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ABSTRACT

The handbook is a companion volume to "High School Career Interest and Information Survey" but its use extends to high school counselors, teachers, administrators and their students as an independent reference tool for occupational information. The manual is divided into sections corresponding to the fifteen career clusters identified by the U.S. Office of Education (agri-business and natural resources, business and office, communications and media, construction, consumer and homemaking, environmental, fine arts and humanities, health, hospitality and recreational, manufacturing, marine science, marketing and distribution, personal service, public service, and transportation). Each division has three components: a general statement concerning the cluster of careers; comprehensive accounts of several career fields within the cluster, each with a bibliography of other sources of information; and a dictionary of other careers within the cluster. A selected bibliography of general sources of information covering many careers follows the clusters.  
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CAREER INFORMATION HANDBOOK

TEXAS STATE TECHNICAL INSTITUTE  
and  
TEXAS EDUCATION AGENCY

Prepared by  
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Waco, Texas

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Waco, Texas

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## INTRODUCTION

In 1970, members of the staff of Texas State Technical Institute, under the direction of the Senior Vice-President, began experimenting with a simple low-cost survey instrument for obtaining data on the career interests of high school students and the amount of information they had about various careers. The TSTI instrument, called "High School Career Interest and Information Survey," was inspired by one used by a public service organization and was developed by utilizing part-time and temporary employees and the aid and advice of junior college personnel, high school counselors and industrialists. The original version was tested in 1971 with 1,813 seniors from 19 public and private high schools in McLennan County. These tests showed certain weaknesses in the instrument so it was significantly revised and retested. The retests involved 1,173 seniors from 27 additional high schools in eight additional counties in Central Texas, then 1,871 seniors from 17 high schools in seven counties in West Texas and, finally, 2,739 seniors from 21 high schools from three counties in South Texas.

These tests proved the effectiveness of the survey instrument, revealed additional usefulness to school administrators and counselors beyond that originally visualized, and indicated that widespread use should be promoted.

For 1971-72, the Division of Occupational Research and Development, Department of Occupational Education and Technology, Texas Education Agency, provided funds to test systems and procedures by which the instrument could best be made available throughout the state. During that year, the instrument was used with 34,715 students in 168 schools in 39 counties in three areas of the state. Results of this program have been reported in the "Final Report, High School Career Interest and Information Survey, Phase I," filed with the Texas Education Agency.

During follow-ups to determine the value of the surveys and the effectiveness of the various procedures tested, one suggestion was received more often than any other. That suggestion concerned the need for a companion publication to provide information concerning the careers listed in the survey instrument. Some school personnel asked for such a publication to be used at the time the survey was being made. Others felt that it would be more useful either before or after the surveys as a tool in the counseling process. Others regarded the publication as potential "instructional" material for group counseling or even for scheduled class instruction. Whatever the use, all agreed that the need existed, and all seemed to agree on the type of information needed. As a result of these suggestions, the Division of Occupational Research and Development, Department of Occupational Education and Technology, Texas Education Agency, in 1972-73 provided funds under TEA Contract No. 31333, "High School Career Interest and Information Survey, Phase II," to supplement the efforts of Texas State Technical Institute in compiling and publishing the needed materials.

The publication was originally conceived as a "dictionary" containing only brief definitions or descriptions of the careers. However, as the work proceeded and as more and more people became involved, enthusiasm for the project grew and the concept of the publication continuously expanded. As finally compiled, this "Career Information Handbook" is divided into sections corresponding to the fifteen career clusters identified by the U. S. Office of Education. Each division consists of three components:

1. A general statement concerning the cluster of careers.
2. Comprehensive, though briefly summarized, write-ups of several career fields within the cluster, each with its thoroughly researched bibliography of publications and other sources of information.
3. A dictionary of numerous other careers within the cluster with a listing of sources of more comprehensive information.

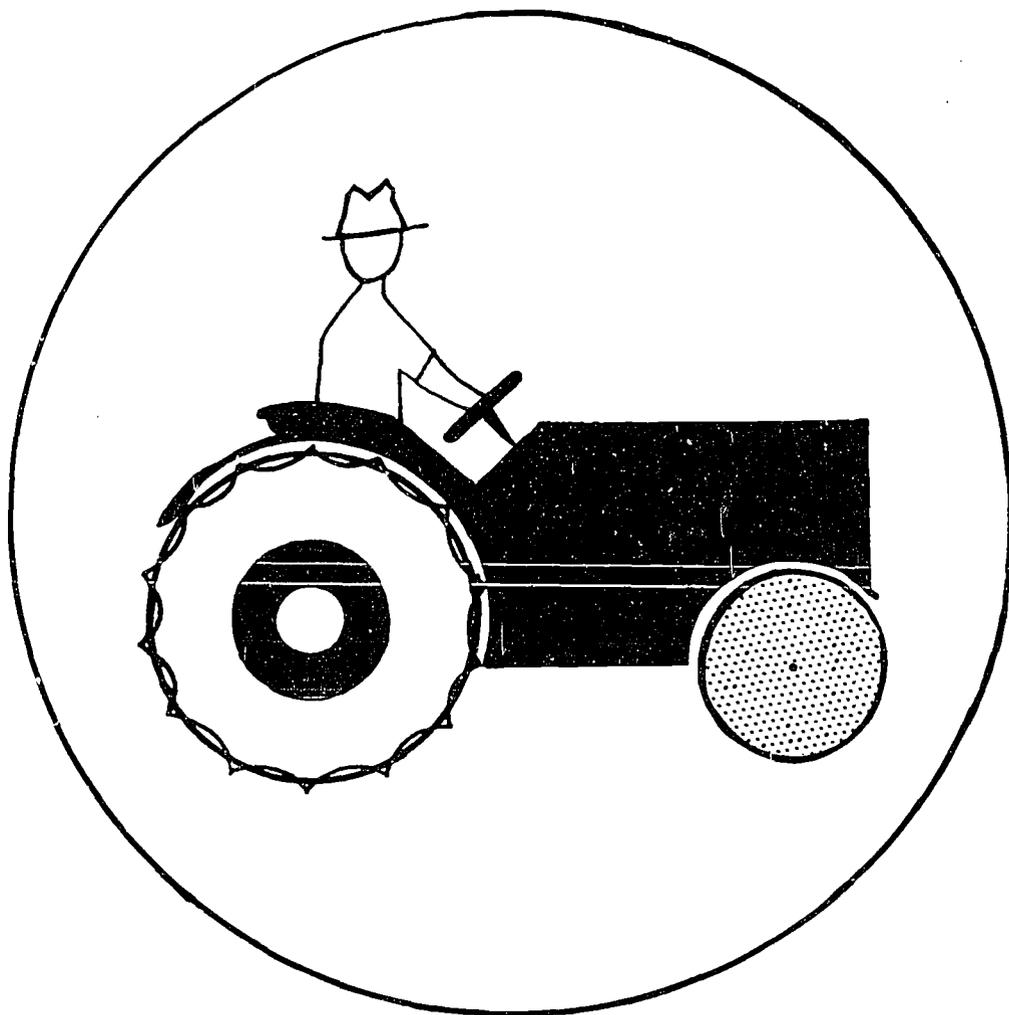
Following the clusters, a selected bibliography of general sources of information covering many careers is provided.

Every effort has been made to give this handbook a high degree of authenticity. However, because of the rapid development of new knowledge and technology, population growth, high living standards, and other economic changes, new careers are constantly emerging, and established careers are changing swiftly. Hence, it is impossible to provide, in every instance, career descriptions which are relevant and up-to-date.

Members of the faculty and staff of Texas State Technical Institute, with many years of experience in and contact with certain of the careers described, have provided or checked the information concerning those careers. Many hours have been spent in personal interviews and literature searches to collect and verify the facts concerning other careers. The number of persons involved in providing, checking, or obtaining the information has been so great, and the contributions so varied, that listing them or giving proper credit would be impossible. Several were employed temporarily to handle the bulk of the work but most donated their time and expertise without any reimbursement. In order to provide a consistency of presentation and assure the professional excellence of the finished product, Educational Services, Inc. of Waco was commissioned to organize, compile, and edit the vast amount of information gathered for the project.

It is the belief of the administration and staff of Texas State Technical Institute that this "Career Information Handbook" will provide a valuable new resource for high school counselors, teachers and administrators and, most important, for their students, especially in those schools which also use the "High School Career Interest and Information Survey."

# AGRI-BUSINESS AND NATURAL RESOURCES



## Agri-Business and Natural Resources Occupations

### GENERAL INFORMATION

The field of agriculture is undergoing changes which are having a tremendous impact on the employment outlook in this area. In brief, fewer farmers are producing more of America's farm products. Farmers today produce more than at any time in history, thanks to modern, highly complex equipment and techniques. To make this high-capacity equipment profitable, farmers must harvest greater areas of land, and must have capabilities which are more sophisticated than those of even one generation ago.

Management problems face modern farmers much more than in the past; therefore college and special training are becoming more beneficial to persons employed in agricultural production. This training gives the technical basis needed for keeping up with research, technology, and practical application. Biology, engineering, soil science, agronomy, economics and accounting are all necessary for today's successful live-stock or crop farmer. To aid those in agriculture who lack such knowledge and training, many thousands of specialists are needed. The areas of information and guidance, research, publications, teaching and extension work offer positions in which workers aid and advise farmers seeking help with their enterprises.

Although the number of opportunities in farming is shrinking, the number of jobs in farm-related occupations and industries which supply both products and services are on the rise. There is a definite need for new persons who have a farming background and interest, plus specialized training for their functions.

Agri-business and natural resources occupations have direct influence on the daily lives of all people. The harvesting of natural resources is becoming more mechanized. Fuel and power sources must be discovered, exploited, and delivered to industries and families. The recent emphasis on environmental control and protection is bringing many changes in these areas. Not only must the needs for the present be met, but must be met in such a way as to guarantee resources for the future.

## Agri-Business and Natural Resources Occupations

### FARMING

Farming is one of man's oldest and most important activities. It not only benefits the farmers and their families, but aids persons everywhere by providing necessities of life such as food, clothing and shelter. Farming includes cultivating soil, sowing seeds, and harvesting crops through the seasons, while fighting floods, dry periods, diseases, and insect pests. Scientific farming methods, powerful tractors and special machinery have enabled modern farmers to reduce the man-hours needed to produce most of the major commodities.

Farms vary in size from small operations to large and complex businesses. Farmers produce several kinds of crops on diversified farms, or they may grow only one kind of crop such as cotton, maize, wheat, corn, peanuts, dairy products, fruit, poultry, or truck products.

Personal qualifications for farmers include a love for the out-of-doors, acceptance of the challenge of independence, and appreciation for the freedom associated with being in business for themselves. Farmers need to have above-average mechanical abilities, plus a knowledge of all types of machinery used on the farm. They must be strong and in good health, as much of the work requires hard, physical labor in all kinds of weather. Farmers must have knowledge of the principles of soil preparation and cultivation, be able to choose the proper crops for soil and climate, and select seeds or plants. They must have a good understanding of crop rotation, fertilization, insect control, animal diseases, poultry diseases and pests, plus a knowledge of business practices including bookkeeping and management. Mathematical ability is also important as farmers must risk large sums of money against bad weather and fluctuating market prices.

There are no specific educational requirements for the farmer. Both farm training and experience are advisable for successful farming. Being raised on a farm offers both of these, as does membership in organizations such as 4-H clubs and Future Farmers of America. Most persons need experience before entering their own ventures in farming. Many types of vocational training programs are now available in high schools, junior colleges and technical schools. These programs tend to sharpen basic skills of agriculturally-oriented persons.

Working conditions for farmers include out-of-door work with long, irregular hours. Their life is affected by weather, and there are few breaks in the routine. Since the work is seasonal, farmers may engage in other pursuits during off-seasons. Large farms have the availability of machinery and workers for most of the work. Work is common on weekends and holidays for all farmers.

Opportunities in farming are best for the young person who takes over a family farm since the basic investment for land and machinery has already been made. The long-range forecast is for a decrease in the number of people working as farmers and farm laborers. There is a growing need in

## Agri-Business and Natural Resources Occupations

this occupation for well trained, skillful persons who can manage the financial problems of farming in an increasingly technological age. Management is the key to success in modern farming.

Despite problems encountered, farming continues to offer a way of life which is attractive to many families. The independence and freedom to be one's own boss, plus the quiet, simple life to be found in the country add to the advantages of farming. Both household and farming appliances have eliminated most of the disadvantages of rural living which were prevalent only a generation ago. Farming offers challenging and rewarding careers with larger incomes and better living conditions than ever before. Actual earnings of the farmer will vary considerably, depending upon the size of the farm, its location and type.

Agri-Business and Natural Resources Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
FARMING

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605

No. 20 Agricultural Science and Modern Farming  
No. 80 Careers in the Dairy Products Industry  
No. 170 Poultry Farming  
No. 175 Vegetable Farming

Other Sources

American Dairy Ass'n  
20 N. Wacker Drive, Chicago, Ill. 60606

County Agricultural Agent, your county

Texas Agricultural Extension Service  
Texas A&M University, College Station, Texas

Texas Ass'n of Future Farmers of America  
Texas Education Agency  
201 E. 11th Street, Austin, Texas 78701

Texas Farm Bureau  
Box 489, Waco, Texas 76703

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

U.S. Department of Commerce  
Washington, D.C. 20230

## Agri-Business and Natural Resources Occupations

### LIVESTOCK AND RANCH OPERATIONS

Livestock production is a rewarding and profitable career field for persons who like the out-of-doors, animals, hard work and little desk work. Included in the broad range of livestock and ranching are positions as ranch and feedlot workers, meat inspectors, commercial ranch managers and owners, and salesmen of animal health products and feeds.

The term ranching may refer to several types of animals, including poultry, dairy animals, heavy beef, hogs, sheep and goats. Many jobs are available in the cattle industry alone. Positions with national livestock associations, auctioneering, marketing, trucking, and grooming show herds are some of the jobs in this industry. A number of jobs are opening up for the artificial insemination technician.

Although farms and farm jobs are decreasing, prospects for careers in livestock and ranch operations have never been brighter. For those persons with education and ambition, these fields offer many opportunities. Ranching is "big business" today. Population growth and demands for more food make the prospects for continuing growth promising. Ecology has affected the agricultural field, with a resulting emphasis on testing, research and quality control to standardize and upgrade products.

To be successful in this business, young people should study the requirements necessary for specific types of ranching operations. They must take into consideration the vast number of skills, knowledge and ability needed to direct labor, handle animals, and operate the machinery common to the livestock industry. Great responsibility is placed on the person who chooses to work for the ranch owner.

Many positions on a ranch involve seven-day workweeks. This may not present a great hardship on those who really enjoy their work. Weather conditions are certain to present added problems from time to time. However, there are usually slack labor periods during some seasons of the year when a more relaxed atmosphere prevails on the ranch.

As the trend toward specialization affects the livestock and ranching industry, persons entering this field will need more advanced knowledge. Employees can progress on a ranch from "hand" to manager only with specialized training and years of experience. Technically trained personnel will find numerous opportunities in large commercial operations as well.

