prepare for occupations such as aircraft mechanic and television and radio serviceman.

Many employers consider a formal apprentice training program to be the best way to learn skilled maintenance and repair work. An apprenticeship consists of about 3 to 4 years of paid on-the-job training, supplemented each year by at least 144 hours of related classroom instruction. Formal apprenticeship agreements are registered with a State apprenticeship agency or the U.S. Department of Labor's Bureau of Apprenticeship and Training.

Employers look for applicants who have mechanical aptitude and manual dexterity. Many employers prefer people whose hobbies or interests include automobile repair, model building, or radio and televi-

sion repair. A high school education often is required for employment. Employers also favor applicants who have had courses in mathematics, chemistry, physics, blueprint reading, and machine shop. Generally, apprentice applicants and other trainees are required to be at least 18 years old and in good health.

Physical requirements for work in this field vary greatly. For example, a millwright should be strong and agile, since he may need to climb ladders, lift heavy equipment, and work in awkward positions in cramped spaces. On the other hand, instrument and watch repairmen need patience, finger dexterity, and good vision. Persons with certain physical handicaps can repair watches.

Workers in most maintenance and repair occupations have several avenues of advancement. Some move into a supervisory position, such as foreman, maintenance manager, or service manager. Specialized training prepares others to advance to sales, technical writing, and technician jobs. Substantial numbers of servicemen have opened their own businesses.

Employment Outlook

Employment in maintenance and repair occupations as a whole is expected to increase moderately through the 1970's. Job openings resulting from employment growth, deaths, and retirements are expected to average more than 130,000 a year during this period. Additional job openings will result as experienced workers transfer to other occupations. Automobile mechanics, business machine servicemen, maintenance electricians, appliance servicemen, aircraft mechanics, industrial machinery repairmen, instrument repairmen, and television and radio service technicians will find many employment opportunities.

Many factors are expected to contribute to the growing demand for mechanics and repairmen. The anticipated rise in expenditures for new plant and equipment will result in more mechanization and the use of more complex machinery and equipment in many industries. Greater research and development expenditures probably will yield new and, in many cases, more complex products for use by industry and consumers. Growing numbers of household and higher levels of personal spendable income will contribute to an increased demand for household appliances, automobiles, lawnmowers, boats, and other items that mechanics and repairmen service.

In the future, applicants for maintenance and repair jobs will have to meet higher standards of performance to maintain and repair the increasingly complex equipment coming into general use. Young persons who acquire a good basic education (including courses in mathematics and science), as well as thorough job training, will be prepared better than other applicants to compete for the higher paying jobs that are likely to be available.

This chapter includes statements on the following maintenance and repair workers: Air-conditioning, refrigeration, and heating mechanics; appliance servicemen; bowling-pin-machine mechanics; automobile body repairmen; automobile mechanics; business machine servicemen; diesel mechanics; electric sign servicemen; farm equipment mechanics; industrial machinery repairmen; instrument repairmen; maintenance electricians; millwrights; motorcycle mechanics; television and radio service technicians; truck and bus mechanics; vending machine mechanics; and watch repairmen. Other maintenance and repair workers are discussed in other chapters in the *Handbook*. For example, aircraft mechanics are discussed in Civil Aviation Occupations and telephone and PBX installers and repairmen in Occupations in the Telephone Industry.

AIR-CONDITIONING, REFRIGERATION, AND HEATING MECHANICS

(D.O.T. 637.281 and .381; 862.281 and .381; and 869.281)

Nature of the Work

Air-conditioning, refrigeration, and heating mechanics work on cooling and heating equipment used in homes, offices, schools, and other buildings. Major occupations in this fields are air-conditioning and refrigeration mechanic, furnace installer, oil burner mechanic, and gas burner mechanic. Many workers are skilled in more than one of these trades. This statement does not cover mechanics who work on railroad, truck, automotive, or marine air-conditioning and refrigeration equipment.

Air-conditioning and refrigeration mechanics (D.O.T. 637.281 and .381) install and repair equipment ranging in size from small window air-conditioners to large central-plant type air-conditioning or refrigeration systems. When installing new equipment, the mechanic puts the motors, compressors or absorption equipment, evap-

orators, and other components in place, following blueprints and design specifications. He connects duct work, refrigerant lines, and other piping and then connects the equipment to an electrical power source. After completing the installation, he charges the system with refrigerant and checks it for proper operation.

When air-conditioning and refrigeration equipment breaks down, the mechanic diagnoses the cause and makes the necessary repairs. When looking for defects, he may inspect components such as relays and thermostats. Tools and equipment used include electric drills, pipe cutters and benders, acetylene torches, and testing devices such as refrigerant gages and ammeters.

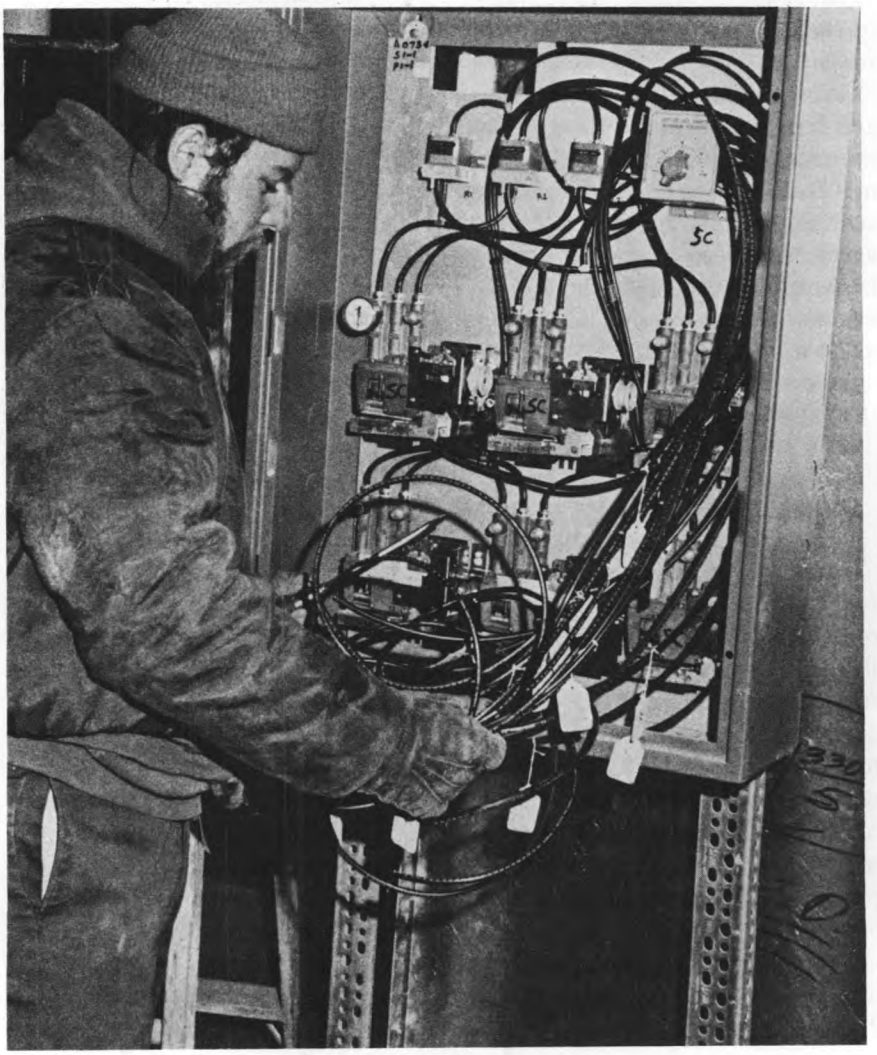
Furnace installers (D.O.T. 862.381 and 869.281), also called heating equipment installers, follow blueprints or other specifications to install oil, gas, and electric heating units. After setting the heating unit in place, they install fuel pipes, air ducts, pumps, and other components. They then connect electrical wiring and controls, and check the unit for proper operation.

Oil burner mechanics (D.O.T. 862.281) keep oil-fueled heating systems in good operating condition. During the fall and winter, they service and adjust oil burners and oil-fueled heating systems. The mechanic determines the reason a burner is not operating properly by checking the thermostat, burner nozzles, controls, and other parts. The mechanic may carry a large stock of replacement parts in his truck to make repairs in the customer's home or business. However, if major repairs are necessary, he usually completes the work in the repair shop. During the summer the mechanic services heating units, replaces oil and air filters, and vacuum cleans vents, ducts, and other parts of the heating system that accumulate soot and ash.

Gas burner mechanics (D.O.T. 637.281), also called gas appliance servicemen, have duties similar to those of oil burner mechanics. They diagnose malfunctions in gas-fueled heating systems and make necessary repairs and adjustments. They also may repair cooking stoves, clothes dryers, and hot water heaters. During the summer mechanics employed by gas utility companies may inspect and repair gas meters.

Furnace installers, oil burner mechanics, and gas burner mechanics use a variety of tools, including hammers, wrenches, metal snips, electric drills, pipe cutters and benders, and acetylene torches. They also use testing devices such as vacuum gages, volt meters, air velocity meters, and electronic circuit testers.

Cooling and heating systems sometimes are installed or repaired by craftsmen other than the mechanics discussed here. For example, on a large air-conditioning installation job, especially where workers are covered by union-management contracts, duct work might be done by



sheet-metal workers; electrical work by electricians; and installation of piping, condensers, and other components by pipefitters. Appliance servicemen often install and repair window air conditioners. Additional information about appliance servicemen appears elsewhere in the *Handbook*.