For those who enjoy working with their hands, the "open spaces", and animals, a career in livestock and ranching is rewarding and satisfying. Here, as in few other occupations, lies the real challenge---that of producing and maintaining living products for market, utilizing the land and its resources. Benefits in this type of employment can also be great. Besides a salary, in many cases one can expect that housing, utilities, transportation, and sometimes even food, will be furnished.

Agri-Business and Natural Resources Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
LIVESTOCK AND RANCH OPERATIONS

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 166 Beef Cattle Raising and Breeding as a Career

Other Sources

The American Aberdeen-Angus Breeders' Ass'n  
1 Dexter Park Ave., Chicago, Ill. 60609

The American Hereford Ass'n  
300 W. 11th Street  
Kansas City, Mo. 64105

American National Livestock Ass'n  
515 Cooper Bldg., Denver, Colo. 80202

The American Shorthorn Breeders' Ass'n  
7 Dexter Park Ave., Chicago, Ill. 60609

Breeders' Ass'n, American Rambouillet  
2709 Sherwood Way, San Angelo, Texas 76901

County Agricultural Agent, your county

East Texas Hereford Breeders' Ass'n  
2007 Rosewood Drive, Tyler, Texas 75701

National Live Stock & Meat Board  
36 South Wabash Ave., Chicago, Ill. 60603

National Livestock Producers Ass'n  
139 N. Clark Street, Chicago, Ill. 60602

Texas Brahman Ass'n  
4905 Calhoun Road, Houston, Texas 77004

Texas Cattle Feeders Ass'n  
2915 South Georgia, Amarillo, Texas 79109

Texas Farm Bureau  
Box 489, Waco, Texas 76703

Texas Sheep & Goat Raisers Ass'n  
Box 1486, San Angelo, Texas 76901

## Agri-Business and Natural Resources Occupations

### AGRICULTURE-RELATED BUSINESS

Production agriculture such as farming and ranching is supported by a wide array of enterprises often referred to as agri-business. Some provide farmers or ranchers with the equipment and supplies. Others are involved with buying, storing, distributing or processing the products of farms and ranches. Still others provide services such as financing, crop dusting, fertilizer application, and harvesting. Because so many businesses are engaged in the support of production agriculture, only a few of the many careers available in the field are discussed.

Agri-business technicians provide farmers with power, fuel, transportation services, and other farm and supply services. These technicians find employment in the three main areas of management of an agricultural business, sales, service, and records. Managerial employment is with large farms or dairies, credit institutions dealing in real estate and personal property loans, and in feed or seed companies. Service areas include aerial crop spraying, and distribution of farm produce on both national and international levels. Some technicians may be employed to set up complete systems of records for farmers. So rapid has been the development of agri-business technicians that the profession is still relatively unknown outside the agricultural community.

Personal qualifications include accuracy, good judgment, honesty, and the ability to work with others as part of a team. These jobs also require ability to work with mathematics, an understanding of abstract concepts, and the verbal technique of explaining ideas or devices to others in precise and understandable language.

A high school diploma with courses in language, social studies, sciences, mathematics, and agriculture is essential. Also needed is training in agricultural colleges or technical schools with emphasis in economic theory, problem analysis, communications and report writing.

Working conditions vary greatly since the field of agri-business is so large. Those who work in sales will be traveling a good deal. Those working for banks or in offices will usually work in modern, pleasant surroundings during a normal forty-hour week. The technician who goes into farm management or who owns his own business will work outdoors.

The employment outlook for this job is highly favorable as small farms give way to large corporate businesses. Agri-business specialists have salaries which are fair to good. Advances come with experience, especially in the sales area. Fringe benefits depend upon the employer, but include pension plans, paid vacations, company insurance, and tuition refunds for further education.

Cooperative extension workers are engaged in educational work to improve methods of agriculture, home economics, youth activities, and

## Agri-Business and Natural Resources Occupations

community resources development. They are employed jointly by land-grant universities and the U.S. Department of Agriculture. County agricultural agents are interested in improving the efficiency of agricultural production and marketing, including the development of new market outlets. County home economic agents work closely with women in home management, nutrition, and other phases of family living.

Extension workers help people analyze and solve their farm and home problems, and aid in community improvement. Much of this work is carried out in groups, through meetings, tours, demonstrations and local voluntary leaders.

County extension staffs are supported by specialists such as persons well versed in agronomy, livestock, marketing, agricultural economics, home economics, horticulture and entomology. These specialists work to keep abreast of new developments in their particular field, and work with agents in applying this information to local needs and problems.

Personal qualifications for extension agents are enjoyment in working with people, aggressiveness, a compassion for farmers and their problems, and the ability to teach. These persons must also be patient, have organizational abilities, and a real interest in their field which will enable them to keep up with new techniques and information.

Extension workers are required to have a bachelor's degree, usually with a major in agriculture or home economics.

This type of work can be both mentally and physically tiring. Extension workers may remain in the office on some days working in routine matters, while at other times they may be in the field working to help solve problems of farm families. Many meetings are required, and travel is common. The hours are not regular and various activities often take this person away from his family in the evenings and on weekends. The pay is fair to good.

Competent agricultural extension agents are promoted rapidly. Promotions may be in the form of assignments to more responsible positions or in salary only. It is possible to move into state jobs as directors or supervisors.

Satisfaction is gained through working with people in solving problems, particularly with those who sincerely appreciate help. The work is not particularly confining, and the individual with enterprise and initiative is rewarded by both promotions and recognition.

Agri-Business and Natural Resources Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
AGRICULTURE-RELATED BUSINESS

Pamphlets

California State Polytechnic College  
Publications Manager  
San Luis Obispo, Calif. 93402  
Careers in Agriculture Business Management

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 53 Jobs in Agriculture Businesses  
No. 80 Careers in the Dairy Products Industry  
No. 152 Agricultural Engineering  
No. 204 Plant Scientist  
No. 210 Research Careers in Agriculture  
No. 242 Careers in the U.S. Dept. of Agriculture  
No. 245 Farm Equipment Dealership

U.S. Government Printing Office  
Washington, D.C., 20402  
No. 1300-3 Agricultural Occupations, 15¢

Books

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Agricultural Engineering

Weyant, J. Thomas, Hoover, Norman K., McClay, David R.,  
An Introduction to Agricultural Business and Industry  
Interstate Printers and Publishers Co., Danville, Ill.

Other Sources

American Society of Agricultural Engineering  
420 Main Street, St. Joseph, Mich. 49025

American Society of Agronomy  
677 South Segoe Road, Madison, Wis. 53711

County Agricultural Agent, your county

Texas Independent Meat Packers Association  
Box 7369, San Antonio, Texas 78207

Texas Seedsmen's Association  
Suite 15, 6515 Sanger Ave., Waco, Texas 76710

## Agri-Business and Natural Resources Occupations

### VETERINARIANS OR ASSISTANTS

Veterinarians, doctors of veterinary medicine, study and treat diseased and injured animals, either medically or surgically. They also work with healthy animals in order to prevent illness.

About one-third of all vets work solely with household pets, while some work only with large animals such as horses, cattle and sheep. Most small-animal clinics and hospitals are located in cities or suburban areas. Veterinarians who specialize in large animals work primarily in rural areas, sometimes as staff veterinarians for large dairies, cattle ranches or horse farms. A few research-oriented vets are employed by the space program which has used animals in new ventures into the atmosphere. A large number of veterinarians work in state and federal health programs as inspectors in meat packing and poultry processing houses. Others work as herd inspectors; in teaching positions in schools of veterinary medicine; in research centers; and a few are employed by zoos.

The degree of doctor of veterinary medicine (D.V.M.) is required before any veterinarian may be licensed to practice. The degree is achieved through six years of study following graduation from high school. Some junior colleges offer pre-veterinary training, involving courses such as chemistry, zoology, animal husbandry, physics, English and social studies.

After obtaining the D.V.M. degree, veterinarians planning to enter private practice must take an examination conducted by a state board in order to be licensed. The examination is difficult but there is no limit to the number of times an applicant may take the test. No license is required for those entering government service or the teaching field.

In addition to this full training program, a person should have physical strength and stamina, physical courage, a love of animals and good talent for observation.

Most small-animal clinics and hospitals are well-appointed and attractive, with air conditioning and central heating. Small-animal vets maintain regular office hours, but are subject to emergency house calls and night work. Occasionally, they may work as much as sixty hours a week, especially when an infectious disease is sweeping the country. As well as advising on the care, feeding and breeding of pets, vets keep records of all sick animals treated, as well as all medicines and supplies ordered.

Large-animal vets usually work in rural areas, and are subject to much travel, often in remote areas and at any hour. They may have to treat a sick cow or horse in an open field away from all conveniences.

Veterinarians are respected members of their community and are

## Agri-Business and Natural Resources Occupations

considered to be professionals. Most veterinarians have feelings of deep satisfaction with their chosen profession, with the knowledge that they are providing a much needed service to both animals and their owners. For vets in private practice, advancement usually is the reward of a successful and expanding business and the resulting higher income. Earning levels are good to very good, and, in some cases, are excellent.

Veterinary technologists assist licensed vets in giving injections, performing operations, and helping in routine duties. These persons should have an interest in the welfare of animals, be energetic and have an above-average educational background. They should have a high school diploma and training in veterinary assisting obtained in technical schools or junior colleges. This training should include studies of animal physiology and anatomy, plus other related subjects which will equip the student to perform necessary duties. Length of time for such courses is usually two years, with three months of practical experience in a veterinary clinic.

Most work will be inside, in a clinic-type atmosphere. The veterinarian assistant will be responsible for meeting the public, keeping records on the history of animals, treatment and other information.

Some persons in this field further their education and become vets. Satisfaction is gained from caring for animals and aiding in their health. Salaries are fair.

Agri-Business and Natural Resources Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
VETERINARIANS OR ASSISTANTS

Pamphlets

American Veterinary Medical Ass'n  
600 South Michigan Ave., Chicago, Ill. 60605  
Career Facts About Veterinary Medicine  
Dimensions of Veterinary Medicine  
Veterinary Medicine as a Professional Career for Women

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 71 Veterinary Medicine

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-99 Veterinarians, 5¢

Books

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Veterinary Medicine

Other Sources

Agricultural Research Service  
U.S. Department of Agriculture, Hyattsville, Md. 20782

College of Veterinary Medicine  
Texas A & M University, College Station, Texas

Texas Veterinary Medical Ass'n  
Suite 3-D, Page Bldg., 610 Brazos Street, Austin, Texas 78701

## Agri-Business and Natural Resources Occupations

### MINING, QUARRYING, OIL AND GAS PRODUCTION

The mining industry supplies basic raw materials and energy sources. It is made up of mining of metals such as iron, copper and gold; quarrying of limestone, gravel, clay and granite; coal mining; and oil and gas extraction. The latter has the largest group of employees.

These industries employ such professional persons as geologists, mining engineers and a variety of other specialists in the areas of drilling, operations and maintenance.

For non-professional jobs, a high school diploma is desired. These persons are usually trained on the job. They must have good health, and the desire to work hard.

Most of the work in the industry is outdoors. The majority of oil fields are away from cities, but may be near small towns. Frequent moves are necessary for most drilling employees. Those in maintenance and well operations work out-of-doors, and may travel to and from sites. Benefits are good, with vacations, retirement and hospitalization. The pay is good, with higher paid employees being offshore workers, who live on platforms on the ocean or on ships anchored near drilling rigs. Advancement in general is slow, and is usually through pay increases.

Geologists study the structure, composition and history of the earth's crust. They study rock cores, cuttings, minerals, and fossils. Geologists also may spend considerable time in laboratory work in the analysis of material and research. They prepare reports, maps and other readings of surface and subsurface formations. Specialized fields of geology include petroleum geology, mineralogy, and stratigraphy. Persons interested in this career should have an aptitude for mathematics, physics and chemistry. They should like to work outdoors and have physical stamina.

A bachelor's degree is required. A master's degree and Ph.D. are desired. The work is mainly outdoors, but indoor work is required when laboratory studies are necessary. This type of work is physically demanding, and is sometimes in remote or rugged areas. The geologist may have to be away from his family for long periods of time. Laboratory work may be long and tedious.

Advancement is slow unless a person has a Ph.D. degree, then he may advance to administrative or research positions. Hours of work are varied. Salaries rank high in the scientific field. The geologist will find great satisfaction working with members of a team in contributing to man's knowledge of the earth.

The following are brief summaries of some other occupations in mining, quarrying, oil and gas production:

## Agri-Business and Natural Resources Occupations

Scouts keep their companies informed of all leasing, drilling and production in a specified area.

Rig Builders install rigs which are used to support equipment and raise and lower drilling tools.

Drillers operate all drilling machines and select proper drill bits. They also keep all drilling records.

Roughnecks assist drillers and guide the lower end of pipe to the well opening, connect and disconnect pipes and drill bits.

Tool Pushers are the foremen of a drilling rig. They are also in charge of supplying all materials needed.

Roustabouts are general oil field laborers who do odd jobs such as cleaning floors of derricks and constructing roads in fields.

Pumpers operate and maintain motors and pumps used to force an artificial flow from the wells after drilling has been completed.

Switchers work in fields where oil does not require pumping, but has a natural flow. They open and close valves to regulate the flow.

Gagers keep track of oil flowing into tanks or pipelines, and take samples to check the quality of the oil.

Many unions represent different levels of employees in mining, quarrying and oil and gas production industries. Some of these unions are quite strong.

Agri-Business and Natural Resources Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
MINING, QUARRYING, OIL AND GAS PRODUCTION

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605

No. 15 Careers in Geology

No. 62 Careers in the Oil & Gas Industry

No. 179 Mineral Economics as a Career

National Coal Ass'n, Education Division  
1130 17th Street N.W., Washington, D.C. 20036

Careers in the Coal Industry

New York Life Insurance Co.

Career Information Service

Box 51, Madison Square Station, New York, N.Y. 10010

Should You Go Into the Mineral Industry

U.S. Government Printing Office

Washington, D.C. 20402

No. 1300-67 Petroleum Production and Refining Occupations, 10¢

Books

Universal Publishing and Distributing Co.

235 E. 45th Street, New York, N.Y. 10017

Vocational Guidance Manual, Petroleum Industry

Other Sources

American Ass'n of Mining, Metallurgical and Petroleum Engineers (AIME)  
345 E. 47th Street, New York, N.Y. 10017

American Ass'n of Petroleum Geologists

Box 979, Tulsa, Okla. 74101

American Geological Institute

2201 M St. N.W., Washington, D.C. 20037

American Petroleum Institute

1801 K Street, N.W., Washington, D.C. 20006

National Petroleum Refiners Ass'n

1725 DeSales Street, N.W., Washington, D.C. 20036

Society of Exploration Geophysicists

Box 3098, Tulsa, Okla. 74101

## Agri-Business and Natural Resources Occupations

### OTHER AGRI-BUSINESS AND NATURAL RESOURCES OCCUPATIONS

Career fields in agri-business and natural resources occupations, in addition to those already discussed, include the following:

Plant and Animal Quarantine Inspectors are responsible for the inspection of agricultural products in transit. They enforce quarantine and regulatory laws to prevent the spread of plant and animal diseases.

Agronomists conduct experiments in field crop problems and develop new and improved methods of growing crops to secure more efficient production, a higher yield and improved quality.

Cotton Graders classify cotton according to grade, length of staple, and character based on U.S. Department of Agriculture grade standards

Ginners separate cotton lint from the seeds, hulls and waste materials using cotton ginning machinery.

Compress Operators tend presses which reduce the size of cotton bales for shipment and storage.

Grain Elevator Superintendents coordinate and supervise all activities of workers engaged in the unloading, loading, cleaning, storing and blending of grain in grain elevators.

Drier Operators operate facilities to remove moisture from harvested grain, peanuts or other crops so that these crops can be stored or shipped.

Meat Graders examine animal carcasses to grade them in terms of sales value, and determine grade to stamp or tag carcasses.

Hatchery Operators are responsible for the operation of hatcheries concerned with the production of baby chicks for sale to egg or meat producers.

Artificial Breeding Technicians collect and package bull semen for the artificial insemination of cows. They may ship for distribution and mechanically inseminate cows for breeding.

Farm Machinery Set-Up Men erect and assemble, adjust and demonstrate farm machinery. They may also deliver to purchasers.

Seed Growers specialize in the production of pure seeds of definite varieties for sale to farmers and growers. They may work to develop new varieties of plants resistant to diseases or insects.

## Agri-Business and Natural Resources Occupations

Airplane Pilots (Crop Dusting) fly airplanes or helicopters at low altitudes over agricultural fields to dust or spray with fertilizer, insecticides or seeding.

Feed Store Operators sell seed, feed, fertilizers, insecticides and other products used in the production of crops and livestock.

Farm Implement Dealers deal in various equipment needed for the production of agricultural products such as tractors, combines and other harvesting equipment.

Farm Equipment Mechanics maintain and repair farm machinery based on a knowledge of the mechanical, electrical, and hydraulic systems in farm machinery. If employed by a farm equipment dealer he may also assemble new farm machinery that is to be displayed for sale.

Agri-Business and Natural Resources Occupation

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OTHER AGRI-BUSINESS AND NATURAL RESOURCES OCCUPATIONS

Pamphlets

California State Polytechnic College  
San Luis Obispo, Calif. 93402  
Careers in Agriculture Business Management

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 166 Beef Cattle Raising and Breeding as a Career  
No. 204 Plant Scientist  
No. 242 Careers in the U.S. Dept. of Agriculture  
No. 245 Farm Equipment Dealership

New York Life Insurance Co.  
Box 51, Madison Square Station, New York, N.Y. 10010  
Should You Go into the Mineral Industry?

Books

Weyant, J. Thomas, Hoover, Norman K., McClay, David R.,  
An Introduction to Agricultural Business and Industry  
Interstate Printers and Publishers, Danville, Ill.

Other Sources

Association of Official Seed Analysts  
National Seed Storage Lab  
Fort Collins, Colo. 80521

American Society of Agronomy  
677 South Segoe Road, Madison, Wis. 53711

County Agricultural Agent, your county

Texas Agricultural Extension Service  
Texas A & M University, College Station, Texas

Texas Farm Bureau  
Box 489, Waco, Texas 76703

U. S. Dept. of Agriculture  
Washington, D.C. 20250

# BUSINESS AND OFFICE



## Business and Office Occupations

### GENERAL INFORMATION

A variety of professional workers play a major role in administering the business of banks, accounting firms, real estate and insurance offices, and a multitude of other organizations, both private and governmental. They perform a variety of tasks and duties which are both highly specialized and routine in nature. The decisions made by those in management positions, and their effectiveness in implementing their decisions, may determine the success or failure of the enterprise.

Clerical workers and secretaries are essential and, in most cases, form the largest occupational area in the business and office field. These two groups represent a wide variety of skills and experience from executive secretaries to the positions of file clerks, which can be assumed with little specialized training or experience.

The diverse services provided by financial, insurance and real estate industries are used by nearly every individual or organization in the country. These areas are major sources of job opportunities.

Increasing uses of computers and data processing equipment has eliminated the need for some routine and clerical-type positions in the business and office area. For the most part, however, the use of computers is creating a need for thousands of new personnel to fill positions which utilize these machines in performing varied tasks, thus relieving heavy work loads and pressures once felt in the business and office fields.

With the exception of real estate and insurance salesmen, most business and office work is confining. However, many business executives find it necessary to travel a great deal, often on short notice.

## Business and Office Occupations

### ACCOUNTING, BOOKKEEPING, CPA

Bookkeepers keep systematic records and up-to-date accounts of financial transactions in business and industrial firms. They record these transactions daily on ledger sheets, in journals or on other types of accounting forms. They also prepare summary statements of financial transactions, funds received and paid out. This job is a very vital part of a firm or business. Other general duties of the bookkeeper include mailing statements, filing and interpreting financial data to other employees.

These persons are usually employed in retail businesses, manufacturing firms, educational institutions, hospitals, banks and insurance firms. They perform most of their work by hand, but also may use adding machines, typewriters and calculating machines.

Aptitudes for reading comprehension, grammar, spelling, mathematics and a good memory are assets for the bookkeeper. These persons must also have good vision, patience, the ability to perform detailed work, and great accuracy.

Most employers seek those persons who have completed post-secondary training in either junior colleges or business schools. High school graduates with training in business subjects are also employed but usually serve as assistants.

This work is indoors and may be in a very small area, depending upon the type and size of company. The hours are usually forty a week, but may require overtime on occasion.

Well-trained, efficient bookkeepers will find promotional opportunities open in this field. Beginners usually start out in routine work and simple transactions, and may progress to accountant or office manager as they become more proficient.

Beginning salaries are generally low, but persons with ability, alertness and skill progress rapidly. There are generally a reasonable number of paid holidays each year with vacation time which can increase to four weeks with tenure. Fringe benefits may include hospitalization, life insurance, sick leaves and retirement.

This type of work can be repetitive, producing eye strain and nervousness. Opportunities in this field are good, with satisfaction gained from being part of an essential and necessary business operation.

Accountants compile, analyze and prepare business and financial records such as profit and loss statements, balance sheets, cost studies and tax reports. These persons may specialize in auditing, tax work, cost accounting, budgeting and control or systems and procedures.

## Business and Office Occupations

The duties of accountants vary with the type of accounting. Public accountants work independently on a fee basis for businesses or industries desiring services. The public accountant may audit books, prepare income tax forms, financial statements or conduct financial investigations for numerous clients. Private accountants, generally called industrial or management accountants, handle financial records of a firm when there are salaried employees. They may be cost accountants or be responsible for determining unit costs. Tax accountants specialize in federal, state and local taxes and may be public or private. These persons may conduct research on tax effects in a company, and recommend changes to reduce taxes. This is an area of growing importance for accountants. Government accountants work on financial records of government agencies and audit records. They may also be bank employees, internal revenue agents or investigators.

Certified public accountants (CPA) must pass special qualifying examinations and hold certificates issued by the state in which they practice. Most states require all public accountants to hold a CPA certificate.

Most accountants have the minimum of a bachelor's degree and most states require CPA candidates to have this degree with two years of experience in the field. There are indications that in the future all CPA's will be required to hold graduate degrees. Accountants must be able to work independently and supervise the work of others as well. Logical thinking and the ability to work with numbers is very important. Clarity in oral and written expression, accuracy, sound judgment and the ability to make good decisions are important.

The work is almost totally indoors but travel may be required. Because of the complexity of this work, chances for advancement are good. Hours of work are forty per week with some evening and weekend work necessary, especially during the tax period. Industrial accountants have company benefits and two to five week vacations. Federal government employees have Civil Service benefits. Salaries range from good to high with certified public accountants in the highest bracket.

Since accountants deal with a variety of problems, their work is challenging and can be very satisfying.

Business and Office Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
ACCOUNTING, BOOKKEEPING, CPA

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605

- No. 4 Accounting  
No. 98 Cost Accounting  
No. 103 Career as a CPA  
No. 115 Bookkeeping and Machine Operator  
No. 135 Careers For Women in Office Work

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-1 Accountants, 5¢

Books

Rohn, Fred, So You Want to Be an Accountant  
Harper & Row Co., New York, N.Y.

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manuals, Accounting  
Business Papers

Other Sources

American Institute of Certified Public Accountants  
666 Fifth Ave., New York, N.Y. 10019

National Association of Accountants  
505 Park Ave., New York, N.Y. 10022

National Society of Public Accountants  
1717 Penn. Ave. N.W., Washington, D.C. 20006

Texas Ass'n of Public Accountants  
1014 Brazos, Austin, Texas 78701

Texas Society of Certified Public Accountants  
200 Corrigan Tower  
Dallas, Texas 75201

## Business and Office Occupations

### SECRETARIAL OR CLERICAL

Secretaries are office technicians who are skilled in taking dictation in shorthand of correspondence, reports and minutes, or in transcribing from dictated or taped material. They are responsible for scheduling appointments, greeting visitors, making travel arrangements, keeping competent and readily-accessible filing systems, handling mail and answering and making telephone calls.

Executive secretaries usually work for one person and often are required to handle a variety of business details on personal initiative. Occasionally, they are required to supervise a pool of typists and stenographers and allocate work assignments.

Secretaries become more valuable to employers as they gain experience, and can relieve administrative officials of minor executive and clerical duties. At this stage, they are often promoted to the position of executive secretary. These people should have a good vocabulary and spelling ability; be capable of handling personal accounts and banking needs; assisting with the preparation of reports and speeches; be competent to meet the public and assist customers.

Administrative secretaries should be above average in vocabulary and spelling ability, and be able to dictate material to other secretaries and stenographers for their transcription. They should have the ability to work under pressure, to prepare agendas for meetings, personally take notes of all decisions at meetings, prepare budget and financial statements and annual reports. They should be capable of making decisions and generally keep the office running smoothly.

Where shorthand is essential, required dictation speed for secretaries varies from a minimum of 80 words per minute up to 160-180 words per minute, and accurate typing speeds from 50 to 60 words per minute upward. Secretaries should be able to operate a variety of office machines, such as adding machines, calculators, dictaphones, and copying equipment. They should be neat and well-groomed, punctual, dependable, accurate, tactful, discreet, even-tempered, attentive to detail, conscientious, versatile, friendly and work well with others. These persons must be high school graduates, with additional training in business skills such as shorthand, typing, English, arithmetic, filing and general office practices.

Working conditions are usually good. Secretaries usually work a forty-hour workweek.

Work experience and additional training usually result in promotion to the levels of senior secretary, executive secretary, administrative secretary, and possibly office manager or department supervisor. Opportunities are greatest in urban areas. Salaries generally range from fair to good. Other benefits include paid vacations, paid holidays,

## Business and Office Occupations

and sick leaves, health insurance, retirement benefits, and occasionally shared-cost life insurance.

Other special secretaries have similar jobs to those previously discussed, but need additional specialized training for their positions. A brief explanation of some types of specialized secretaries follows:

Technical Secretaries work in engineering, data processing, data analysis, and the scientific fields, such as chemistry, physics, mathematics and biology.

Legal Secretaries may attend courtroom trials and perform other specialized duties common to a law office. Professional legal secretaries usually hold membership in the National Association of Legal Secretaries, requiring at least five years of experience in the field, and successful completion of a two-day examination.

Medical Secretaries work as receptionists, bookkeepers and medical assistants in a doctor's office. They handle financial matters and keep the office running smoothly and efficiently.

Clerk typists and receptionists have similar duties which include handling telephone calls, sorting mail and using various types of office machines such as calculators, transcribers, copying machines and adding machines. Other qualifications are generally the same as those required in secretarial positions, with less specialized training in some areas. These persons have to sit for long periods of time, perform repetitive tasks, and work under close supervision, possibly in a typing pool.

Opportunities are greatest in highly industrialized areas and large population centers. Without additional training these careers do not normally offer much opportunity for advancement, except into different positions such as stenographer, specialized clerks or possibly secretary. Pay is fair.

Business and Office Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
SECRETARIAL OR CLERICAL

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 64 Women as Private Secretaries  
No. 135 Careers For Women in Office Work  
No. 194 Public Stenographers  
No. 200 Medical Secretary  
No. 215 Court Reporter  
No. 232 Legal Secretary

U.S. Dept. of State  
Division of Employment, Washington, D.C. 20520  
Overseas Opportunities, Secretaries

U.S. Government Printing Office  
Washington, D.C., 20402  
No. 1300-89 Secretaries, Stenographers and Typists, 5c

Books

Richards Rosen Press, Inc.  
New York, N.Y.  
Aim High Vocational Guidance Series  
Office Machine and Clerical Operations

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Office Occupations

Other Sources

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

National, International Secretaries Ass'n  
Texas-Louisiana Division  
1300 W. Cannon Street, Ft. Worth, Texas 76104

National Shorthand Reporters Ass'n  
25 W. Main, Madison, Wis. 53703

Texas Ass'n of Legal Secretaries  
1941 South Seventh Street, Abilene, Texas 79602

## Business and Office Occupations

### BANKING OR FINANCE

Banking is a complex business and many kinds of officers and bank related workers are necessary to this career.

Bank Cashiers oversee the receipt, disbursement, expenditures and custody of the money.

Administrative Secretaries carry out policies established by the president and other officers of the bank.

Treasurers are responsible for directing the formal financial affairs of the bank.

Controllers control the financial affairs.

Mortgage Loan Officers investigate and judge the reputations and finances of customers seeking bank credit.

Trust Officers manage assets belonging to individuals, families, corporations and institutions.

Reserve Officers maintain and calculate the reserve funds in a bank.

Securities Traders handle stock and bond transactions.

Vice Presidents serve as financial officers to promote good will and develop new business. These persons are in contact with customers, businesses and civic organizations. Vice presidents may be in charge of specific areas such as loans, trusts or foreign exchange.

A college degree is necessary for most bank officers. A number of majors can be pursued because of the complexity of the banking business. Bankers do not need special licenses, but must have the special traits of tact, neatness and accuracy in work, and the ability to get along well with all kinds of people. They must be prompt and well-organized people. Honesty is perhaps the most important qualification. Because bankers or bank workers handle large sums of money, and have access to confidential information about bank customers, they must have a high degree of personal integrity.

The working conditions are indoors and very good. Advancement is usually slow and has to be made through channels. Bank officers have prestige and know they are a vital part of the business world. Their salaries are moderate to high.

Bank related workers include the following positions:

## Business and Office Occupations

Bank Clerks, Tellers and Cashiers are responsible for handling of customer account transactions. These persons receive and pay out monies, cash checks, record transactions or may be in charge of safety deposit boxes.

Bookkeeping workers keep records and up-to-date financial transactions, and may prepare summary statements for customers.

Computer Operating Personnel are responsible for operating the many kinds of data processing and computer equipment now being used by most banks. They feed programmed instructions into the computer, and may write the data which is coded onto cards or paper tape by keypunch operators. The flexowriter operators operate printer machines which translate programs into words or numbers.

These employees should have essentially the same qualifications and characteristics of bank officers. However, a college degree is not required, but is helpful. Working conditions are indoors, and are good. Advancement is slow and salaries are low to moderate.

Banking or finance employees may also work in financial organizations such as savings and loan associations, credit unions, and investment companies. Their duties are comparable to those in a bank.