Places of Employment

An estimated 115,000 air-conditioning, refrigeration, and heating mechanics were employed in 1970. These mechanics worked mainly for dealers and contractors who specialize in selling and servicing cooling and heating equipment; construction companies; fuel oil dealers; and gas utility companies. Air-conditioning and refrigeration mechanics, as well as furnace installers, were employed primarily by cooling and heating dealers and contractors. Fuel oil dealers employ most oil burner mechanics, and gas utility companies employ most gas burner mechanics.

Air-conditioning and refrigeration mechanics, and furnace installers are employed in all parts of the country. Generally, the geographic distribution of these workers is similar to that of our population. The employment of oil burner mechanics is concentrated in States where oil is a major heating fuel. More than half of these workers are employed in New York, Masachusetts, Pennsylvania, New Jersey, Connecticut, and Illinois. Similarly, the employment of gas burner mechanics is concentrated in States where gas is a major heating fuel. More than half of these workers are employed in California, Texas, Ohio, Illinois, Michigan, Pennsylvania, and New York.

Training, Other Qualifications, and Advancement

Most air-conditioning, refrigeration, and heating mechanics start as helpers and acquire their skills by working for several years with experienced mechanics. Beginners perform simple tasks, such as insulating refrigerant lines or cleaning furnaces. As helpers gain experience, they are given progressively more complicated tasks such as installing pumps and burners and checking circuits.

A growing number of employers prefer high school graduates who have had courses in mathematics, physics, and blueprint reading. Mechanical aptitude and an interest in electricity also are important qualifications. A good physical condition helps in lifting and moving heavy equipment.

Many high school and vocational schools cooperate with local employers and organizations such as the Air-Conditioning and Refrigeration Institute and the National Oil Fuel Institute in offering basic mechanics courses. These courses may last from 2 to 3 years and consist of on-the-job training and classroom instruction. In 1970, unemployed and underemployed workers were trained in programs lasting up to a year in many cities under the Manpower Development and Training Act. Additional on-the-job training and experience is needed to qualify these students as skilled mechanics.

Apprenticeship programs for pipefitters, electricians, and sheet-metal workers often include training in air-conditioning, refrigeration, and heating. Journeymen in these trades may specialize in installing and maintaining air-conditioning, refrigeration, and heating equipment. Additional information about these trades appears elsewhere in the *Handbook*.

Employment Outlook

Employment of air-conditioning, refrigeration, and heating mechanics is expected to increase very rapidly through the 1970's. In addition to the anticipated employment growth, a few thousand job openings will arise annually to replace experienced mechanics who retire or die. Openings also will occur as experienced mechanics transfer to other occupations.

Most new openings will be for air-conditioning and refrigeration mechanics. Anticipated increases in household formations and rising personal incomes indicate a very rapid increase in the number of air-conditioned homes. Air-conditioning in offices, stores, hospitals, schools, and other nonresidential buildings also is expected to increase. In addition, more refrigeration equipment will be needed in the production, storage, and marketing of food and other perishables.

Employment of furnace installers and gas burner mechanics is expected to follow the rapid growth trends in the construction of homes and businesses. However, these workers may experience some competition for jobs as a result of the small but rapidly growing number of electrically heated homes and businesses. Electric heating systems usually are installed and serviced by electricians.

Employment of oil burner mechanics is expected to remain fairly stable during the 1970's, since relatively few new homes are being built with oil heating systems. Nevertheless, employment opportunities for oil heating mechanics will occur

as experienced mechanics retire, die, or transfer to other occupations.

Earnings and Working Conditions

Earnings data for air conditioning, refrigeration, and heating mechanics are not available on a national basis. In 1970, however, several employers indicated that straight-time hourly rates for skilled mechanics ranged from about $3.25 to $7. Skilled mechanics generally earned between two and three times as much as inexperienced helpers. Rates of pay for helpers and mechanics depended on factors such as level of skill, type of equipment worked on, and geographic area. For example, mechanics who worked on both air-conditioning and heating equipment frequently had higher rates of pay than those who worked on only one type of equipment.

Wage rates may range considerably higher for electricians, pipefitters, and sheet-metal workers who are employed by construction firms specializing in air-conditioning, refrigeration, and heating work. Union minimum hourly rates for journeymen construction electricians, pipefitters, and sheet-metal workers averaged $6.82, $6.93, and $6.75, respectively, on July 1, 1970. (See individual statements on these trades for additional wage information.)

Most mechanics work a 40-hour week. However, during seasonal peaks they often work overtime or irregular hours. Air-conditioning and refrigeration mechanics are busiest during spring and summer. Oil burner mechanics and gas burner mechanics are busiest during fall and winter. Most employers try to provide their mechanics with a full workweek the year round, but they may temporarily reduce their hours of work or lay off some of them when seasonal peaks end. However, employment in most shops that install and service both air-conditioning and heating equipment is fairly stable throughout the year.

Mechanics sometimes are required to work at great heights when installing new equipment. They also may work in awkward or cramped positions to reach motors or other parts of the equipment they are repairing. Common hazards in this trade include electrical shock, torch burns, muscle strains, and other injuries that may result from handling heavy equipment.

Sources of Additional Information

Information about employment opportunities for air-conditioning, refrigeration, and heating mechanics can be obtained from the local office of the State employment service, as well as firms that employ these workers. The State employment service also may be a source of information about training opportunities available under the Manpower Development and Training Act, apprenticeship, and other training programs.

Information about advanced training in air-conditioning and refrigeration may be obtained from the Refrigeration Service Engineers Society, 433 North Waller Ave., Chicago, Ill. 60644.

Information about oil heating systems training may be obtained from the Education Department, National Oil Fuel Institute, 60 East 42nd St., New York, N.Y. 10017, or its local or State organization.

General information about gas burner mechanics may be obtained from the American Gas Association, Inc., 605 Third Ave., New York, N.Y. 10016.

APPLIANCE SERVICEMEN

(D.O.T. 637.281, 723.381, and 827.281)

Nature of the Work

Appliance servicemen repair appliances that range from small, relatively uncomplicated items such as toasters and irons, to large appliances that may have complex control systems, such as refrigerators and automatic washing machines. To repair appliances, the serviceman first determines why they are not operating properly and then installs new parts, repairs parts, or makes adjustments. Appliance servicemen usually specialize in the repair of either electric or gas appliances, and in the case of large appliances, specialize in the repair of a single type, such as clothes washers and dryers, refrigerators, freezers, or dishwashers.

To determine why an appliance is not operating properly, servicemen may ask customers how the appliance performed when it was used previously. They may operate an appliance to detect unusual noises; overheating; excess vibration; and broken, worn, or loose parts. Servicemen also look for common sources of trouble such as faulty gas, electric, and fluid lines and connections. To check electric and gas systems, they use special tools and testing devices, including ammeters, ohmmeters, voltmeters, and manometers, combustion test equipment, and vacuum and pressure gages.

After servicemen determine why

an appliance is not operating properly, they make the necessary repairs and adjustments. This work frequently involves replacing parts that receive extra wear, such as electric cords on small appliances, or cleaning parts such as the lint filters in clothes dryers. To remove old parts and install new ones, servicemen use common handtools, including screwdrivers and pliers, and may use special wrenches and other handtools designed for use on particular appliances.

Most refrigerators and other large appliances are repaired in the customers' homes. However, if major repairs are necessary, the appliance is removed to a repair shop. Small appliances usually are brought to a repair shop by the customer.

An important part of the work of most appliance servicemen is personal contact with customers. They answer customers' questions and complaints about appliances and frequently advise customers about their care and use. For example, they may demonstrate to housewives the proper loading of automatic washing machines or how to arrange dishes in dishwashers.

Appliance servicemen have variety in their work. They may drive light trucks or automobiles, some equipped with two-way radios. They may give estimates to customers on the cost of repair jobs, and usually keep records of parts used and hours worked on each repair job.

Places of Employment

An estimated 220,000 appliance servicemen were employed throughout the country in 1970, mostly in independent repair shops and service centers of retail establishments such as department and appliance stores. Other were employed in service centers operated by appliance manufacturers and wholesale distributors of appliances and by gas and electric utility companies.

Appliance servicemen are employed in almost every community. Most servicemen, however, are employed in the more highly populated States and metropolitan areas.

Training, Other Qualifications, and Advancement

Appliance servicemen usually are hired as helpers and acquire their skills through on-the-job training and work experience. Inexperienced men are given relatively simple work assignments. In some companies, they work for the first few months helping to install appliances in homes, driving service trucks, and learning street locations. In other companies, they begin to learn the skills of appliance servicemen by working in the shop where they rebuild used parts such as washing machine transmissions. Trainees gradually learn how motors, gears, and other appliance parts operate. They progress from simple repair jobs, such as replacing a switch, to more difficult jobs such as adjusting automatic washing machine controls. In addition to practical experience on the job, trainees frequently receive classroom instruction given by appliance manufacturers and local distributors. Many trainees take correspondence courses in basic electricity and electronics or attend technical schools to increase their skills in appliance repair.