Business and Office Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
BANKING OR FINANCE

Pamphlets

American Bankers Ass'n  
90 Park Ave., New York, N.Y. 10016  
Banking, An Opportunity For You

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 30 Investment Banking  
No. 31 Careers in Banking  
No. 83 Bank Employment, Jobs For Women

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-14 Banking Occupations, 10¢

Books

Richards Rosen Press, Inc.  
New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Banking

Other Sources

American Bankers Ass'n  
Personnel Administration and Manage Development Committee  
1120 Conn. Ave. N.W., Washington, D.C.

Investment Bankers Ass'n, Texas Group  
American National Bank Bldg., Box 2266, Austin, Texas 78767

National Ass'n of Bank Women, Inc.  
National Office, 111 E. Wacker Drive, Chicago, Ill. 60601

National Consumer Finance Ass'n  
1000 16th Street N.W., Washington, D.C. 20036

Texas Bankers Ass'n  
1001 Vaughn Bldg., Austin, Texas 78701

Texas Mortgage Bankers Ass'n  
Box 1908, Austin, Texas 78767

INSURANCE

There are two broad categories of insurance, life and health insurance and property and liability insurance. Most companies specialize in one of these areas, but many handle both.

Insurance Salesmen sell policies which provide life, retirement income, property, fire, burglary and emergency insurance, liability, health, and short or long term policies. They are generally field representatives for companies. They may be independent and purchase insurance for their clients from one of several companies. Salesmen find customers, explain services, develop insurance plans, close the transaction, and follow-up with contacts.

Actuaries make statistical studies about various kinds of risks, On the basis of these studies, they also determine premium rates of policies.

Claims Adjusters decide whether claims are covered by the customer's policy, see that the payment is made, and if necessary, investigate the claim.

Investment Analysts are employed by large insurance companies in evaluation of real estate mortgages and issuance of bonds and securities. They also analyze investments, and advise when to hold, buy or sell.

Persons in the insurance field should have a liking for detailed work, a positive attitude, sympathy for problems of others, and a belief in the values of insurance coverage. College trained persons are preferred in this area, but it is not necessary. A life insurance salesman must pass a state test for a license before he can sell insurance. A small percentage of salesmen are Chartered Life Underwriters, which requires three years of experience and successful completion of a series of tests.

Insurance employees work generally on their own initiative. Salesmen are usually active in social groups, service clubs, and churches through which they are exposed to new clients. Much detailed work is necessary, and earnings are uncertain at the beginning of this career. There will be both night and weekend work.

Advancement depends entirely upon the individual. Opportunities in the insurance field are good. The wages are usually based on commissions, and after four to five years the pay is good to very good.

Business and Office Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
INSURANCE

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 40 Careers in Life Insurance  
No. 111 Careers in Fire and Casualty, Accident and Health Insurance

U. S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-50 Insurance and Real Estate Agents & Brokers, 10¢

Books

Richards Rosen Press, Inc.  
New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Insurance Industry

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Life Insurance Selling

Other Sources

Institute of Life Insurance  
277 Park Ave., New York, N.Y. 10017

Insurance Information Institute  
110 William Street, New York, N.Y. 10038

Life Insurance Agency Management Ass'n  
170 Sigourney Street, Hartford, Conn. 06105

National Association of Insurance Agents  
96 Fulton Street, New York, N.Y. 10038

National Ass'n of Life Underwriters  
1922 F Street N.W., Washington, D.C. 20006

Southwestern Insurance Information Service, Inc.  
San Jacinto Bldg., Suite 401, Austin, Texas 78701

Texas Ass'n of Insurance Agents  
414 First Federal Bldg., Austin, Texas 78701

## Business and Office Occupations

### REAL ESTATE

Real estate brokers are independent businessmen who sell real estate or rent and manage properties, make appraisals, arrange for loans to finance purchases, and develop new building projects. A broker who is an active member of the National Association of Real Estate Boards may be known as a Realtor.

Real estate salesmen are employed by the brokers and execute orders from buyers and sellers for the sale or rental of property. These salesmen obtain listings of property for their firms. The salesmen show buyers or potential buyers the property in which they are interested. They usually visit all listings first to become familiar with them. They work with sellers to agree on price and other conditions. Salesmen may have to serve as negotiators. They prepare formal contracts, collect the earnest money, advise buyers regarding title searches and insurance, and may arrange for the necessary loan.

There are no set educational requirements for the real estate business, but a high school diploma is minimum. An increasing number of these persons hold college degrees. A license is required to work as a salesman or broker.

Real estate employees must have a general liking for people, the ability to express themselves well, and have tact, enthusiasm, and good judgment. Maturity is an asset. Patience is of prime importance, as salesmen may show a customer many different pieces of property, and not make a sale.

Some work is indoors, but most is traveling to and from property to be shown. The hours are very irregular, with night and week-end work. The pay is good after a person has gained some experience and recognition. Salaries are usually on a commission basis, and may come either slowly or rapidly. Advancements are usually on a monetary basis.

Real estate personnel play a significant roll in helping families with one of their largest investments, that of buying a home. Some specialize in commercial property and others list only private homes. Also, some handle rental property in addition to property to be sold.

Business and Office Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
REAL ESTATE

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 74 Real Estate and Building Management  
No. 216 Real Estate Broker - Salesman

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-50 Insurance and Real Estate Agents & Brokers, 10¢

Other Sources

National Ass'n of Real Estate Boards, Dept. of Education  
155 E. Superior Street, Chicago, Ill. 60611

Texas Real Estate Ass'n  
Box 9907, Austin, Texas 78757

## Business and Office Occupations

### DATA PROCESSING OR COMPUTING

Computer operations utilize two important types of professionals to aid in problem solving common to this field. The computer programmer prepares step-by-step instructions for the electronic computer. The systems analyst plans, schedules and coordinates activities necessary to the development of data systems which are fed into the computer for problem solving.

Because the nature of programming techniques vary with individual application, many programmers specialize in certain areas of computer programming. A common use of the computer in business offices is as a tool for billing customers. In this instance, computer programmers will determine programming techniques, construct detailed flow charts, code programs, test and debug programs, and document programs. These persons may also perform other related duties such as the design of forms to be used in data presentation. In addition, existing programs must be updated in order to improve efficiency and keep pace with administrative changes.

The job of the systems analyst encompasses the areas of accounting, inventory and other business-related problems. The systems analyst, with the aid of managers, defines, analyzes and logically structures the problem to be solved. These persons must identify all needed data, then work to set up material for processing. They too must prepare charts, tables and diagrams to describe a system and the steps necessary to its operation. The systems analyst also recommends the equipment to be used in problem solving. This person is responsible for preparing instructions for programmers. The final reports obtained from their work must then be interpreted and translated into terms which can be understood by management or customers.

Personal qualities for programmers include ingenuity and imagination, mathematical interest and aptitude, extreme attention to detail and accuracy in work. They must have a high school diploma, or the equivalent, with a strong business background which includes typing.

Training required for systems analysts includes a bachelor's degree with course work in mathematics, data processing and computer operations, business administration and science. Graduate degrees may be required for some positions in this field.

Young persons interested in entering the field of computer operations can acquire necessary skills at technical schools, colleges and universities. High school and post-secondary training often does not eliminate the need for on-the-job training since technological changes require updating of skills.

Computer operations work is based on that of other office and professional workers, about forty hours per week. Occasionally, evening

## Business and Office Occupations

or weekend work may be necessary to complete emergency projects.

Employment opportunities are excellent as experienced and capable persons are in demand to make full use of the multitude of electronic data processing equipment found in business and government operations. The extension of computer technology to small businesses, coupled with the growth of computer centers which serve many clients, signifies a rapid rise in employment for this field. In large organizations, employees may be promoted to senior programming jobs with supervisory responsibilities.

Working conditions are good in modern, well-lighted and air conditioned offices. Employers are sympathetic to the need for computer personnel to work in surroundings which complement their exacting job.

Salaries vary from average to moderately high for the programmer and excellent for the experienced systems analyst.

Business and Office Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
DATA PROCESSING OR COMPUTING

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 92 Computer Technology--Data Processing  
No. 115 Bookkeeping--Machine Operator  
No. 135 Careers for Women in Office Work

Books

Carrol, John, Careers and Opportunities in Computer Science  
Dutton Publishing Co., New York, N.Y.

Cross, Wilbur, A Job With a Future in Computers  
Grosset and Dunlap, New York, N.Y.

Laskow, Robert, Bright Future Careers with Computers  
Chilton Book Co., Philadelphia, Pa.

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Your Career in Computer Programming

Morrison, Phyllis, A Career in the Modern Office  
Gregg Division, McGraw-Hill Book Co., New York, N.Y.

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Office Occupations

Other Sources

American Federation of Information Processing Societies  
210 Summit Ave., Montvale, N.Y. 07645

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

Data Processing Management Ass'n  
505 Busse Hiway, Park Ridge, Ill. 60068

## Business and Office Occupations

### OTHER BUSINESS AND OFFICE OCCUPATIONS

Career fields in business and office occupations, in addition to those already discussed, include the following:

Systems Accountants create and install special accounting systems for organizations which cannot use standardized systems.

Statisticians discover general facts and interpret quantitative information by the application of statistical methods.

Mathematicians determine mathematical principles involved and the most efficient methodology for solutions of problems particularly for computer solutions.

Trust Clerks specialize in trusts, mortgages and legal transactions.

Court Reporters record examinations, testimony, judicial opinions and other legal records using the typewriter or recording machines.

Personnel Supervisors supervise and coordinate activities of workers engaged in compilation and maintenance of personnel records.

Personnel Recruiters travel to different areas to recruit and interview applicants for job openings.

Personnel Investigators check and verify backgrounds of persons applying for jobs. They compile detailed reports of their findings.

Financial Analysts conduct statistical analyses of information affecting investment programs of public, industrial or financial installations.

Investment Counselors give information regarding stocks, bonds, market conditions and company histories to customers or organizations.

Timekeepers keep daily records of arrival and departure time of employees. They may locate workers on the job, pay employees, calculate time worked, wages and units produced.

Business and Office Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OTHER BUSINESS AND OFFICE OCCUPATIONS

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 30 Investment Banking  
No. 35 Personnel Employment Manager  
No. 94 Careers in Purchasing  
No. 108 Office Management  
No. 215 Court Reporter  
No. 246 Careers in Labor Relations in Industry

Books

Marshall, Max L., Cowles Guide to Careers and Professions  
Cowles Education Corp.  
Look Bldg., 488 Madison Ave., New York, N.Y. 10022

Morris, Phyllis, A Career in the Modern Office  
Gregg Division, McGraw-Hill Book Co., New York, N.Y.

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Business Papers  
Office Management

Winter, Elmer, Your Future in Your Own Business  
Arco Publishing Co., Inc., 219 Park Ave. S., New York, N.Y. 10003

Other Sources

American Society for Personnel Administration  
52 E. Bridge Street, Berea, Ohio 44017

Future Business Leaders of America  
Box 5387, North Texas State University, Denton, Texas 76203

Investment Bankers Ass'n of America, Texas Group  
American National Bank Bldg., Box 2266, Austin, Texas 78767

# COMMUNICATIONS AND MEDIA



## Communications & Media Occupations

### GENERAL INFORMATION

Communicators use a variety of processes to relate their message to the listener or reader. Their "language" may be that of the printed word, the photograph or the broadcast.

A science in itself, communications employs persons who are skilled craftsmen to operate machinery such as printing presses and electronic equipment common to radio and television broadcasting. These occupational areas are also dependent upon the artistic and productive talents of writers and specialized reporters as well as skillful photographers.

Many of the areas of employment in communications require membership in guilds or labor unions. However, this is not true in smaller population areas.

The communications practitioners are constantly faced with deadlines whether covering sports, politics, entertainment, fashion or straight news. Meeting schedules and supplying their information to the public while it is still timely is a foremost responsibility.

In recent years, the rate of change in the field of communications and information processing has surpassed that of any other industry. The future will demand those in this occupational field to have even more imagination and creativity plus a broader understanding of trends and technology which affect our daily lives.

Communicators, regardless of the area of interest, are part of a large system of changing and determining ideas of the people around them. Responsibility for shaping these ideas and attitudes is part of being a communicator.

JOURNALISM

Journalism is an objective report of things as they appear at the moment of writing. Historically, journalists have been identified by society as persons who report the news, and when called for, provide interpretation and opinion based on solid fact. Journalists may write an account which is entertaining as well as newsworthy.

Because journalists are mainly concerned with breaking the news, using available pertinent facts, they must possess characteristics which enable them to find and write all that is newsworthy. Personal characteristics important to journalists are a "nose for news," curiosity, persistence, initiative, resourcefulness, an accurate memory, plus the physical stamina to maintain an active and fast-paced life. Journalists must be able to relate to all types of persons. They should also have the ability to make accurate and unbiased observations, question everything, yet avoid cynical fault finding, and know what information is important and interesting to the public.

Although many of today's journalists do not have college educations, persons preparing for a journalism job should obtain some type of formal training. A degree is important to this career field because it provides a liberal arts education. To some employers, only a degree in the liberal arts is necessary. English courses, which include writing, plus subjects such as sociology, political science, economics, history, psychology, and speech are desirable to the prospective journalist. Reading and conversational ability in a foreign language, as well as training in mathematics are also desirable. Typing skills are necessary since nearly all journalists are required to submit typewritten material.

A journalist will be required to work both inside and outside his office area. A common workday for a newspaper reporter averages 7 to 8 hours in length for a total of five days a week. For special events coverage or special assignments, the hours are often longer. Many journalists are responsible for night time news gathering and maintain hours which begin in the late afternoon and end in the early morning. Some experienced journalists may be sent on special assignments which allow them to travel throughout the country and perhaps all over the world.

Journalists may work as reporters for daily or weekly newspapers, national or area magazines, television or radio stations, or as business journalists who write information about one or more particular company. Some persons work as free-lance journalists who seek out news and sell their stories to large magazines or newspapers. The national wire services such as Associated Press and United Press International also employ scores of journalists in their operations.

Competition for advancement in the field of journalism is great. Those persons with talent, experience and drive can advance from reporter to positions such as copy editors, columnists, correspondents,

## Communications & Media Occupations

editors, or even top newspaper executives or publishers. From a small weekly or daily newspaper, journalists may advance to a large newspaper or national magazine. Opportunity is great in the field, yet those who qualify for higher positions must prove themselves through hard work, dedication, accuracy, and fair-mindedness.

Pay scales for beginning journalists with a college degree range from moderate to good. Journalists who begin work on minor publications can expect a smaller salary than those employed by large newspapers or magazines.

Journalistic writing also encompasses the area of technical communications. Technical writers work to develop brochures, manuals, proposals and laboratory reports as well as articles and reports for technical journals. These writers need an understanding of the particular area well enough to edit materials prepared in draft form by engineers, technicians and scientists.

To compete successfully in technical communications, it is necessary to have writing ability plus knowledge about specific technical fields with which the career deals. The professional technical writer should enjoy working with words as well as ideas. Technical writers should have the ability to properly utilize language and to understand technical terms. Because these jobs require contact and cooperation with others, technical writers must be able to get along well with other people.

Pay scales for technical writers are generally good. Increases in technology have opened up many new areas for technical writers and opportunities for employment are increasing rapidly.

To maintain the required technical proficiencies, writers usually are required to constantly upgrade areas of knowledge.

Although actual writing occurs indoors, technical writers may be required to visit work sites in order to obtain information.

Communications & Media

SOURCES OF ADDITIONAL INFORMATION ABOUT  
JOURNALISM

Pamphlets

The Institute For Research

610 South Federal Street, 7th Floor, Chicago, Ill. 60605

- No. 9 Careers in the Publishing Field
- No. 19 Journalism
- No. 118 Editorial Work
- No. 133 Advertising Copy Writer
- No. 167 Professional Writer
- No. 174 News Reporter
- No. 188 Cartooning As A Career
- No. 189 Newspaper Publishing
- No. 193 Photojournalism
- No. 266 Sports Writer
- No. 269 News Correspondent
- No. 274 Careers with Magazine Publishing Companies

Books

Messner Career Books

Julian Messner Co. 1 West 39th Street, New York, N.Y. 10018  
Your Career in Journalism

Universal Publishing and Distributing Co.

235 E. 45th Street, New York, N.Y. 10017

Vocational Guidance Manual, Journalism Careers

Other Sources

American Book Publishers Council

58 West 40th Street, New York, N.Y. 10018

American Newspaper Publishers Association

750 Third Ave., New York, N.Y. 10017

Sigma Delta Chi

35 East Wacker Drive, Chicago, Ill. 60601

Society for Technical Communications, Inc.

Suite 421, 1010 Vermont Ave N.W., Washington, D.C. 20005

Southwestern Journalism Congress

Box D, University Station, Austin, Texas 78712

PRINTING OPERATIONS

Career training in the printing field is designed to prepare people for several different occupations such as printing pressmen, assistants, photoengravers, electrotypers and stereotypers. Bookbinders, composing room and lithographic workers also form an important segment of the printing industry.

Preparation for a career in the printing field includes training in many, if not all, of these basic areas: camerawork, stripping and plate-making, photo-type setting, paste-up and layout, and offset presswork. Also integral to a printing career are experience in bindery and silk screen production.

Persons entering the printing industry should have a high school diploma or the equivalent. An above average understanding of basic mathematics, as well as a high degree of mechanical aptitude, is advantageous. A knowledge of electronics and photography is becoming increasingly important for the operation of new equipment. Post-secondary training in printing technology offers higher entry positions and is deemed desirable by employers.

General abilities in layout and design, photocomposition, paste-up and copy preparation, camera work, and offset and screen processes are necessary for a good printer. Printers must possess qualities such as neatness, attention to detail, and ability to perform repetitive functions without boredom or loss of quality. Many processes associated with printing require a great degree of exactness.

Employees in the "backshop" of a general commercial printing operation will be working to produce such items as books, catalogs, business forms, social and business stationery, and various advertising items.

As there is a general trend toward offset production processes in most areas of printing, the growth rates of these particular areas show the greatest potential as a career field. By 1980, it is estimated that offset methods may account for two-thirds of all commercial printing. Offset product areas include that of greeting cards, business forms, books and periodicals. The newspaper industry is converting rapidly to offset methods of production as time and expenses allow.

Many large industries and establishments maintain their own printing operations to handle routine production and rely on commercial printers only for elaborate productions such as full-color brochures.

Working conditions in the printing industry are generally good. Some skill areas in printing plants are represented by trade unions or craft guilds. Opportunities for advancement are closely tied to an individual's ability to progress through various skill levels. Good salaries and positions are currently abundant. However, better salaries are usually found in a metropolitan area.

Communications & Media Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
PRINTING OPERATIONS

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 140 Career as a Printer  
No. 274 Careers with Magazine Publishing Companies

U.S. Government Printing Office  
Washington, D.C.  
No. 1300-77 Printing Occupations, 15¢

Books

Richards Rosen Press, Inc., New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Printing

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Printing Trades

Other Sources

Allied Printing Trades Council  
1110 W. Illinois, Dallas, Texas 75224

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

International Association of Electrotypers & Stereotypers, Inc.  
758 Leader Bldg., Cleveland, Ohio 44114

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

Printing Industries of America, Inc.  
1730 N. Lynn Street  
Arlington, Va. 22209

PHOTOGRAPHY

Professional photographers are specialists who record places, people and events on film. Tools include either still or motion picture equipment.

The work of photographers vary greatly; however the equipment and materials are basically the same throughout the profession. Photographers must know how to use the many different types of cameras, lenses, filters, film and lighting equipment. In addition, they may be required to process film, print negatives, and make enlargements. Photographers need to have a knowledge of art and design principles, plus the ability to do retouch work on finished products.

As well as artistic abilities, a degree of manual dexterity is required. Imagination and creative approaches in performing the work, a pleasing personality plus the ability to put people at ease are beneficial.

Portrait photographers take pictures of individuals or small groups of persons. They try to obtain a natural looking effect and one that expresses the personality. They generally work in their own studio, but may go into homes or other places to do their work.

Commercial photographers take pictures of merchandise, machinery and fashions, both indoor and outdoors. These pictures are used mainly in advertising.

Industrial photographers' main interest is that of taking pictures for a single company or firm which may lead to improvements in the organization or their product. These photographers also "shoot" workers or equipment and high speed machinery. Their pictures are used for advertising and public relations purposes or determining results from industrial research or testing.

Motion picture photographers either work for large companies producing features or may work for smaller organizations producing documentary films, instructional films, educational films or promotional films. A basic knowledge of still photography is generally required for those entering the motion picture field. They work indoors and outdoors depending upon the requirements of the production.

Other areas of photography include photojournalism, aerial photography, underwater photography, educational photography and scientific photography. A photographer also may be employed as a representative of a photographic equipment company, a producer of documentary films, or as a free-lance professional.

Educational requirements for professional photographers are varied. A college education is not required, but is preferred. However, prospective photographers should plan on some type of formal training in

## Communications & Media Occupations

some facet of photography. For the field of scientific photography, a background in science or engineering with a college degree is generally expected.

Working conditions for photographers vary considerably according to the particular type of business in which they work. Portrait photographers work mostly indoors at a slow pace, while press photographers are faced with meeting deadlines sometimes several times each day. Industrial and commercial photographers work both indoors and outdoors generally at their own pace. Photographers find employment in all parts of the country, but are concentrated in larger cities and industrial areas.

Advancement in the field of photography is usually in terms of salary raises. If photographers are employed by a company, the benefits are generally good, with insurance, retirement and vacation programs. The work is usually on a 40-hour week basis, but may include night and weekend work for portrait and press photographers. Press and free-lance photographers generally have no established set of hours, and may work during emergency conditions and hardships. These photographers should expect to travel often. Many professional photographers go into business for themselves and become very successful, after having established a reputation as quality photographers.

Pay for the photographer ranges from moderate to high. The ability to express ideas and individual personalities in images gives professional photographers much satisfaction from their work.

Communications & Media Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
PHOTOGRAPHY

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 47 Photography  
No. 202 Photojournalism  
No. 235 Camera and Photo Supply Store Manager

U. S. Government Printing Office  
Washington, D.C.  
No. 1300-69 Photographers, 5c

Books

Richards Rosen Press, Inc. New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Photography

Pinney, Roy, Careers With a Camera  
Lippencott, Co., Philadelphia, Penn.

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Photography Careers

Other Sources

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

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

Southwestern Photographers Ass'n  
Box 3122, Fort Worth, Texas 76105

Texas Professional Photographers Ass'n  
107 N. Second Street, Temple, Texas 76501

## Communications & Media Occupations

### BROADCASTING

Broadcasting includes a variety of jobs in radio and television production fields. Some of these jobs are available in the vast commercial broadcasting area and others can be found in public television and educational television.

In the radio field, one of the most popular positions is that of disc jockeys. They play a variety of music and present numerous advertisements, special announcements and news. Because most of today's music is on tape, disc jockeys serve as the bridge between music and the listener. It is also the job of disc jockeys to give the time of day, weather and sports at various times during the broadcast period.

Announcers of various types are employed in both radio and television. Radio announcers may serve part of their time as disc jockeys, but will also record commercials and special interview programs.

Television announcers are responsible for presenting commercials, news, sports and weather.

They must be poised, neat, level-headed, with good diction and no mannerisms. Television announcers should also possess showmanship. It will attract audiences.

Educational requirements for the radio announcer are more lax than for the television broadcaster. A high school diploma is usually all that is necessary for the disc jockey, while the television announcer should have a college degree or other advanced training. Most television announcers have held prior jobs in broadcasting which help qualify them for their positions.

Working conditions for both types of broadcasters are usually indoors although they may be required to work out-of-doors on a special assignment. Television announcers must work under bright, hot lighting. Hours are not regular for either position, and may total more than forty hours each week. The pay in this area is moderate.

Announcers are well-known personalities in the community, and are often sought after as participants in community affairs. They are generally looked upon as celebrities.

Radio and television newsmen are sometimes referred to as electronic journalists. They gather news, report news, interview people in the news, and sometimes present the news on the air. At smaller radio and television stations newsmen may prepare and present the news for both radio and television if both broadcasting media have a common owner.

Broadcasting newsmen work both indoors and outdoors.

## Communications & Media Occupations

Television newsmen most of the time must also be able to film a news event. Therefore, they are required to have knowledge in the motion picture area. Sometimes, they may cover a story, write the story, film the story, edit the film and present the entire story within a newscast.

Sportscasters are specialized positions in the broadcasting field. They give play-by-play descriptions of sports events. They must have extensive knowledge of the particular sport they announce. They must be articulate, have a familiarity with the teams, and possess a good vocabulary. Sportscasters must be able to describe the events as quickly as possible.

Program directors of news, weather, advertising and special feature coverage are another specialized area in the broadcasting field. Directors are usually promoted from other television jobs. A college degree is advantageous for this position, but not required in many instances. The pay is good.

Another area of employment in broadcasting is audio and video tape technicians. These people operate and maintain recording equipment and many times edit the tape for broadcasting presentation.

Other areas of employment in broadcasting include the broadcasting engineers, TV cameramen, sound engineers, lighting specialists, make-up specialists, commercial artists, set designers, and many others depending on the size of the station.

All of the fields require specialized training, and seldom are persons hired without the proper education and experience in broadcasting. Advancement may be to supervisory positions or to a larger station with salary increases.

Work hours are irregular, with shift work in some cases. Essential to some of these areas is an understanding or at least a familiarity with electronics. Mechanical aptitude is also important in parts of the broadcasting field.

The work is interesting, stable and satisfying, although it can mean working under pressure.

Communications & Media Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
BROADCASTING

Pamphlets

American Women in Radio and Television, Inc.  
75 E. 55th Street, New York, N.Y. 10022  
Women in Broadcasting

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 59 Radio Broadcasting  
No. 153 Writing for Radio & TV  
No. 158 Careers As Radio & TV Performers  
No. 173 TV and Radio Announcers  
No. 174 News Reporter  
No. 213 Careers in TV  
No. 248 Engineers & Technicians in Radio & TV  
No. 292 Career as Movie or TV Actor

U.S. Government Printing Office  
Washington, D.C.  
No. 1300-83 Radio and TV Broadcasting Occupations, 10c

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Your Career in TV and Radio

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Radio

Other Sources

American Federation of Television and Radio Artists  
724 Fifth Ave., New York, N.Y. 10019

National Association of Broadcasters  
1771 N. Street N.W., Washington, D.C.

Texas Association of Broadcasters  
901 W. 19th Street, Austin, Texas 78701

Your local Radio or Television Station

OTHER COMMUNICATIONS & MEDIA OCCUPATIONS

The following are listings of other occupations in the broad spectrum of the communications field.

Motion Pictures:

Producers coordinate writers, directors and editors in the production of a motion picture. It is their job to establish the budget, engage key actors and production staff members who will be active in the operation.

Directors organize and direct the cast and crew members of the motion picture during rehearsal and actual filming. They distribute parts, explain desired interpretations, give critiques and suggest changes to improve the film. Some film companies employ directors of research, art, music, casting and location.

Script Writers are responsible for writing stories and adaptations for production. They may be known as gag writers or title writers.

Narrators make explanatory comments to accompany action of motion pictures.

Gaffers position and operate both floor and overhead lights during filming of motion pictures.

Sound Engineers control recording equipment of sound which originates on the set of the film or in the studio where sound is originated or mixed.

Sound Cutters edit and synchronize music, dialogue and sound effects of film into a single print.

Film Editors adapt the film and sound track to conform to the requirements of the director and scenario.

Motion Picture Projectionists set up and operate the projector and sound reproduction equipment for viewing of films.

Costumers design and select costumes for the cast of a motion picture according to the period style and characteristics to be portrayed.

Make-Up Artists apply make-up to actors and cast members to alter their appearance in accord with roles.

## Communications & Media Occupations

Grips handle all of the various equipment needed to produce a motion picture and put into place.

Unit Managers are responsible to directors and assistant directors in repair, care and inventory control of all motion picture equipment.

Laboratory Chemists run tests for quality control purposes in motion picture processing laboratories.

Film Processors work in motion picture laboratories and actually operate the processors.

### Technical Communications:

Technical Manual Writers prepare all types of manuals of equipment used by industry and consumers.