Trainees usually are supervised closely for 6 to 12 months. By this time, most gas-appliance servicemen can repair several kinds of appliances on their own, and they may be given responsibility for their own service trucks and for appliance parts and tools. Electrical-appliance servicemen usually need up to 3 years' on-the-job experience to become fully qualified. Many experienced servicemen attend training classes (often on company time) and study service manuals to become familiar with new appliances and the best ways to repair them.

Appliance servicemen must understand, in a practical way, how to use equipment that measures electricity and how to use measurements to determine whether electrical currents in appliances are flowing properly. A knowledge of wiring diagrams that show electrical connections and current flow between appliance parts also is important. A knowledge of electronics is necessary to perform some appliance repair jobs.

Programs to train unemployed and underemployed workers for entry jobs in the appliance service field were operating in many cities

in 1970 under the Manpower Development and Training Act. These programs lasted from several weeks to a year; most lasted longer than 5 months. Through additional training and experience, graduates of these programs can eventually become skilled servicemen.

Employers prefer applicants having good mechanical aptitude, particularly high school and trade school graduates who have had courses in electricity, mathematics, and science. Some employers, in cooperation with local high schools and trade schools, provide students with an opportunity to gain practical experience by working part-time in appliance repair shops while attending school. Additional on-the-job training and work experience after graduation can qualify these students as skilled appliance servicemen.

Appliance servicemen who work in large repair shops or service centers and show technical proficiency may be promoted to foreman, assistant service manager, or service manager. Preference is given to men who also have shown ability to cooperate with other servicemen and with customers. A general knowledge of bookkeeping and other subjects related to managing a business is helpful. Experienced servicemen who have sufficient funds may open their own appliance sales or repair shops.

Servicemen who work for appliance manufacturers may become instructors, who teach servicemen to repair new models of appliances, or technical writers, who prepare service manuals. A few servicemen may advance to managerial positions such as regional service or parts manager.

Employment Outlook

Employment of appliance servicemen is expected to grow rapidly through the 1970's. In addition to opportunities resulting from growth, thousands of opportunities will arise annually to replace experienced servicemen who retire, die, or transfer to other kinds of work.

The number of household appliances in use is expected to increase rapidly during the 1970's. Factors that will contribute to the demand for appliances include increasing population and family formations; rising levels of personal income; introduction of new appliances; and improved styling to make existing models more attractive and easier to operate. In addition, more widespread use of appliances such as electric can openers, waste disposers, home clothes dryers, dishwashers, and knife sharpeners is expected.

Employment of appliance servicemen is not expected to increase as rapidly as the number of appliances in use. Although the automatic operation of some types of appliances has tended to make them more complicated, manufacturers are designing appliances with more durable components, and appliances that can be taken apart and repaired more easily. In addition, employers are increasing the efficiency of servicemen through more effective training.

Earnings and Working Conditions

National earnings data are not available for appliance servicemen. However, wage data obtained from a large number of employers and union-management contracts in 1970 indicated that most experienced servicemen earned more than $3 and some earned as much as $5.30. Inexperienced helpers generally start at $2 to $3 an hour. The wide variations in wage rates for servicemen and their helpers reflect differences in type of employer, geographical location of the job, the type of equipment serviced, and skill levels. Many appliance servicemen work more than 8 hours a day and receive higher rates of pay for overtime. Most appliance servicemen receive paid vacations, sick leave, health insurance, and other employee benefits, as well as credit toward retirement pensions.

Appliance repair shops are relatively quiet, well lighted, and adequately ventilated. When repairing small appliances, servicemen usually sit at benches. Working conditions outside the shop vary considerably. Servicemen sometimes work in narrow spaces, uncomfortable positions, and places that are not clean. Servicemen who repair large appliances may spend several hours a day driving between customers' homes.

Appliance repair work generally is safe, although accidents are possible while the serviceman is driving, handling electrical parts, or lifting or moving large appliances. Inexperienced men are shown how to use tools safely and instructed in simple precautions against electric shock.

The work of appliance servicemen often is performed with little direct supervision. This feature of the job appeals to many people.

Sources of Additional Information

Further information about jobs in the appliance service field may be obtained from local appliance repair shops, appliance dealers, gas and electric utility companies, appliance manufacturers, and local offices of

the State employment service. Local vocational schools that offer courses in appliance servicing, electricity, and electronics can provide helpful information about training. The State employment service also may provide information about the Manpower Development and Training Act and other programs that provide training opportunities.

Information about training programs or work opportunities in this field also may be obtained from:

Association of Home Appliance Manufacturers, 20 North Wacker Drive, Chicago, Ill. 60606.

National Appliance and Radio–TV Dealers Association, 318 W. Randolph St., Chicago, Ill. 60601.

Gas Appliance Manufacturers Association, 1901 North Fort Myer Drive, Arlington, Va. 22209.

AUTOMOBILE BODY REPAIRMEN

(D.O.T. 807.381)

Nature of the Work

Automobile body repairmen are skilled craftsmen who repair damaged motor vehicles by straightening bent frames, removing dents from fenders and body panels, welding torn metal, and replacing badly damaged parts. Body repairmen usually are qualified to repair all types of vehicles, although most work mainly on automobiles and small trucks. Some specialize in repairing large trucks, buses, or truck trailers.

Before making repairs, body repairmen generally receive instructions from their supervisors, who determine which parts are to be restored or replaced, and who estimate the amount of time the repairs should take. When repairing damaged fenders and other body parts, the body repairman may first remove body hardware, window operating equipment, and trim in order to gain access to the damaged area. To reshape the metal, he may push large dents out with a hydraulic jack or hand prying bar, or knock them out with a hand tool or pneumatic hammer. He smoothes remaining small dents and creases by holding a small anvil against one side of the damaged area while hammering the opposite side. Very small pits and dimples are removed from the metal by pick hammers and punches.

The body repairman may remove badly damaged sections of body panels with a pneumatic metalcutting gun or acetylene torch, and weld in new sections. If the damage tears the metal, he welds the torn edges. He shrinks stretched metal by repeatedly heating the area with an acetylene torch and striking it with a hammer to restore the metal's original shape.

The automobile body repairman uses solder or plastic to fill small dents that he cannot work out of the metal. Before applying solder, he cleans the dent and coats it with liquid tin so that the solder will adhere to the surface. He softens the solder with a torch and uses a wooden paddle or other tool to mold it to the desired shape. When the solder has hardened, the body repairman files or grinds it down to the level of the adjacent metal.

After being restored to its original shape, the repaired surface is sanded in preparation for painting. In most shops, automobile painters do the painting. (These workers are discussed elsewhere in the *Handbook*.) Some smaller shops employ workers who are combination body repairmen and painters.

The automobile body repairman uses special machines to align damaged vehicle frames and body sections. He chains or clamps the machine to the damaged metal and applies hydraulic pressure to straighten it. He also may use special devices to align damaged vehicles that have "unit-bodies" instead of frames. In some shops, the straightening of frames and unit-bodies is done by a body repairman who specializes in this type of work.

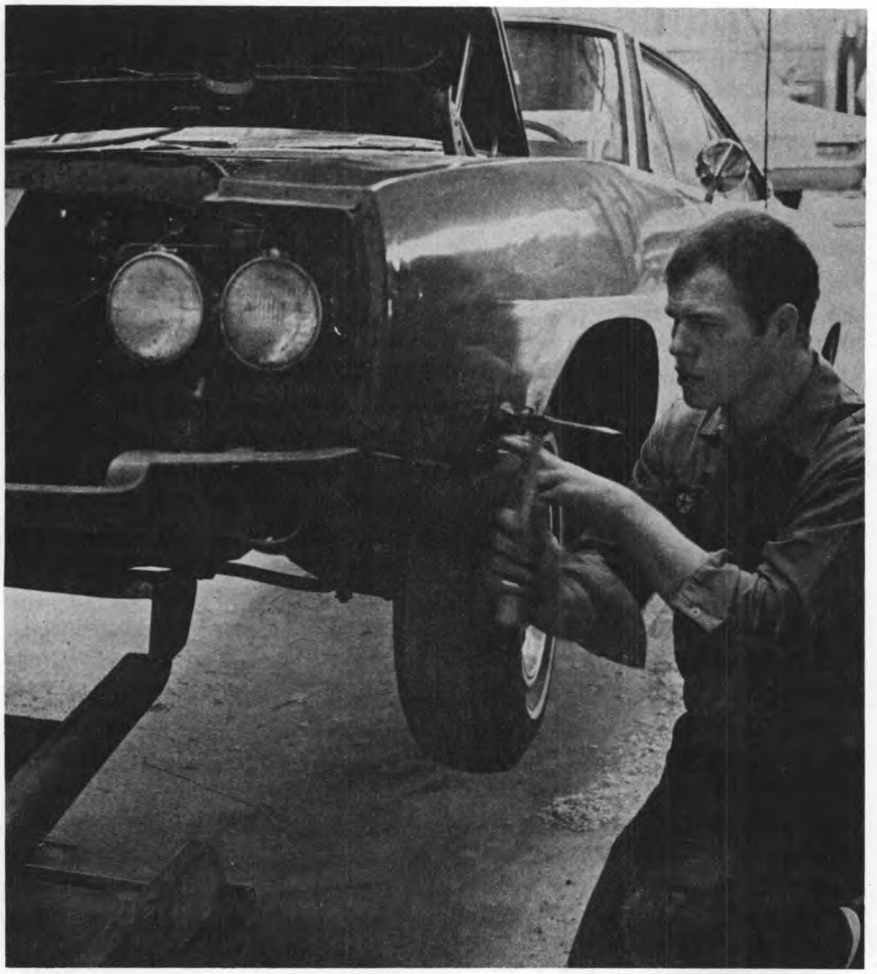
The body repairman's work is characterized by variety because the repair of each damaged vehicle presents a different problem. Therefore, in addition to having a broad knowledge of automobile construction and repair techniques, he also must develop appropriate methods for each repair job. Most body repairmen find their work challenging and take pride in being able to restore damaged automobiles.