Communications & Media Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OTHER COMMUNICATIONS AND MEDIA OCCUPATIONS

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 226 Careers for Women in Telephone Work  
No. 248 Engineer and Technician in Telephone, Radio and Television

Other Sources

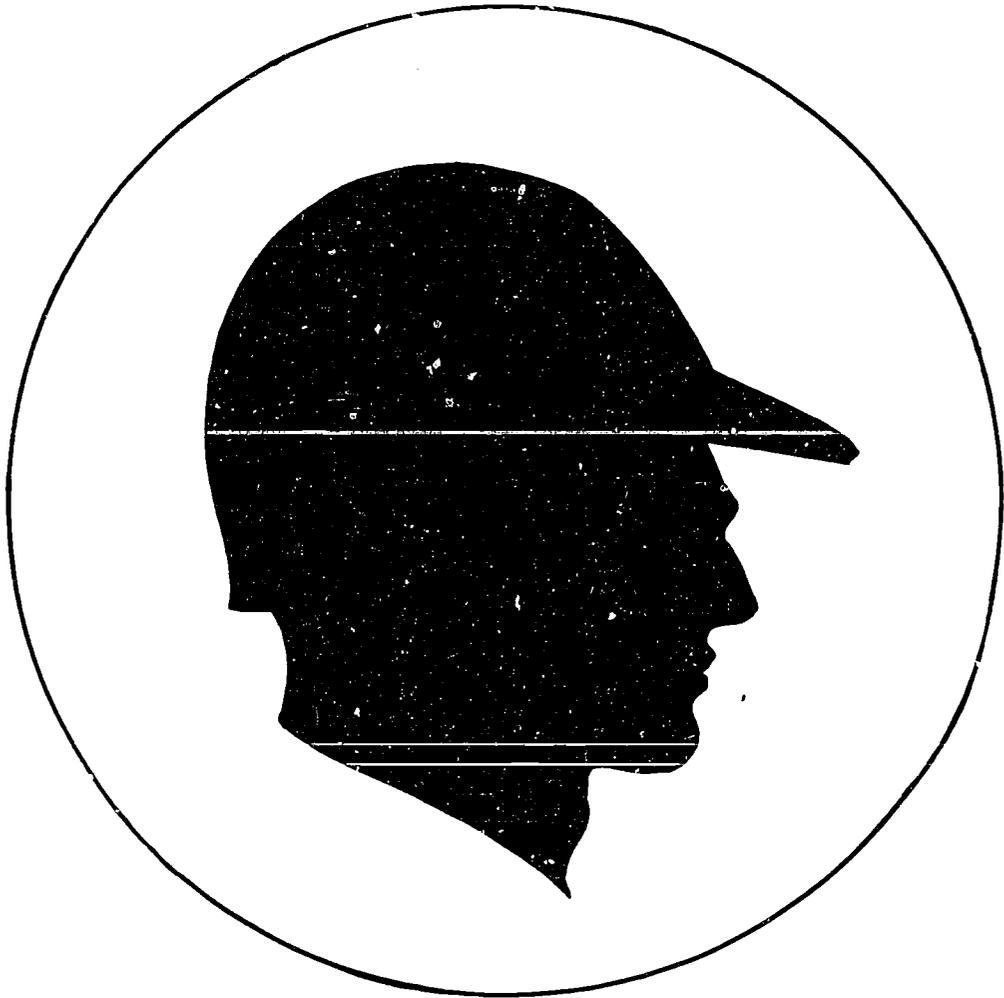
American Science Film Ass'n (Motion Picture)  
1319 F Street, N.W. Washington, D.C. 20004

Society of Motion Picture and Television Engineers  
9 E. 41st Street, New York, N.Y. 10017

Southwestern Bell Telephone Co.  
Dallas, Texas

Western Union Telegraph, Division Office  
1520 Corrigan, Tower Bldg., Dallas, Texas 75201

# CONSTRUCTION



## Construction Occupations

### GENERAL INFORMATION

Construction and building trades occupations represent the largest group of skilled workers in the national labor force. People in these occupations design and build homes and commercial buildings; plan and construct highway systems, bridges, and dams.

The industry is old, as old as man's desire to construct shelter and to connect himself with others by paths, then roads. Through the centuries, methods have changed and improved. Now, machinery, light and heavy, does many jobs once performed by human hands.

Some phases of construction show less employment growth than others because of fairly recent advances in technology. For example, in the home building industry, the development and use of prefabricated components has slowed the increase in the number of certain workers required. New lightweight, durable plastics which are used in many building components often eliminate or postpone the need for repairs or alterations.

Persons employed in construction are usually craftsmen in specialized areas. They must have a high skill level as well as sound knowledge of assembly and construction principles.

The rapid change in methods of building is dazzling and persons entering any occupation in the construction field should be willing to update skills and knowledge throughout their professional careers. Training past high school is becoming more and more desirable as unskilled workers are used less and less in all areas. Persons desiring to enter this career area should plan on investing several years in acquiring knowledge and skills.

Trade and craft unions represent many construction employees. Wage rates are generally good, although employment often fluctuates due to weather conditions.

## Construction Occupations

### ARCHITECTURE OR ARCHITECTURAL DRAFTING

Architecture is the profession concerned with the design of structures which enhance the beauty of communities and which provide shelter from the elements for man and his possessions. These structures include human and animal housing, schools, offices, public buildings, business establishments, gymnasiums, playgrounds and recreational facilities, museums, and commemorative structures. This field also includes the design and planning of streets, parks and the utilization of land.

To accomplish their objectives, architects must work closely with other professionals, and coordinate all the elements of the architectural concept. Architects work with master planners, landscape architects, structural, electrical, mechanical and acoustical engineers, materials suppliers, general contractors, interior designers and furniture or fixture manufacturers.

Motivation and the desire to improve the environment of man are important qualifications for entry into the field of architecture and architectural design. Accuracy, neatness and patience are desirable characteristics. The ability to work independently within the framework of a team effort is also necessary. To qualify as an architect a person must have a minimum of five years of college training and three years of practical experience, and successfully complete a professional examination.

The field of architecture is made up of different elements. Almost any single part can be mastered in post-secondary technical school with two years of training. The most common practice is to qualify as architectural draftsmen who produce scaled drawings of architects' conceptions of a project. With technical training, experience and independent study, draftsmen or technicians can qualify as designers, model builders, specification writers, supervisors of construction, salesmen of architectural products and materials or public relations representatives within the field. Technicians may even qualify as architects with eight years of actual experience, plus the successful completion of two professional examinations.

The advantages of this work are many. The working environment is above average and opportunities are available for advancement. Salaries and other benefits are good. Satisfaction is gained through contributions to the beauty, utility, and comfort of man with the improvement of the national environment as the end result of the architects work.

Construction Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
ARCHITECTURE OR ARCHITECTURAL DRAFTING

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 12 Professional Architect  
No. 201 Engineering Draftsman

U.S. Printing Office  
Washington, D.C. 20402  
No. 1300-9 Architects, 5¢  
No. 1550-5 Employment Outlook For Architects, 15¢

Books

Marshall, Max L., Cowles Guide to Careers and Professions  
Cowles Education Corp.  
Look Bldg. 488 Madison Ave., New York, N.Y. 10022

Richards Rosen Press, Inc.  
New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Constructions Interior, Constructions Exterior

Whitfield, Edwin A., Guide to Careers Through Vocational Training  
Robert R. Knapp Co., San Diego, Calif. 92107

Other Sources

American Institute of Architects  
1785 Massachusetts Ave. N.W., Washington, D.C. 20036

American Institute for Design and Drafting  
770 South Adams Road, Suite 110  
Birmingham, Mich. 48011

Texas Society of Architects  
904 Perry-Brooks Bldg., Austin, Texas 78701

## Construction Occupations

### BUILDING CONSTRUCTION

The construction industry is one of America's largest and continues to grow and expand. By 1975, many experts predict that building activity will double, and will grow to four times the present size by the year 2000.

Many kinds of people work together to build and service our constructed world. These people possess various levels of skills and learning. They range from apprentices who learn skills while earning on the job to the technicians and professional building engineers who have various levels of skills acquired through post-secondary training.

Craftsmen of high skill and recent experience with new tools and techniques are meeting the challenge to provide enough modern houses and buildings of all varieties to meet increasing demands. Technicians are given training in planning, estimating, and construction work and related occupational fields. This training also includes business operations, so they are capable of serving as construction supervisors and contractors after a reasonable amount of practical experience.

As the construction industry grows, it will need more college trained professional builders. Technical schools and universities meet this need by training in the fundamentals of their respective field in construction. These are positions of trust and responsibility. Fewer opportunities exist for unskilled workers than in the past.

The best construction men have these traits in common: they are active and mentally alert, like to be outdoors, and enjoy seeing the immediate results of what they have done. Craftsmen must have good hand-to-eye coordination and manual dexterity. They must have the stamina to work hard for long hours but great physical strength is not always required.

Pay scales vary greatly and are primarily based on levels of education in the field, years of experience, and technical skills. During peak periods and on major construction, considerable overtime may be required with resulting high levels of pay. However, slack periods sometimes cause layoffs or lack of work.

Skilled construction tradesmen or technicians may advance to positions as foremen, estimators, or superintendents. Many construction workers of all levels go into business for themselves with resulting increases in income or job satisfaction.

All building craftsmen, technicians and engineers enjoy a challenging career with many rewards of financial gain and personal satisfaction of creating with one's own hands, seeing the construction projects being enjoyed by others, and contributing to the growth of the nation year after year.

Following are short summaries of some of the specialized jobs which

fall within building construction occupations:

Carpenters form the largest group of building trade workers. They erect scaffolding and build forms for concrete for use on building projects. They erect the wood framework in buildings, including sub-flooring, sheathing, partitions, joists, studding and rafters. They also install mouldings, paneling, cabinets, windows, doors and hardware.

Cement Masons finish the exposed concrete surfaces such as patios, floors, sidewalks, dams and runways. They prepare the site for the pouring of concrete. Cement masons may have to correct surface defects when the forms are stripped from the concrete.

Bricklayers or Brickmasons construct walls, partitions, fireplaces, chimneys and other structures from brick. They may also work with cement or cinder blocks, panels made of concrete, porcelain tile, and other structural tile.

Construction Laborers and Hoist Carriers load and unload materials, shovels and other equipment used on a construction project. They may grade sites, erect and dismantle scaffolding, set braces, clean up rubble, set explosives, bore tunnels, and mix, pour and spread cement.

Lathers install the support backings on which plaster, stucco or concrete materials are applied. They may build a light metal framework and attach it to the building, or they may use gypsum board with which to do this work.

Plasterers apply coats of plaster to interior walls and ceilings to produce fire-resistant and relatively sound-proof surfaces. They also work on exteriors and may do ornamental forming and casting work. Plasterers use wallboards, sheetrock, and machines which spray plaster.

Marble, Tile Setters and Terrazzo Workers install these materials in buildings and homes. They must see that these materials fit exactly and are placed properly. They may also install structural glass.

Glaziers fit, cut and install plate glass, window glass, mirrors and leaded glass panels. They may cut the glass or use pre-cut materials. They also install structural glass to decorate building fronts, walls and ceilings.

Painters and Paper Hangers prepare surfaces and apply paint, varnish, enamel, lacquer and wallpaper, vinyls or other interior material.

## Construction Occupations

Roofers apply composition roofing, tile or slate and wood shingles to roofs. They also waterproof and dampproof walls and other surfaces.

Floor Covering Installers replace, repair or install tile, linoleum, vinyl and carpeting on floors of residential, industrial or commercial buildings. They inspect the floor to be covered, and make estimates of amounts of materials needed.

Asbestos and Insulation Workers cover pipes, boilers, furnaces and ducts with asbestos, cork, felt, fiberglass or polyurethane.

Plumbers and Pipefitters install pipe systems which carry water, steam, air or other liquids or gases needed for sanitation or industrial production. They may also repair existing pipe systems and install fixtures, appliances and heating and refrigeration units.

Construction Electricians lay out, install, assemble and test electrical fixtures, apparatus and wiring used in these systems. They also install electrical machinery, electronic equipment, controls, signal, and communication systems.

Sheetmetal Workers fabricate and install ducts used in ventilating, air conditioning and heating systems. They also fabricate and install other products made from thin metal sheets such as siding, store fronts, and framework for neon signs.

Millwrights are skilled craftsmen who move and install heavy industrial machinery. They may also dismantle, reassemble and align equipment to move it or install it.

Elevator Constructors assemble and install elevators, escalators and dumb waiters. They may replace old equipment with new models.

SOURCES OF ADDITIONAL INFORMATION ABOUT  
BUILDING CONSTRUCTION

Pamphlets

The Institute For Research

610 South Federal Street, 7th Floor, Chicago, Ill. 60605

No. 57 Construction Contracting

No. 113 Construction Electrician and Electrical Contracting

No. 114 Plumbing and Plumbing Contracting

No. 138 Carpenter and Residential Building Contractor

No. 220 Painting Contractor

U.S. Printing Office

Washington, D.C. 20402

No. 1300-18 Bricklayers, Stonemasons, Tile Setters, and Terrazo  
Workers, 10¢

No. 1300-19 Building Trades, 10¢

Magazines

Industrial Education Magazine

March, 1973 Careers in Electricity

April, 1973 Careers for the '70s in Building Construction

Books

Richards Rosen Press, Inc.

New York, N.Y. 10010

Aim High Vocational Guidance Series

Painting and Contracting

Skilled Trades: Electrician, Plumbing and Heating, Maintenance  
Fields

Universal Publishing and Distributing Corp.

235 E. 45th Street, New York, N.Y. 10017

Vocational Guidance Manual, Building Construction

Other Sources

American Federation of Labor and Congress of Industrial Organizations

Building Construction and Trades Dept.

815 16th Street, N.W., Washington, D.C. 20006

Associated General Contractors of America, Inc.

1957 E. Street, N.W., Washington, D.C. 20006

Building and Construction Trade Council, Texas

308 W. 11th Street, Austin, Texas 78701

National Association of Homebuilders

1625 L. Street, N.W., Washington, D.C. 20036

## Construction Occupations

### CIVIL ENGINEERING OR TECHNOLOGY

Civil engineers are concerned with the design and construction of systems and facilities to make a safer and more enjoyable life. Although associated with public works in many cases, civil engineers find employment in industry, construction and private practice. They work to design and supervise the construction of roads, harbors, airfields, tunnels, bridges, water supply and sewage systems, and buildings. Major specialties within civil engineering are structural, hydraulic, sanitary, transportation, and soil mechanics. Many civil engineers are engaged in supervisory or administrative positions ranging from site supervisor of a construction project to top level construction executives. Some are employed in the areas of research, design, planning, inspection, or maintenance positions. Others teach in colleges and universities.

Since most of the problems to be solved are practical problems, civil engineers must spend much time away from the confines of an office, usually on construction sites. Civil engineers are sometimes stationed in remote areas of the United States or in foreign countries. Many are required to move from one place to another to work on different projects.

A bachelor's degree or higher is necessary to become a qualified civil engineer. Civil engineering technicians need two years of study in a post high school technical school or college. Technicians assist civil engineers in drafting, surveying, testing, inspecting and calculating. By law, engineers are responsible for design, but without the support of technicians, few projects could be completed on schedule.

Civil engineering is one of the largest and oldest branches of the construction industry. The outlook is for continued growth, with expanding employment opportunities resulting from the growing need for housing, industrial buildings, and highway transportation systems.

Ever changing conditions present challenging problems whose solutions are found by using mathematical application of the laws of natural science. Through this problem solving, civil engineers find satisfaction of accomplishment as well as financially rewarding careers.

Construction Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
CIVIL ENGINEERING OR TECHNOLOGY

Pamphlets

American Society of Civil Engineers  
345 E. 47th Street, New York, N.Y. 10017  
Your Future in Civil Engineering

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 2 Civil Engineering  
No. 147 Highway Engineer  
No. 201 Engineering Draftsman

Books

Armstrong, Donald R., Texas College and Career Guide  
D. Armstrong Co., Inc.  
P.O. Box 22162, Houston, Texas 77027

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Engineers Unlimited, Your Career in Engineering

Other Sources

American Society of Civil Engineers, Texas Section  
Box 327, University of Texas at Arlington  
Arlington, Texas 76010

Consulting Engineers Council of Texas  
402 San Jacinto Bldg., Austin, Texas 78701

Texas Society of Professional Engineers  
Box 2145, Austin, Texas 78767

## Construction Occupations

### HIGHWAY AND HEAVY CONSTRUCTION

Highway and heavy construction fields are recognized by most experts as different from the building construction field because the differences in skills and equipment are significant. The highway construction field not only includes the building of highways, bridges, streets, parkways, and parking areas, but, because the type of work is similar, it also includes airports and light sewage and water works construction. The heavy construction field includes dams, tunnels, railroads, large bridges, flood construction control, irrigation projects, waterways, breakwaters, docks, harbors, refineries, chemical plants, and manufacturing plants.