Automobile body repairmen usually work by themselves with only general directions from foremen. In some shops, they may be assisted by helpers.

Places of Employment

More than 100,000 automobile body repairmen were employed in 1970. Most of them worked in shops that specialized in automobile body repairs and painting, and in the service departments of automobile and truck dealers. Other employers included organizations that maintain their own fleets of motor vehicles, such as trucking companies and buslines, and Federal, State, and local governments. Motor vehicle manufacturers employed a small number of these workers.

Automobile body repairmen can find employment opportunities in every section of the country. About



Automobile body repairman hammers out dents.

half of them work in the nine States with the largest number of motor vehicles: California, Texas, New York, Ohio, Pennsylvania, Illinois, Michigan, Florida, and New Jersey.

Training, Other Qualifications, and Advancement

Most automobile body repairmen learn the trade on-the-job. Young persons usually start as helpers and pick up the skills of the trade from experienced workers. Helpers begin by assisting body repairmen in tasks such as removing damaged parts, installing repaired surfaces in preparation for painting. They gradually learn how to remove small dents and make other minor repairs, and progress to more difficult tasks as they gain experience. Generally, 3 to 4 years of on-the-job training is necessary to become a fully qualified body repairman.

Although most workers who become automobile body repairmen pick up the skills of the trade informally through on-the-job experience, most training authorities recommend the completion of a 3- or 4-year formal apprenticeship program as the best way for young men to learn this trade. These programs include both on-the-job and related classroom instruction.

Training programs for unemployed and underemployed workers for entry automobile body repairmen jobs are in operation in many cities under provisions of the Manpower Development and Training Act. These programs, which last up to a year, stress the fundamentals of automobile body repair. Persons who complete these programs need additional on-the-job or apprenticeship training before they can qualify as skilled body repairmen.

Young persons interested in becoming automobile body repairmen should be in good physical condition and have good eye-hand coordination. Courses in automobile body repair, offered by a relatively small number of high schools, vocational schools, and private trade schools, provide helpful experience, as do courses in automobile mechanics. Although completion of high school is not generally a requirement for an entry job, many employers believe graduation indicates that a young man can "finish a job."

Automobile body repairmen usually are required to own their handtools, but power tools ordinarily are furnished by the employer. Many of these craftsmen have a few hundred dollars invested in tools. Trainees are expected to accumulate tools as they gain experience.

An experienced automobile body repairman with supervisory ability may advance to shop foreman. Many body repairmen open their own shops.

Employment Outlook

Employment of automobile body repairmen is expected to increase moderately through the 1970's. In addition to the job openings result-

ing from employment growth, more than a thousand openings are expected each year from the need to replace experienced body repairmen who retire or die. Job openings also will occur as some body repairmen transfer to other occupations.

The number of body repairmen is expected to increase primarily as a result of the rising number of motor vehicles damaged in traffic. Accidents are expected to continue to increase as the number of motor vehicles in use grows, even though new and improved highways, driver training courses, added safety features on new vehicles, and stricter law enforcement may slow down the rate of increase.

The favorable employment effect of the rising number of motor vehicle accidents will be offset somewhat by developments that will increase the efficiency of body repairmen. For example, the growing practice of replacing rather than repairing damaged parts, the use of plastics for filling dents, and improved tools will enable these workers to complete jobs in less time.

Earnings and Working Conditions

Body repairmen employed by automobile dealers in 34 cities had average straight-time earnings of $5.51, based on a survey in late 1969. Average hourly earnings of these workers in individual cities ranged from $3.83 in Providence–Pawtucket, R.I., to $7.67 in Detroit, Mich. Skilled body repairmen usually earn between two and three times as much as inexperienced helpers and trainees.

Many experienced body repairmen employed by automobile dealers and independent repair shops are paid a commission, usually about 50 percent of the labor cost charged to the customer. Under this method, a worker's earnings depend mainly on the amount of work he is assigned and how fast he completes it. Employers frequently guarantee their commissioned body repairmen a minimum weekly salary. Helpers and trainees are usually paid an hourly rate until they are sufficiently skilled to work on commission. Body repairmen employed by trucking companies, buslines, and other organizations that maintain their own vehicles usually receive an hourly wage rate. Most body repairmen work 40 to 48 hours a week.

Many employers of body repairmen provide holiday and vacation pay, and additional benefits such as life, health, and accident insurance. Some also contribute to retirement plans. Body repairmen in some shops are furnished with laundered uniforms free of charge.

Automobile body shops are noisy because of the banging of hammers against metal and the whir of power tools. Most shops are well ventilated, but often they are dusty and the odor of paint is noticeable. Body repairmen often work in awkward or cramped positions, and much of their work is strenuous and dirty. Hazards include cuts from sharp metal edges, burns from torches and heated metal, and injuries from power tools.

Many automobile body repairmen 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 Sheet Metal Workers' International Association; and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America (Ind.). Most body repairmen who are union members are employed by large automobile dealers and by trucking companies and buslines.

Sources of Additional Information

For further information regarding work opportunities for automobile body repairmen, inquiries should be directed to 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 body repairmen may be obtained from:

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

Independent Garage Owners of America, Inc., 624 South Michigan Ave., Chicago, Ill. 60605.

AUTOMOBILE MECHANICS

(D.O.T. 620.131 through .381, .782, and .885; 721.281 and 825.281)

Nature of the Work

Automobile mechanics keep the Nation's automobiles in good operating condition. They perform preventive maintenance, diagnose breakdowns, and make repairs. (Although truck mechanics, who repair large trucks; bus mechanics, who repair large buses; and automobile body repairmen are sometimes called "automobile mechan-

ics," they are discussed separately in the *Handbook*.)

Preventive maintenance is the periodic examination, and adjustment, repair, or replacement of parts. It is an important responsibility of the mechanic and is vital to safe and trouble-free driving. When performing preventive maintenance, the mechanic may follow a checklist to be sure he examines all important parts of the car. He may, for example, examine and decide whether to replace worn parts, such as distributor points; clean, adjust, or replace spark plugs; adjust the carburetor; and balance the wheels.

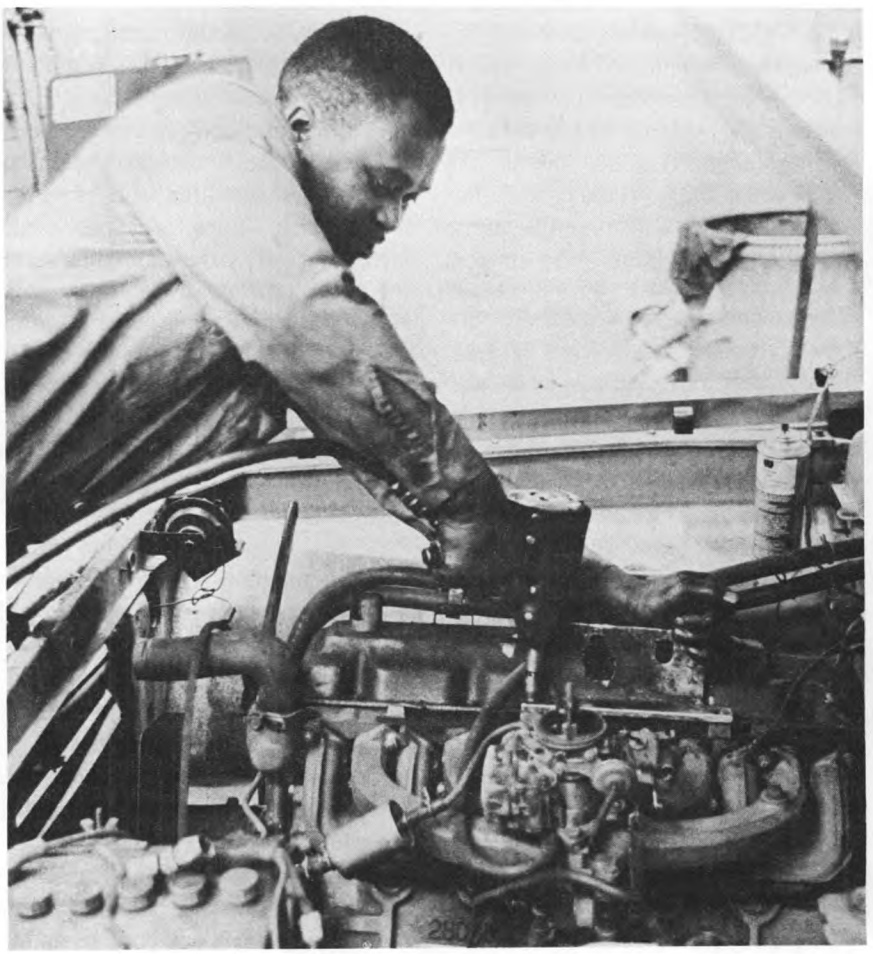
When mechanical or electrical troubles occur, the mechanic first obtains a description of the symptoms from the owner. If the cause of the trouble is not evident immediately, he may visually inspect and listen to the motor, or drive the car. He also may use a variety of testing equipment, such as motor analyzers, spark plug testers, compression gauges, and electrical test meters. The ability to make an accurate diagnosis in a minimum of time is one of the mechanic's most valuable skills and requires analytical ability as well as a thorough knowledge of a car's operations. Many skilled mechanics consider diagnosing "hard to find" troubles one of their most challenging and satisfying duties.

When the mechanic locates the cause of the trouble, he adjusts, repairs, or replaces unserviceable parts. For example, he may replace a fuel pump, grind valves, adjust the ignition timing, clean the carburetor, or machine the brake drums.

In addition to the testing equipment mentioned previously, automobile mechanics use many other kinds of tools and equipment. These may range from simple handtools (screwdrivers, wrenches, pliers), to complicated and expensive machines and equipment that help the mechanic make repairs. Examples of this equipment are wheel alinement machines and headlight aimers. Mechanics also consult repair manuals and parts catalogs, since different makes of automobiles require different parts and adjustments.

Most automobile mechanics perform a variety of repairs. Some mechanics, such as automatic transmission specialists, tune-up men, automobile air-conditioning specialists, front-end mechanics, and brake mechanics specialize in one or two types of repair. However, specialists with all-round skills also may perform general automobile repair work. Other specialists, such as automobile radiator mechanics and automobile glass mechanics, who do not have all-round skills, usually work exclusively at their specialties. The types of work done by some mechanic specialists are described briefly below:

Automatic transmission specialists repair and replace linkage, gear trains, couplings, hydraulic pumps, and other parts of automatic transmissions. Automatic transmissions are complex mechanisms; their repair requires considerable experience and training, including a knowledge of hydraulics. *Tune-up men* adjust the ignition timing and valves, and adjust or replace spark plugs, distributor breaker points, and other parts to insure efficient



engine performance. They often use scientific test equipment to locate malfunctions in fuel and ignition systems. *Automobile air-conditioning specialists* install air-conditioners and repair and adjust components such as compressors and condensers. *Front-end mechanics* align and balance wheels and repair steering mechanisms and suspension systems. They frequently use special alignment testing equipment and wheel-balancing machines. *Brake mechanics* adjust brakes, replace brake linings, resurface brake drums, repair hydraulic cylinders, and make other repairs on brake systems. Those employed in repair shops that specialize in brake service also may replace shock absorbers, springs, and mufflers. In some shops, combination front-end and brake mechanics are employed. *Automobile-radiator mechanics* clean radiators with caustic solutions, locate and solder radiator leaks, and install new radiator cores. They also may repair heaters and air-conditioners, and solder leaks in gasoline tanks. *Automobile-glass mechanics* replace broken or pitted windshield and window glass and repair manual and power-window mechanisms. They install pre-formed glass to replace curved windows, and may cut some replacement glass from flat sheets by using window patterns and glass cutting tools. Shops that repair both automobile radiators and glass may employ mechanics who are skilled in both specialties.

Places of Employment

Most of the more than 600,000 automobile mechanics employed in 1970 worked for automobile dealers, independent automobile repair shops, and gasoline service stations. Many others were employed by Federal, State, and local governments, taxicab and automobile leasing companies, and other organizations that maintain and repair their own automobiles. Some mechanics also were employed by automobile manufacturers to make final adjustments and repairs at the end of the assembly line. A small number of mechanics were employed by department stores that have automobile service facilities.

Most automobile mechanics work in shops employing from one to five mechanics, but some of the largest repair shops employ more than a hundred. Generally, automobile dealer shops are larger than independent repair shops.

Automobile mechanics are employed in every section of the country. About half of them work in the nine States with the largest number of motor vehicles: California, Texas, New York, Ohio, Pennsylvania, Illinois, Michigan, Florida, and New Jersey.

Training, Other Qualifications, and Advancement

Most automobile mechanics learn the trade through on-the-job experience. Young persons usually start as helpers, lubrication men, or gasoline service station attendants, and gradually acquire the necessary knowledge and skills by working with experienced mechanics. Although a beginner can learn to do simple kinds of repair work after a few months' experience, 3 to 4 years are required to become an all-round mechanic, and an additional year or two to learn a difficult specialty, such as automatic transmission repair. In contrast, radiator mechanics, glass mechanics, and brake specialists, who do not need an all-round knowledge of automobile repair, may learn their specialties in about 2 years.

Most training authorities recommend the completion of a 3- or 4-year formal apprenticeship program as the best way to become an all-round mechanic. These programs include both on-the-job training and related classroom instruction in nearly all phases of automobile repair.

For entry jobs, employers look for young persons with mechanical aptitude and an understanding of automobile construction and operation. Generally, a driver's license is required. Practical experience in automobile repair gained from working as a gasoline service station attendant, training in the Armed Forces, or working on cars as a hobby may be helpful. Courses in automobile repair offered by many high schools, vocational schools, and private trade schools also are valuable. Courses in science and mathematics help a person better understand how an automobile operates.

Training programs for unemployed and underemployed workers seeking entry jobs as automobile mechanics are in operation in a large number of cities under provisions of the Manpower Development and Training Act. These programs, which last up to a year, stress basic maintenance and repair work. Persons who complete this training are able to make simple repairs, but they still need additional on-the-job or apprenticeship training before they can qualify as skilled mechanics.

Completion of high school is an advantage in obtaining an entry mechanic job because to most employers high school graduation indicates that a young person can "finish a job," and has potential for advancement.

Most mechanics are required to purchase their own handtools. Beginners are expected to accumulate tools while they gain experience. Many experienced mechanics have several hundred dollars invested in their tools. Employers furnish engine analyzers and other test equipment, power tools, and special tools for servicing units such as automatic transmissions.

Employers sometimes send experienced mechanics to factory training centers to learn how to repair new car models or receive special training in subjects such as automatic transmission or air-conditioning repair. Manufacturers also send representatives to local shops to conduct short training sessions. A relatively small number of young high school graduates are selected by automobile dealers to attend factory-sponsored mechanic training programs for beginners.

A young person considering a career as an automobile mechanic should have strength and manual dexterity in order to handle tools and equipment. Good mechanics read many service and repair manuals to keep abreast of changes in automobile engineering. A pleasing personality is helpful in dealing with customers who are irate over repair bills or car breakdowns. Mechanics work independently and are able to see the results of their labor.

Capable and experienced mechanics in a large shop may advance to a supervisory position, such as repair shop foreman or service manager. Many mechanics open their own repair shops or gasoline service stations.

Employment Outlook

Employment of automobile mechanics is expected to increase moderately through the 1970's. In addition to the job openings resulting from employment growth, several thousand openings are expected each year from the need to replace experienced mechanics who retire or die. Job openings also will occur as some mechanics transfer to other occupations.

Employment is expected to increase because expansion of the driving age population, consumer purchasing power, and multicar ownership will create a demand for more automobiles. Employment of mechanics also is expected to grow because a greater number of automobiles will be equipped with exhaust emission control devices, air-conditioning, and other features that increase maintenance requirements.

Primarily because of greater efficiency in the shop, employment of mechanics is not expected to grow as rapidly as the number of automobiles. For example, increased mechanic specialization and growth in the use of test equipment (such as dynamometers and engine analyzers) should reduce the time needed to diagnose malfunctions and check the quality of repairs. In a growing number of large shops, mechanics skilled in operating dynamometers and other kinds of test equipment determine needed repairs, then route the automobiles to mechanics who specialize in a particular kind of repair work. Also expected to improve efficiency are greater emphasis on replacement rather than on repair of defective parts, better shop management, and improved training methods.

Earnings and Working Conditions

Skilled (journeymen) automobile mechanics employed by automobile dealers in 34 cities had average straight-time hourly earnings of $5.16, based on a survey in late 1969. Average hourly earnings of these workers in individual cities ranged from $3.62 in Providence–Pawtucket, R.I., to $6.13 in Detroit, Mich. Skilled mechanics usually earn between two and three times as much as inexperienced helpers and trainees.

A large proportion of the experienced mechanics employed by automobile dealers and independent repair shops are paid a commission, usually about 50 percent of the labor cost charged to the customer. Under this method, the mechanic's weekly earnings depend on the amount of work he is assigned and how fast he completes it. Employers frequently guarantee their commissioned mechanics a minimum weekly salary. Helpers and trainees usually are paid an hourly rate until they are sufficiently skilled to work on commission. Some mechanics—for example, those employed by organizations that repair their own fleets of automobiles—receive an hourly rate.

Most mechanics work between 40 and 48 hours a week but may work even longer during busy periods. Mechanics paid on an hourly basis frequently receive overtime rates for hours worked in excess of 40 a week.

Many employers of automobile mechanics provide holiday and vacation pay, and additional benefits such as life, health, and accident insurance. Some also contribute to retirement plans. Laundered uniforms are furnished free of charge by some employers.

Generally, a mechanic works indoors. Modern automobile repair shops are well ventilated, lighted, and heated, but older shops may not have these advantages.

The work of the mechanic fre-

quently requires working with dirty and greasy parts, working in awkward positions, and lifting heavy objects. Minor cuts and bruises are common. Serious accidents usually are avoided by observing safety practices.

Some mechanics are members of labor unions. Among the unions organizing these workers are 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.).