These industries are characterized by the large size of projects which may involve moving, shaping and compacting enormous amounts of soil, and the forming and pouring of huge quantities of concrete.

The very heart of the industry is the use of machinery, much of it very large. Over two-thirds of the employees in this industry are engaged in the operation of such machinery, or its supervision, support or maintenance. The operators of this machinery may be known as heavy equipment operators or operating engineers. They must become highly skilled in precision handling of such equipment.

Extremely good eye-to-hand-to-foot coordination is required for the more complicated machines. Excellent depth perception is a must, and in many cases, good judgment in estimating load size is required. Because mishandling of such powerful machines could easily cause serious damage to property and injury to people, operators must be mentally alert at all times. Most important, they must enjoy working with machinery.

Operators may handle only one piece of equipment which may require substantially less skill than others. For example, in operating earth-boring machines that dig holes for poles or posts, operators merely set the proper auger in the spindle, start the machine, and stop it when the auger has penetrated to the proper depth. On the other hand, they may operate single pieces of equipment which require the highest skill. For example, crane operators manipulate various pedals and levers to rotate cranes on their chassis, and to raise or lower crane booms and load lines. They must also manipulate a number of different attachments to crane booms. For instance, they manipulate buckets for excavation work; pile drivers to drive steel beams, wood and concrete piling into the ground; and wrecking balls for demolition work. All these operations must be extremely precise considering the size of the equipment. Of course, the most valuable and therefore the highest paid operators are able to handle many types of equipment. Other construction machinery includes bulldozers, motor graders, scrapers, drag lines, power shovels, tractor loaders, trenching machines, concrete mixers, concrete paving and finishing machines, and asphalt paving machines.

To the uninitiated, it may seem that the machinery does all of the work, but the constant use of hands, arms, feet and legs, and the high degree of concentration required for precise handling of equipment can be

## Construction Occupations

very tiring. In addition, the constant movement of some machines with the resulting shakes and jolts can severely punish a person's body. Therefore, successful construction employees must be strong, physically vigorous, rugged and hardy. Because high noise levels are encountered almost continuously, employees must also have the endurance to withstand such conditions. Since this is an outdoor occupation, workers in the heavy construction industry are involved in a continuing conflict with the weather in order to meet schedules and deadlines.

Jobs are available in heavy construction for persons with all levels of education from high school through advanced college degrees. Those entering the field from high school will normally become trainees in an apprenticeship or on-the-job training program. Depending upon the capabilities of individuals, persons will usually require three to five years before becoming journeymen or craftsmen. Persons with specific skills and interests may become foremen, job superintendents or general superintendents. Another way to enter the industry is through post-secondary technical school training. Graduates from such a program may enter the industry as draftsmen or engineering aides, then move through the engineering and project supervision areas to positions as job superintendents or project managers, or move through office-type occupations such as purchasing. College graduates may move directly into the industry at the professional level as estimators, assistant engineers or engineers.

The highway and heavy construction industry is essentially a mobile industry. It offers opportunities for travel and a change of scenery such as is found in few other industries. One project may be a freeway passing through the heart of a large city, and the next a highway in the most remote area. Employees must be willing to live in a given location for only a few months or a few years.

Construction projects are visible and lasting monuments to the creativity and competence of the workers who build them, and are sources of great pride. The life of heavy construction workers provides the excitement of travel and the opportunity to see new and strange, and often, far-off places. Yet this life may be lacking the comforts of the well-established home and community relationships. Many workers in this field, as their families grow, choose to give up the life of travel and find employment either with a company which restricts its business to one area, or with a concern which uses their skills in maintaining the construction projects after their completion.

Salaries for these workers range from good to very good, depending upon levels of skills and experience.

Construction Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
HIGHWAY AND HEAVY CONSTRUCTION

Pamphlets

Association of General Contractors of America, Inc.  
1957 E. Street, N.W., Washington, D.C. 20006

AGC publications:

No. 60 Construction Opportunities Unlimited, 75c

No. 60a Construction Opportunities Unlimited (Open Shop), 75c

No. 60b Open Shop Construction - Questions and Answers, \$2.00

Association of General Contractors of America, Inc.  
Texas Highway - Heavy Branch  
P.O. Box 2185, Austin, Texas 78767

Grow Where the Action Is With the Growing World

U.S. Printing Office  
Washington, D.C. 20402

No. 1650-76 Operating Engineers (Construction), 15c

Other Sources

Brown and Root, Inc.  
Box 3, Houston, Texas

Federal Highway Administration  
U.S. Dept. of Transportation  
Washington, D.C.

International Union of Operating Engineers  
1125 17th Street, N.W., Washington, D.C.

DIESEL OR CONSTRUCTION EQUIPMENT MECHANICS

Diesel or construction equipment mechanics repair machines related to the diesel engine and construction equipment field. They are workers who must use their hands as well as their minds to perform the jobs.

These mechanics maintain, repair, and rebuild, to factory specifications, diesel and other internal combustion construction equipment such as crawler tractors, motor graders, motor scrapers, front-end loaders, cranes, draglines, paving machines, and other machinery associated with the heavy construction field.

For entry into this field, a person must be a high school graduate in good physical condition. Handicapped persons may qualify for selected specialized jobs within the industry. Some diesel mechanics learn their trade through formal apprenticeship programs which generally last four years. Such programs give students a combination of classroom training and practical experience in repairing diesel engines. The practical side includes a study of valves, bearings, injection systems, starting systems, cooling systems, and other parts of the diesel engine. Another method of entry is through attendance at a trade or technical school which offers comprehensive training in diesel maintenance and repair. These programs usually last from a few months to two years. In either case, graduates need additional on-the-job training before they can become skilled mechanics.

Diesel mechanics are employed in all parts of the country by service departments of distributors and dealers of diesel engines and farm equipment. They may also work for companies and government agencies which maintain their own diesel-powered equipment. Others are employed by independent repair shops.

With diesel engines replacing gasoline engines in a growing variety of equipment, job opportunities for diesel mechanics are on the rise. Overtime, night and weekend work is common to this field.

Advantages of this career occupation include the fact that the diesel and construction equipment area has been one of the most stable industries in the past twenty years. Many dealers have not had a major lay-off or cutback in this period of time. Industrial representatives expect the service part of the heavy construction industry to increase as much as twenty-five percent over the current status in less than ten years.

This occupation offers a real challenge to persons who like to work with big machines. They should not mind heavy lifting and extremely dirty work. Much of the industry offers outdoor work, and the personal satisfaction of having a part in an important industry. Pay scales and benefits depend upon individual training and experience, but are generally good.

Construction Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
DIESEL OR CONSTRUCTION EQUIPMENT MECHANICS

Pamphlets

Association of General Contractors of America  
1957 E. Street, N.W., Washington, D.C. 20006

No. 60 Construction Opportunities Unlimited, 75c

No. 60a Construction Opportunities Unlimited (Open Shop), 75c

The Institute For Research  
610 South Federal Street, 7th Floor  
Chicago, Ill. 60605

No. 61 Diesel Engineering and Diesel Technician

U.S. Printing Office  
Washington, D.C. 20402

No. 1650-84 Diesel Mechanics, Farm Equipment Mechanics, 10c

Books

Goldenthal, Allan B., Your Career Selection Guide  
Regents Publishing Co. Division  
Simon and Schuster, Inc.  
New York, N.Y.

Other Sources

International Union, United Automobile, Aerospace and Agricultural  
Implement Workers of America  
8000 E. Jefferson Ave., Detroit, Mich. 48214

OTHER CONSTRUCTION OCCUPATIONS

The construction industry employs thousands of workers who are employed by any large activity. These include managers, personnel directors, accountants, auditors, purchasing agents, clerks, stenographers, etc.

Other careers not quite so common include the following:

Estimators obtain basic data concerning a proposed construction project, including quantities of materials, methods to be used, and specifications to be met. They also estimate the manhours to perform the work, the equipment required, the cost of purchase and delivery of materials, and the total cost of the construction, which becomes the contractor's competitive bid for the job.

Expediteurs maintain construction schedules by reviewing deliveries, scheduling arrival of material and men at job sites, establishing priorities and obtaining clearances so that the flow of the work may continue and time schedules can be met.

Welders weld metal parts together according to layouts, blueprints, work orders or oral instructions. They may specialize in one type of welding (arc, gas, gas shielded) or may perform any combination of types. They may be required to pass tests such as those given by the American Society of Mechanical Engineers or the American Bureau of Ships.

Safety Engineers apply knowledge of industrial processes, mechanics, chemistry, psychology and industrial health and safety laws to prevent or correct injurious environmental conditions, and minimize effects of human traits which create hazards to life and property or reduce worker morale and efficiency.

Other careers specific to the construction industry include the following:

Job Superintendents direct all construction functions on small or medium size projects, or on specific phases of large projects. They are responsible for maintaining proper schedules, budget methods, and procedures.

General Superintendents direct all construction functions for large projects, according to established schedules, specifications, methods, and procedures; they supervise job superintendents on very large projects or on a variety of smaller projects.

Project Managers direct all construction functions on very large projects; establish and develop methods, procedures, schedules, and policies; coordinate the work of all units and divisions; and perform such administrative duties as are required for proper com-

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pletion of the project.

Structural Steel Workers perform any combination of the following duties to raise, place and unite girders, columns, and other structural-steel members to form completed structures or structure frameworks, working as part of a crew. They set up hoisting equipment, fasten steel members to cable of hoist, using chain, cable or rope. They signal workers operating hoisting equipment to lift and place steel members, and guide members with tag line, or ride on members to guide them as they are hoisted into position. They then force members into final position, using turnbuckles, crow-bars, jacks, and handtools, and bolt aligned members to keep them in position until they can be permanently riveted or welded in place. These persons may specialize in erecting or repairing specific types of structures and be designated accordingly as Bridge-Maintenance Men; Scaffold Builders, Metal; or Structural-Steel Equipment Erectors.

Riggers assemble rigging to lift and move equipment or material. They select cables, ropes, pulleys, winches, blocks, and sheaves according to weight and size of load to be moved. They also attach pulley and blocks to fixed overhead structures, such as beams, ceilings, and gin pole booms, with bolts and clamps.

Riveters operate hydraulic or pneumatic riveting machines to rivet steel plate sections together. They select dies according to size of rivet and type of head to be formed, and start machines and adjust valves to regulate pressure according to size of rivet.

Duct Installers install prefabricated sheet metal ducts used for heating and air conditioning purposes. They assemble sections of sheet metal duct according to specifications, using slip joints or metal screws, and cut holes in ceiling and walls as required, and make holes and bends in metal to accommodate installation.

Ornamental Iron Workers install prefabricated ornamental ironwork, other than structural ironwork, such as metal window and door frames, motor-driven and automatic power doors, metal trim and paneling and aluminum curtain-wall frames. They weld brackets to lintels, sills, columns, and other structural framework, drill holes in metal, concrete, and masonry structures, using portable power drills, air-hammers, and handtools. Their work also includes installation of equipment such as motor-driven or automatic doors. They may be designated according to type of equipment installed or material worked, as Ornamental Bronze Workers; Metal-Sash Setters; Ornamental Rail Installers; Steel-Door Setters; or Steel-Sash Erectors.

Millwrights install machinery and equipment according to layout plans, blueprints and other drawings, using hoists, lift trucks,

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handtools, and power tools. They read blueprints and schematic drawings to determine work procedures, and dismantle, move, assemble and install machinery and equipment such as shafting, conveyors, and tram rails.

Equipment Installers install electronic control panels and mechanical equipment, such as motor generator units, battery chargers, utility reels, and darkroom equipment. They bolt and screw control panels and assembled operating units to framework, connect electrical wiring and cables, and install lighting fixtures, outlets, switches, wall boxes, and terminal boards.

Linemen erect wood poles and prefabricated light duty metal towers, cable, and related equipment to construct transmission and distribution power lines used to conduct electrical energy between generating stations, substations, and consumers.

Air Conditioning Installers install air conditioning units, and inspect existing wiring and fuses on customer's premises to insure adequate power supply for operating air conditioners.

Cabinetmakers construct and repair wooden articles, such as store fixtures, office equipment, cabinets, and high grade furniture. They set up and operate such woodworking machines as power saw, jointer, mortiser, molder, tenoner, and shaper to cut and shape parts. They may be designated as Millmen; Cabinetmakers, Maintenance; or Carpenters, Bench.

Insulation Workers apply insulating material to exposed surfaces of equipment such as boilers, tanks, hot-or-cold air ducts or pipes, and steam generators. They also may cover pipe with felt which is bound with wire, or gauze which is covered with plaster of paris. They may be designated as Blanket-Insulation Workers; Block Insulation Workers; Corkboard-Insulation Workers; Prefabricated Pipe-Insulation Workers; or Asbestos Workers.

Blasters assemble, plant, and detonate charges of industrial explosives to loosen earth, rocks, and stumps, or to demolish structures to facilitate removal. They examine mass, composition, structure, and location of object to be blasted, estimate amount and determine kind of explosive to be used, and mark location of charge holes for drilling. They assemble primer and place it with main charge in hole or near object to be blasted, cover charge with mud, sand, clay, or other material, and tamp it firm to improve detonation and confine force or blast. They may operate jackhammers, hand drills, or electric drills, and may climb cliffs or banks to plant explosive charge, using ropes and safety harness. They may be designated according to object blasted, such as Stumpers or High Scalers.

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Construction Inspectors inspect and oversee the construction of bridges, buildings, dams, highways, and other types of construction work to insure that procedures and materials comply with specifications. They interpret blueprints and specifications for the contractor and discuss deviations from specified construction procedures to insure compliance with regulations governing construction. They maintain a daily log of their construction and inspection activities. They may be designated as Building Construction Inspectors; Ditch Inspectors; Highway Inspectors; Masonry Inspectors; Reinforced-Concrete Inspectors; Rivet Inspectors; Rod Inspectors; Structural-Steel Inspectors; or Tunnel Heading Inspectors.

Surveyors survey the earth's surface and oversee engineering survey parties engaged in determining exact location and measurements of points, elevations, lines, areas, and contours of earth's surface to secure data for construction, mapmaking, land valuation, mining, or other purposes.

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OTHER CONSTRUCTION OCCUPATIONS

Magazines

Industrial Education Magazine

April 1973, Careers for the '70s in Building Construction

Other Sources

American Congress on Surveying and Mapping

733 15th Street, N.W., Washington, D C. 20005

Building and Construction Trade Council

308 W. 11th Street, Austin, Texas 78701

International Ass'n of Bridge, Structural and Ornamental Iron Workers

3615 Olive Street, St. Louis, Mo. 63108

International Ass'n of Heat and Frost Insulators and Asbestos Workers

1300 Connecticut Ave., N.W., Washington, D.C. 20036

Laborers International Union of North America

905 16th Street, N.W., Washington, D.C. 20006

Sheet Metal and Air Conditioning Contractors' National Ass'n, Inc.