Where To Go for More Information

For further information regarding work opportunities for automobile mechanics, inquiries should be directed to local employers such as automobile dealers and independent repair shops; 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 mechanics may be obtained from:

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

Independent Garage Owners of America, Inc., 624 South Michigan Ave., Chicago, Ill. 60605.

National Automobile Dealers Association, 2000 K St. NW., Washington, D.C. 20006.

BOWLING-PIN-MACHINE MECHANICS

(D.O.T. 639.381 and 829.281)

Nature of the Work

Bowling-pin-machine (or automatic pinsetting) mechanics repair, maintain, and adjust the tens of thousands of pinsetting machines in use today. When a breakdown occurs, the mechanic determines its cause and makes the necessary adjustments or repairs. He may partially or completely disassemble components of a machine to repair or replace defective parts. After he reassembles the machine, he adjusts it for proper operation.

A pinsetting machine is a complex mechanism that automatically performs a series of operations—returns the bowling ball to the bowler, clears the pin deck of fallen pins, and conveys and distributes the pins to a pinsetting mechanism that resets them on the pin deck. Pinsetting machines are electrically powered and electrically or mechanically controlled.

A pinsetting machine mechanic maintains various gap or clearance adjustments in belts, chains, and other drive devices; adjusts the clutch and brakes; and inspects bearings, sliding surfaces, and shock absorbers. He also maintains electrically controlled systems.

Much of the mechanic's worktime is spent in preventive maintenance. He regularly inspects and tests pinsetting machines, and cleans, oils, greases, and adjusts them. In his work, the mechanic applies knowledge gained through training, on-the-job experience, and the use of operating and troubleshooting manuals.

When servicing mechanical equipment, the mechanic uses many different types of tools and equipment, such as pliers, wrenches, screwdrivers, hammers, portable hoists, and lubricating guns. In electrical maintenance and repair work, the mechanic may use soldering irons, feeler gages, and crimping tools. He uses continuity testers, ammeters, and voltmeters to test electrical circuits, relays, solenoids, transformers, and motors. To assist him in this work, he uses diagrams of electrical circuits. Often the mechanic will purchase his own set of handtools, but the employer usually supplies special tools.

The mechanic may supervise one or more assistant mechanics, trainees, and pinchasers. He is often called upon to instruct trainees in locating and correcting minor malfunctions in pinsetting machines. Such instruction includes demonstrating how the machine operates as well as disassembling components and explaining their function. He shows trainees and pinchasers how to break minor jams and recondition bowling pins. He also explains proper safety procedures.

Some clerical work is done by the mechanic. He maintains a stock of repair parts by keeping inventory records and ordering replacements when necessary. He also may keep records of machine breakdowns and estimate maintenance costs.

Places of Employment

About 6,000 mechanics were employed in 1970. Most worked in commercial bowling establishments. The remainder, about 5 percent, were employed by manufacturers of automatic pinsetting machines to install and service machines of bowling establishments. Although the primary responsibility of manufac-

turers' mechanics is to inspect equipment periodically for proper operation, they may be called in to repair major breakdowns that mechanics in bowling establishments cannot handle.

Although mechanics and their assistants are employed in every State, employment is concentrated in the more populated areas, where there are many bowling establishments. Of the more than 10,000 bowling establishments in operation in early 1970, the majority were located in New York, Pennsylvania, Illinois, Ohio, Michigan, California, Wisconsin, Minnesota, New Jersey, and Texas.

Training, Other Qualifications, and Advancement

Pinsetting machine mechanics usually start out as pinchasers, assisting mechanics in individual bowling establishments. Many pinchasers, who demonstrate mechanical ability and willingness to learn, become trainees and are sent to a mechanics' training school maintained by bowling-machine manufacturers. To become a trainee at a factory school, candidates are required to take written tests to determine their mechanical aptitude and personality traits. Usually, trainees must be at least 16 years old. Trainees' wages and expenses during the training period, which usually lasts 4 weeks, are paid by employers. Trainees study the structure and operation of machines manufactured by the firm operating the school and learn to locate typical sources of trouble. They learn preventive maintenance procedures, how to read wiring diagrams, and how to use the tools of the trade. Their training also includes actual repair work on demonstration machines. After attending factory schools, trainees usually need several months of on-the-job experience before they acquire the skills of the trade.

Trainees who do not attend factory schools acquire their skills on the job by observing experienced mechanics at work and by receiving instruction in machine operation and maintenance, typical malfunctions, and safety procedures. They also do actual repair work, progressing from simple to more complex jobs as their skills increase. Usually, 1 to 2 years of such training and experience is necessary for trainees to acquire mechanics' skills.

Employers prefer to hire pinchasers who are high school graduates, although many workers in this trade have not completed high school. Courses in electricity, blueprint reading, and machine repair are useful.

Qualified mechanic trainees employed in commercial bowling establishments may be promoted to assistant mechanic and then to head mechanic. Mechanics can become managers or proprietors of bowling establishments. Those who work for manufacturers may advance to the position of service manager or instructor in a training school.

A young person planning a career as a bowling-pin-machine mechanic should have good eyesight (including color vision), physical strength, and eye-hand coordination. He also should have mechanical abilities and like to work with his hands. The job requires a person who can work independently in an isolated area. Because speed is usually essential in repairing pinsetting ma-

chines, he should be capable of working under pressure.

Employment Outlook

Little or no change in the number of bowling-pin-machine mechanics is expected through the 1970's. However, many job openings will result each year to replace workers who retire, die, or leave their jobs for other reasons.

Trends in the growth of bowling facilities, as well as developments in pinsetting machine technology, will be a major influence in the employment of mechanics in the future. Although the demand for bowling facilities is likely to grow as a result of expanding population, rising income levels, and more leisure time for recreation, employment of mechanics is not likely to increase. Older pinsetting machines are being replaced by improved models which need less maintenance; thus mechanics are able to service a greater number of machines.

Earnings and Working Conditions

National wage data are not available for pinsetter mechanics, assistant mechanics, and pinchasers. However, wage data from union-management contracts in mid-1970 covering a large number of these workers in large metropolitan areas on the East and West Coasts and in the Midwest show a very wide range of pay rates. Straight-time hourly rates ranged from $2.15 to $3.75 for mechanics, from $1.84 to $3.14 for assistant mechanics, and from $1.53 to $2.45 for pinchasers.

On the East Coast and in the Midwest most mechanics and their assistants work a 48-hour, 6-day week. On the West Coast, most of them work a 40-hour, 5-day week. Nightwork and work on Sundays and holidays is common. Workers covered by union-management contracts receive premium pay for overtime. In addition, union-management agreements usually provide for 1 week paid vacation after a year's service, 2 weeks after 2 years' service, and 3 weeks after 5 years' service. These agreements also call for 4 to 8 paid holidays a year. Many contracts provide health insurance and pension plans financed entirely by employers.

Mechanics and their assistants work in a long, relatively narrow corridor at one end of a bowling establishment where the automatic machines are located. The work area includes space for a workbench. The workspace is usually well lighted and well ventilated, but quite noisy when the lanes are in operation. When making repairs and adjustments, repairmen frequently have to climb and balance their bodies on the framework of the pinsetting machines, and to stoop, kneel, crouch, and crawl around the machines. Mechanics employed by manufacturers to install and service pinsetting machines are required to do considerable traveling.

Repairmen usually are not required to wear any special safety devices, such as goggles. Safety guards are provided on the pin-setting machines, but workers are subject to common shop hazards, such as electrical shock, cuts, falls, and bruises. Repairmen often wear coveralls to protect themselves from grease and dirt.

Mechanics, assistant mechanics, and trainees employed in large metropolitan areas generally are members of unions; usually the Service Employees' International Union or the International Brotherhood of Teamsters, Chauffeurs, Warehousemen, and Helpers of America (Ind.).

Sources of Additional Information

A young man who wishes to obtain further information about training or work opportunities in this trade should contact proprietors of commercial bowling establishments in his area, the local bowling proprietors' association, or locals of the unions previously mentioned. The local office of the State employment service is another source of information about employment and training opportunities.

BUSINESS MACHINE SERVICEMEN

(D.O.T. 633.281 and 828.281)

Nature of the Work and Places of Employment

Business machine servicemen maintain and repair the increasing numbers and types of office equipment used for correspondence, for recording and processing transactions, and for duplicating and mailing information. Equipment used for these purposes includes typewriters, adding and calculating machines, cash registers, electronic computers and other data-processing devices, dictating and transcribing machines, and mailing, duplicating, copying, and microfilm equipment. These machines are becoming increasingly complex as electric and electronic control components are incorporated in them.

Servicemen do much of their

work in the offices where the machines are used. Servicemen may maintain this equipment on a regular basis, returning at frequent intervals to inspect the machines, to clean and oil them, and to make minor adjustments or repairs. They also may be called to an office to check or repair a defective machine. On office calls, servicemen usually question the operator about the condition of the machine. They often have to explain to operators how various features of the machines can best be used and how to avoid machine damage.

When inspecting business machines, the serviceman usually checks the operation of various parts of the equipment to see if they work properly or to find the source of reported trouble. For example, he may strike the keys of a typewriter or calculator, rotate the drum of a duplicating machine, or feed punchcards to a tabulator or sorter. In addition, he may check type or photographic devices for alinements and rollers for dryness or compactness. He may make voltage checks of electric or electronic components. The serviceman may take a machine to the company's servicing department for a major repair or overhaul.

In addition to common handtools, such as screwdrivers, pliers, and adjustable wrenches, business machine servicemen frequently use gauges and meters and other test equipment and tools designed for special purposes. In large service shops, servicemen use power tools such as drill presses, lathes, and other power equipment.

Business machine servicing offers considerable variety in work assignments. This work requires the application of analytical ability to a wide range of problems. Many persons find considerable satisfaction in being able to diagnose and correct the cause of trouble in a faulty machine. Some manufacturers' servicemen have the opportunity to evaluate and report on recommended improvements in new and existing company products.

Besides responsibilities for maintenance and repair, servicemen may engage in sales activities. Most commonly, they sell preventive maintenance contracts for machine servicing on a regular basis. Some servicemen also are expected to sell supplies, such as special paper, ink, ribbons, and stencils, used with particular machines.

Business machine servicemen are employed in several types of firms. Most of them work in the sales and service offices of business machine manufacturers; others, in independent business machine repair shops; the remainder, for large organizations that have enough machines to justify full-time servicemen.

In a manufacturer's branch office, servicemen usually work exclusively on the manufacturer's products. They specialize in one or two machines or service the full line of equipment. In a small city, specialization is impractical and most servicemen are "full-line." In these instances, service and selling new equipment usually are combined.

Servicemen employed by independent dealers maintain and repair the many makes and models of office machines used in the community. Most dealers sell and service typewriters. Some also sell and service adding machines, dictating machines, and less complex types of duplicating and copying equipment. Other dealers specialize in the sales and service of adding and calculating machines, cash registers, and bookkeeping-accounting machines. Most independent dealers employ fewer than five servicemen, although some large dealers may employ as many as 10 or 15.

Business machine servicing jobs are found throughout the country. Even relatively small communities usually have at least one or two shops which repair machines. However, most business machine servicemen work in large cities, where the majority of business machines are located.

Typewriter Servicemen (D.O.T. 633.281). The principal work of the estimated 19,000 typewriter servicemen employed in 1970 was the maintenance and repair of manual and electric typewriters. Typewriters are the most widely used business machines. They are used in almost every business office, as well as by many individuals in their homes. Though the operation of electric typewriters and mechanical typewriters differs, the two types are similar enough that, with additional training, the servicemen who specialize in the repair of mechanical typewriters usually can learn to repair the electric machines. Some servicemen maintain and repair more sophisticated equipment, such as tape-fed automatic typewriters and interchangeable typeface machines, some of which operate in conjunction with small computers. These machines are considerably more complicated than regular typewriters and extensive training, usually provided by the manufacturer, is required before servicemen may qualify to repair them.

Typewriter servicemen are employed both in the sales and service branches of typewriter manufacturers and by local independent dealers. Many servicemen operate their own maintenance and repair shops. Typewriter servicemen are found in almost every sizable community throughout the Nation.

Adding Machine Servicemen

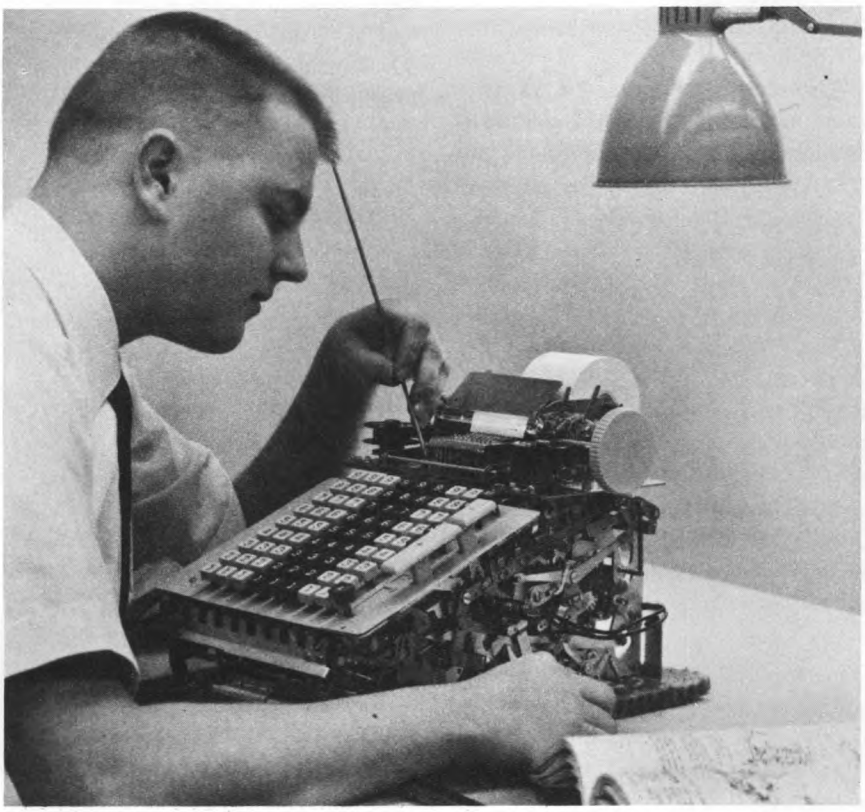
(D.O.T. 633.281). In 1970, about 5,000 business machine servicemen worked mainly on adding machines which are less complex than most office machines. In some cases, servicing of both adding machines and calculators is done by the same employee. The repair of adding machines and simpler calculating machines often provides experience for advancement to work on more complicated equipment such as bookkeeping and accounting machines. In some independent establishments, adding machines are serviced by men who also repair typewriters.

Adding machine servicemen are employed both in manufacturers' sales and service branches and by independent dealers. Other sources of employment are Federal, State, and local governments, and a few large banks and other firms which use large numbers of adding machines.

Calculating Machine Servicemen (D.O.T. 633.281). About 10,000 calculating machine servicemen were employed in 1970. Calculating machines add, subtract, divide, multiply, and perform combinations of these operations. In some shops, servicing of calculators is combined with the servicing of other business machines, particularly adding machines and accounting-bookkeeping machines.

Most of the men who service calculators are employed in manufacturer's sales and service branches. Some independent dealers employ men skilled in the maintenance and repair of calculators. Others are employed by the Federal Government and some large business organizations.

Cash Register Servicemen (D.O.T. 633.281). Repairing cash registers was the main work of approximately 4,000 business machine servicemen in 1970. Next to typewriters, cash registers are the most widely used business machines. The simplest models merely record transactions, add receipts, and provide a change drawer. The more complicated cash registers simultaneously record several different kinds of information on each transaction (such as identification of the clerk, department, type of merchandise, payment given, and change due), provide printed receipts, and dispense change and trading stamps to the customer.



Most cash register servicemen work in the sales and service branches of the few manufacturing firms making these machines. Some of the repair work, especially in smaller communities, is done by independent dealers who also maintain and repair other business machines.

Accounting-Bookkeeping Machine Servicemen (D.O.T. 633.281). The repair of accounting-bookkeeping machines was the main work of more than 2,500 business machine servicemen in 1970. These machines perform a variety of operations. Some post entries and some do billing, but others combine the functions of typewriters and computing devices. All models have keyboards, like those on typewriters and adding machines. These machines are used in firms that have a great deal of accounting and bookkeeping work, such as department stores, large retail and wholesale businesses, and banks. Many of the newer models are adjusted to fit the accounting procedures used in an individual customer's office. Servicemen set up the controls or programs for these machines from plans which have

been devised by the customers and manufacturers' salesmen.

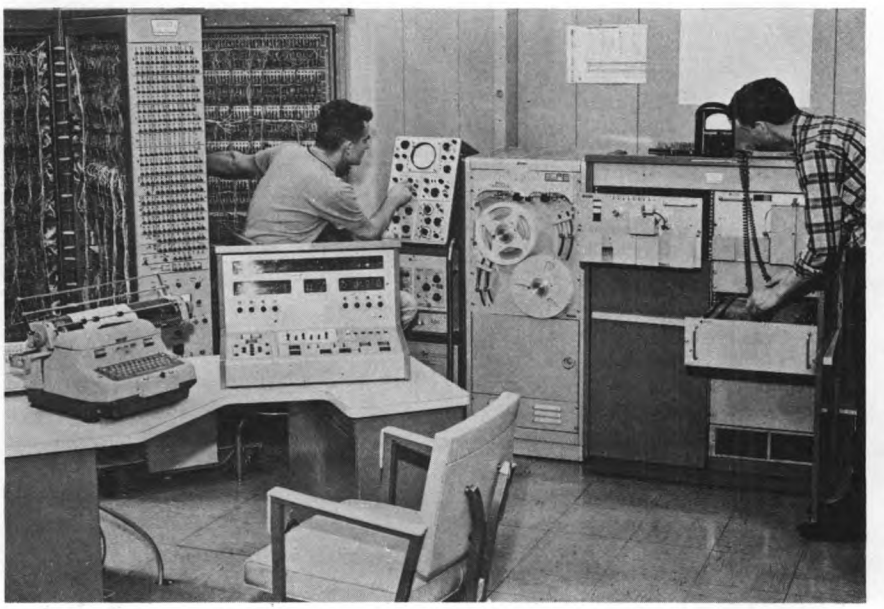
Most accounting-bookkeeping machine servicemen are employed in the sales and service branches of companies manufacturing this equipment. Very few work in independent repair shops.

Data-Processing Equipment Servicemen (D.O.T. 828.281). Nearly 30,000 men were employed in 1970 to install, modify, and maintain groups of machines (systems) used to process large volumes of accounting-statistical data. These men are the most skilled business machine servicemen and must have a good knowledge of electronics. The machines that they service include mechanical and electromechanical devices of varying complexity and highly complicated electronic computers. However, even those machine systems which include the most advanced computers depend to a high degree on associated equipment having electromechanical operating and control mechanisms. This auxiliary equipment feeds information to the computer for data processing and converts the processed data to printed form for immediate use and to magnetic tape and punchcards for recordkeeping and further processing. Machines used in data-processing systems include computers, tabulators, card punchers, sorters, collators, converters, tape transports, printers, and numerous other devices.

Data-processing machine servicemen are employed principally by firms which manufacture and service this equipment. They may work anywhere in the United States, but they are usually stationed in the larger cities. Some are assigned to a large system in one location; others have territories containing a number of machines or systems.

Dictating Machine Servicemen (D.O.T. 623.281). In 1970, about 700 men serviced machines which record dictation on disks, belts, or tape to be played back for typing. In addition to standard office dictating machines, servicemen install and maintain central recording and transcribing systems.

Dictating machine servicemen must have a knowledge of electronic fundamentals to maintain and repair sound-amplifying components of this equipment. Mechanical skills are essential in maintenance work on drive mechanisms needed to control the movement of the recording disk or belt.



Dictating machine servicemen are employed throughout the country with concentrations in the large business and commercial centers. Most servicemen work in the sales and service branches of business equipment manufacturers or for their distributors. Typewriter and adding machine servicemen employed by some independent dealers also service dictating machines.

Duplicating and Copying Machine Servicemen (D.O.T. 633.281). About 6,500 men were employed in 1970 to maintain and repair duplicating and copying machines. These machines are used to make one or more paper copies of printed or written information. The processes used in these machines range widely, from highly complex methods for large volume reproduction to relatively simple methods used in desk-top copiers.

The office duplicator is essentially an offset printing press requiring a special plate for reproduction. A serviceman should be familiar with basic printing principles and technologies. Frequently, an office duplicator is operated in conjunction with photomechanical plate making equipment that also may be serviced by the office duplicator serviceman.

The office copier is an electromechanical device which produces single or multiple copies direct from an original. The equipment used in a single process may vary considerably, from relatively simple hand-operated devices used to make up to five paper copies to highly complicated electromechanical machines

which can quickly duplicate several hundred copies.

When servicing duplicating or copying machines, the serviceman adjusts, oils, repairs, or replaces parts such as rollers, belts, or gear mechanisms. If the equipment has electric or electronic components, he may check voltages to determine the need for adjustment or replacements of parts. He also may clean the machine so that it will function properly and produce clear copy.

Duplicating and copying machine servicemen employed by some companies also service microfilm equipment used in office operations. The maintenance and repair of paper-handling mechanisms used to speed the movement of documents, including drawings, through the photographic equipment is generally similar to that used in duplicating machines. The men who service this equipment, however, must understand the photographic process used in order to properly aline the optical devices so as to produce clear, sharp negatives.

Most duplicating and copying machine servicemen are employed in the branch sales and service offices of manufacturers or by their distributors.

Servicemen of Postage and Mailing Equipment (D.O.T. 633.281). More than 2,000 servicemen were employed in 1970 to maintain the many different types of office machines needed to handle the billions of pieces of mail sent each year by business firms in this country. These office machines included postage meters, addressing and imprinting machines, and folding and inserting equipment. Data-processing machines, used for tabulating and imprinting acount information, also are used in addressing operations where the volume of accounts justifies their use.

Servicemen who work on these predominantly electromechanical machines install the equipment and adjust, oil, clean, and repair or replace components to keep the equipment in working order. As with most paper handling equipment, rollers and other manipulating devices driven by belt or gear mechanisms are the components most frequently requiring maintenance. Since most postage and mailing equipment is electrically powered and an increasing number of machines use electric or electronic controls, the servicemen must have a basic knowledge of electricity. In addition, a knowledge of electronic theory is a decided advantage.

Most men who service postage and mailing equipment are employed in the branch offices of equipment manufacturers.

Training, Other Qualifications, and Advancement

Usually applicants for entrance jobs as business machine servicemen must have at least a high school education. Applicants who have not completed high school, however, are accepted by some companies if they can demonstrate superior mechanical aptitude or have had qualifying mechanical or electrical experience. Completion of high school becomes particularly important, however, when a serviceman has acquired basic skills and is seeking to work on more complex equipment or to be promoted to supervisor. Applicants interested in servicing complex electromechanical and electronic equipment are required to have 1 year or more of training or experience in mechanics or electronics to qualify.

Applicants for entrance jobs often have to pass one or more tests. The most frequently tested characteristic is mechanical aptitude, followed by a knowledge of basic electricity or electronics, manual dexterity, general intelligence and abstract reasoning. Good eyesight, including color vision, also is important.

Employers look for applicants who have a pleasant, cooperative manner. Most machine servicing is done in customers' offices and a serviceman's ability to do his work with the least interference to office routine is very important. A neat appearance and ability to converse effectively also are desired characteristics.

Some employers require business machine servicemen to be bonded. Applicants for these jobs must have a record of honesty and trustworthiness because, in their work servicemen are brought in proximity to large sums of money and other valuables in banks, offices, and other establishments. Servicemen also may collect money for services performed and office supplies delivered to their customers.

Young persons entering the business machine servicing field generally begin as trainees and acquire their skills through on-the-job training, work experience, and instruction in manufacturers' training schools. Courses in business machines maintenance and repair, conducted by some State and city vocational schools and by private correspondence schools, are available to trainees and others interested in this field of work. In addition, programs to train unemployed and underemployed workers as office machine servicemen were operating in several cities in 1970 under provisions of the Manpower Development and Training Act.

Business machine servicemen who are hired for work in a manu-

facturer's branch office are trained to service only the company's line of machines. Trainees usually attend company schools from several weeks to several months, depending on the type of machine they will service. They then receive from 1 to 3 years of practical experience and on-the-job training before they are considered fully qualified. During this period, they may occasionally go back to factory schools for additional training. Even after becoming skilled workers, they may return to school for special instruction in new business machine developments. In addition to training in company schools, servicemen at manufacturers' branch offices are encouraged to broaden their technical and general knowledge during their nonworking hours. Many companies provide full or partial tuition grants for a variety of courses at academic institutions, as well as for home-study courses in subjects related to the serviceman's work.

Men in independent establishments generally learn the trade by working with experienced servicemen who instruct them in the skills of the trade. Occasionally, men employed by an independent dealer who is authorized to sell and service a manufacturer's products will be sent to the manufacturer's school for training. Generally, however, men in independent shops receive little formal training.

Length of training depends on the kind of establishment in which a man is employed. In independent shops, the time required to become a skilled serviceman tends to be somewhat longer than in manufacturers' branches because of the greater variety of machines and the generally informal nature of the training.

The training period also varies in relation to the complexity of the equipment and the serviceman's ability to become thoroughly skilled in the maintenance, repair, and other activities associated with less complicated business machines, such as typewriters, adding machines, and some photocopy equipment. For the servicing of calculating machines, about 2 years of training and experience are required. Cash register repairmen learn their work in from 2½ to 3½ years, the last 6 months of which are usually spent in the company school. Skilled accounting-bookkeeping machine repairmen generally must have at least 3 to 4 years of training and experience. The first 1 to 2 years may consist of servicing adding machines, calculators, or cash registers, since this is considered valuable background for servicing accounting-bookkeeping machines.

Most machines used in data-processing systems contain electrical equipment; many have electronic components. The companies which manufacture and service these machines, therefore, usually require that applicants have some knowledge of electricity or electronics. In qualifying for employment in the maintenance of the complex electronic data-processing machines, college or technical institute courses in engineering are helpful, if not essential. Young veterans who have had electronics training in the Armed Forces are especially desired by employers in this field. Because of the complexity of some computer systems, these servicemen usually must have considerable analytical ability, as well as a broad technical background. For example, they may have to be familiar with computer programing to identify programing procedures as a possible cause of a malfunction. Applicants hired as trainees generally spend their first 2 months in on-the-job training. If they prove satisfactory, they are sent to a company school for a period of from 3 to 6 months. After completing the course, they work under supervision until they acquire enough skill to service and repair on their own. This period usually lasts from 12 to 18 months.

Business machine servicemen may move into sales positions where earnings usually are greater. In some cases, service and sales work are combined. Men who show exceptional abilities also have opportunities for promotion to foreman, service manager, or other supervisory positions, and to serviceman training or product engineering divisions of their companies. Experienced men sometimes open their own repair shops; men who work in the branch offices of some manufacturers are sometimes given sales franchises from the company and become independent dealers.

Employment Outlook

The rapidly growing business machine industry will provide many thousands of job openings for servicemen each year during the 1970's. Opportunities also will occur because of the need to replace experienced workmen who retire, die, or transfer to other fields of work.

The estimated 80,000 business machine servicemen in 1970 more than tripled the number employed during the mid-1950's. The rapid growth is expected to continue as many more types of office machines do all kinds of clerical work. In recent years, many technical changes have occurred in long-established types of business machines. For example, electric typewriters and adding machines have been replacing