1611 N. Kent Street, Arlington, Va. 22209

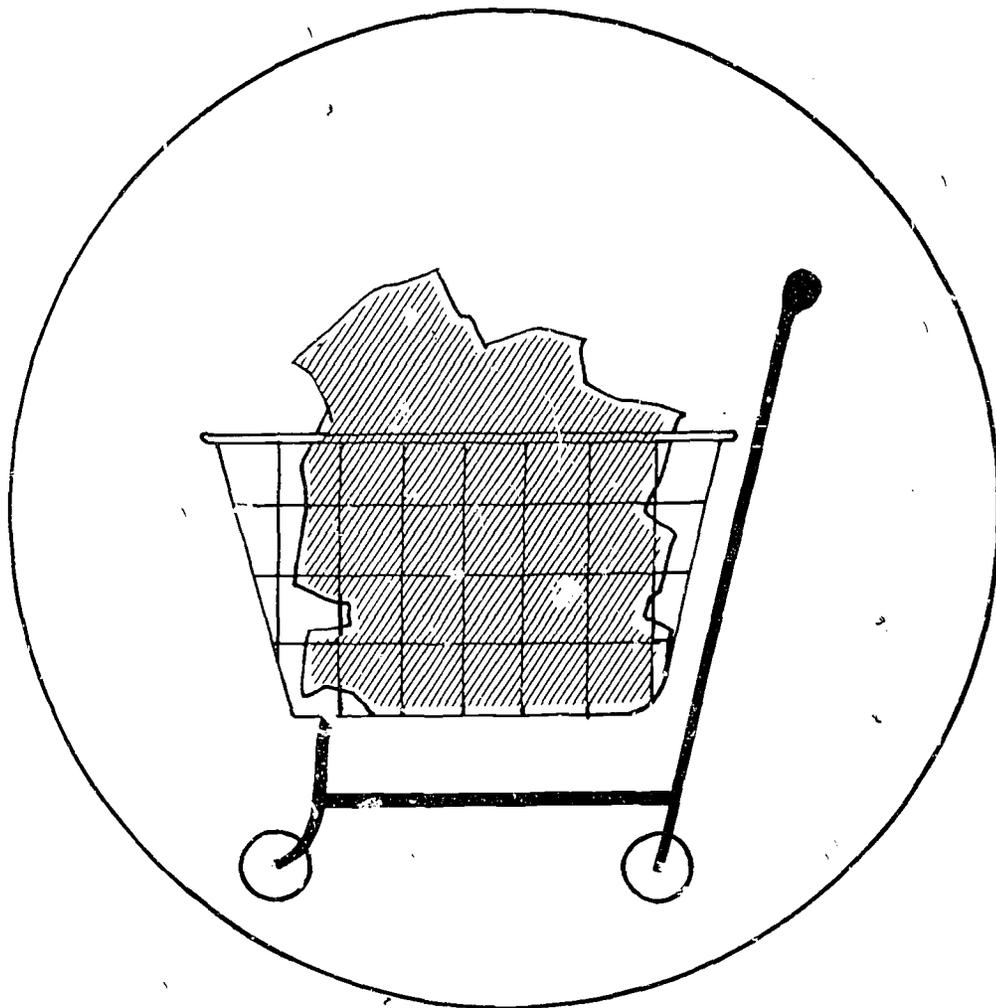
Sheet Metal Workers' International Ass'n.

1000 Connecticut Ave., N.W., Washington, D.C. 20036

United Steel Workers of America

1500 Commonwealth Ave., Pittsburgh, Pa., 15222

# CONSUMER AND HOMEMAKING EDUCATION



## Consumer and Homemaking Occupations

### GENERAL INFORMATION

The American family revolves around the home and the utilization of man, services to make the home comfortable, attractive, happy, and efficient. Most careers in consumer and homemaking occupations have direct bearing on these factors.

As the standard of living has increased, American families have changed and expanded their expectations of consumer products. Consumer research has become more realistic as potential customers have become more demanding in their requests for dependability and factual information.

Homemakers display more concern for nutrition and proper child care than ever before. Public demand has forced fashion designers to relinquish flashy, fad-like creations in preference to better-designed clothing for all family members.

Persons selling services in these career fields are finding it necessary to acquire more formalized training. Entry level requirements are being increased each year and professional standards are being elevated.

This entire occupational cluster has exhibited tremendous growth, and predictions for the future indicate that growth will continue, particularly in the fields of child guidance and food preparation. Career opportunities are quite good for those willing to seek training.

## Consumer and Homemaking Occupations

### HOUSEWIFE

A happy, efficient home starts with the housewife or homemaker. All life and learnings begin in the home, as well as family patterns, democracy, and love of fellow man. Making the home a happy and comfortable place to live, grow and develop is a career, an art and a science.

The home allows the housewife a chance to practice many sides of management, child development, and family relations. It also gives her the opportunity to plan and spend for a variety of consumer goods, both necessities and luxuries. Most successful housewives are agreeable, happy, trustworthy, loving, neat, clean, energetic, good cooks, thrifty and love their roles in being wives and mothers.

There are no formal educational requirements for being a housewife. The ability to cook, sew, wash and iron, clean house and care for children is generally acquired by girls while helping with housework in their own homes before marriage. Home economics courses offered in high schools, vocational schools, junior colleges and universities, as well as specialized training sponsored by state and federal agencies, help to develop skills beyond the level ordinarily reached in the home. A general education in home economics is basic for a well-planned, happy home. It requires knowledge and training in many jobs. Problems and skills involved in homemaking are the special concern of home economics. A girl with a home economics degree is equipped both for homemaking and a career.

The working conditions for a housewife vary with the economy of the family. Modern conveniences and modern appliances definitely have reduced the work load of the homemaker, yet the hours can be long and the work tiring.

The housewife is responsible for planning proper diets; selecting pleasing and harmonious home furnishings; caring for the general health of family members; and creating a warm, secure atmosphere.

The efficient homemaker does not draw a salary, but is well paid for her work by love, pride and the happiness she derives from her family. She receives rewards in the satisfaction of a well-organized, happy, peaceful and respected household, and particularly in the knowledge that she has performed her duties to the best of her abilities. Other advantages of the housewife include the fact that she works at her own pace with no boss or supervisor. Most of the work of the housewife is done within the home, with the exceptions of shopping trips to purchase food, clothing and other necessities for the family.

Consumer and Homemaking Occupations\

SOURCES OF ADDITIONAL INFORMATION ABOUT  
HOUSEWIFE

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 24 Home Economics as a Career

Other Sources

American Home Economics Ass'n  
1600 20th Street N.W., Washington, D.C. 20009

Home Demonstration Ass'n  
Rouce 2, Box 261, Pt. Lavaca, Texas 77979

Texas Home Economics Ass'n  
395 10th Street, Beaumont, Texas 77702

## Consumer and Homemaking Occupations

### CHILD GUIDANCE AND DEVELOPMENT

Persons involved in this career offer care and guidance to children, direct them in leisure-time activities, offer rehabilitation services to those in need, promote social, emotional and mental well-being for the child, and communicate and interact with parents to help them understand the child. They may work in public or private child guidance day centers, schools, orphanages, rehabilitation centers, and hospital wards. Such persons may also work in nursing homes for the aged because of their experience in human dynamics.

Child guidance workers must have a great deal of warmth for and understanding of children. They must enjoy children, have a sincere interest in helping them, and possess a great amount of patience. Assets are evenness of temperament, the ability to get along well with other workers, and objectivity.

A bachelor's degree is advisable but not required for these persons. An associate degree of applied science is also available in junior colleges, and a new Child Development Associate (CDA) certification is offered in some areas. The bachelor of science degree is a four-year program, the associate is two years in length and the CDA certificate does not have a specific time for completion.

Most of this type of work is performed indoors in well equipped buildings. Places of work will vary with the specific job, ranging from small, one room areas to larger and more complex institutions or centers. The working conditions are good in most cases, and are based on a forty-hour week with some shift work necessary for those employed by institutions and hospitals.

Advancement is usually made through more education and experience. Those with a bachelor's degree are generally supervisors, while those holding an associate degree have less responsibility. The CDA certificate is comparable to the associate degree. Aides are also being employed in this area. They are persons with a high school diploma and some training in child care. It is possible to obtain a state license and go into business for one's self without a degree or certificate.

The pay is fair to good, depending upon educational levels and experience. Because there is a growing trend to put more emphasis on early child guidance, the demand for persons in this career field is becoming greater and the opportunities more numerous.

This vital human service career can be most rewarding to the person sincerely interested in helping children to become well adjusted members of society.

Consumer and Homemaking Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
CHILD GUIDANCE AND DEVELOPMENT

Pamphlets

National Ass'n for Education of Young Children  
1834 Conn. Ave. N.W., Washington, D.C. 20009  
Child Guidance

Other Sources

American Home Economics Ass'n  
1600 20th Street, N.W., Washington, D.C. 20009

Child Welfare League of America, Inc.  
67 Irving Place, New York, N.Y. 10003

Journal of Ass'n for Childhood Education, International  
3615 Wisconsin Ave. N.W., Washington, D.C. 20016

National Institute of Mental Health  
Chevy Chase, Md.

Office of Child Development, Children's Bureau  
U.S. Dept. of Health, Education and Welfare, Washington, D.C.

Office of Economic Opportunity, Planning  
U.S. Dept. of Health, Education and Welfare, Washington, D.C.

Texas Ass'n for Mental Health  
103 Lantern Lane, Austin, Texas 78731

Texas Dept. of Community Affairs  
Office of Early Childhood Development  
Box 13166, Capitol Station, Austin, Texas 78711

## Consumer and Homemaking Occupations

### FOOD PREPARATION OR SERVICE; RESTAURANT MANAGEMENT

Occupations connected with the preparation and service of food are those of dietitians, chefs, cooks, waiters or waitresses, and restaurant managers.

Dietitians plan meals with proper nutritional value for hospitals, institutions, schools, restaurants, and hotels. Modern dietitians are trained in numerous specialized areas such as hospital dietetics, research, teaching, writing, commercial food service, and school and college food service.

Administrative dietitians, specifically trained in food management, are responsible for the training and work of food service supervisors and other assistants in the preparation of nutritional meals. They are also responsible for enforcing sanitary and safety regulations, and are in charge of buying food, equipment and other necessary supplies. Since menus must be planned on a large scale with a view towards economy, this requires sound understanding of purchasing techniques. The administrative dietitian is frequently employed in restaurants and cafeterias open to the public and those operated by institutions and industrial plants.

Therapeutic dietitians plan and supervise the preparation of diets especially to meet the needs of individual patients whose doctors have prescribed special diets. They must work closely with both the doctor and the patient in such cases.

Clinical dietitians work with patients who are not hospitalized, but who are referred to a clinic by their doctor when there is a need for a special diet to overcome varying types of nutritional problems in cases of diabetics, pregnancies or obesity.

Hospital research dietitians conduct studies and research projects concerned with food and nutrition. In small hospitals, dietitians may be required to function in all of these areas. In colleges with a home economics department, dietitians may be employed as teachers as well as acting as food service managers. In the public schools, dietitians must plan and supervise the preparation of meals which are economical and nutritious and attractive to young people.

Another field for dietitians is in food manufacturing, promotion of a product, development of recipes, maintaining experimental kitchens, giving information on nutrition, and even presenting radio or television programs. Many trained dietitians are also employed in the Armed Services and U.S. Public Health Service in areas of administration, therapeutics, teaching and research.

A bachelor's degree with a major in foods and nutrition or institution management is necessary to qualify as a dietitian. This requires

## Consumer and Homemaking Occupations

four years of college followed by a minimum of one year of dietetic internship, or three years of experience in a program approved by the American Dietetic Association. Public health nutritionists must earn at least a master's degree.

Interest and aptitude in science is necessary for dietitians because all aspects of dietetics and nutrition are related to this field. Many college courses in science are required of the major. High school students interested in this career field should find part-time or summer employment in hospital or restaurant kitchens so as to learn first-hand from a professional the demands of the field.

Dietetics careers are expected to offer excellent opportunities throughout the next decade. There is a shortage of qualified dietitians in hospitals, schools and industry, and the supply of trained personnel completing internship is not expected to meet the increasing demands.

Working conditions for dietitians vary considerably depending upon the type of institutions, and also the kind of work performed. Generally, the surroundings are pleasant, well-equipped, sanitary and ventilated. Many hospitals provide facilities for living in, offering room, board and laundry facilities for a small fee. A few college dietitians in charge of residence halls are provided with apartments, but in most other areas the dietitians provide their own living quarters. Most employees work a forty-hour week, but some hospital and restaurant dietitians are required to work weekends and irregular hours. Staff dietitians usually take turns supervising on weekends and holidays.

Salaries for dietitians range from fair to good, with staff or supervisors in colleges rating higher. Those ranking at the top of the employment scale in this field are dietitians employed in the federal government. Generally, the more experience and training one has, the higher the salary will be.

Restaurant managers are responsible for the overall operation of food service establishments, purchasing foods and equipment, maintaining health and sanitation regulations, keeping clerical records, directing payroll operations, maintaining inventories and handling large sums of money. The work usually involves close contact with customers.

Experience in all areas of restaurant work is essential for successful management. Certain personality traits which are desirable are poise, self-confidence, and the ability to get along with others.

No specific educational requirements exist; however a good educational background and some specialized training are increasingly valuable to those hopeful of advancement. As more colleges are

## Consumer and Homemaking Occupations

offering programs in specific areas, employers are seeking those with such training. Executive apprenticeship programs, co-sponsored by the National Restaurant Association and by industry, are available. Some restaurants offer on-the-job training.

Chances for employment are especially good in tourist and resort areas. No special licenses or memberships are required. Earnings range from fair to high, depending on the size and location of the establishment.

The workweek will usually be from forty to forty-eight hours, including a certain amount of irregular working hours involving evenings and weekends. Generally, fringe benefits include annual bonuses, group pension plans, hospitalization and medical insurance and meals furnished during working hours.

Other positions in food preparation and restaurant fields include:

Chefs and Cooks responsible for the preparation and cooking of food, usually in large quantities. Chefs supervise staffs of cooks and kitchen helpers, and may be required to train others.

Waiters and Waitresses are responsible for setting tables, taking orders for and serving food and beverages, and making out food checks. They occasionally act as cashiers.

Consumer and Homemaking Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
FOOD PREPARATION OR SERVICE; RESTAURANT MANAGEMENT

Pamphlets

American Dietetic Ass'n  
620 N. Michigan Ave., Chicago, Ill. 60611  
Dietetics as a Profession

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 41 Hospital and Institutional Dietetics  
No. 69 Restaurant Occupations  
No. 161 Snack Shop, Restaurant Operation  
No. 196 Bakery Shop Operation  
No. 230 Professional Cook and Executive Chef

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-86 Restaurant Occupations, 5c

Books

Richards Rosen Press, Inc.  
New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Restaurant

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Food Preparation and Service  
Food Science and Technology

Westbrook, James, Your Future in Restaurant and Food Service  
Arco Publishing Co., Inc., 219 Park Ave. South, New York, N.Y. 10003

Other Sources

National Restaurant Ass'n, Educational Director  
1530 N. Lake Shore Drive, Chicago, Ill. 60610

Texas Dietetic Ass'n  
1619 South 15th Street, Temple, Texas 76501

Texas Restaurant Ass'n  
Box 1429, Austin, Texas 78767

## Consumer and Homemaking Occupations

### FASHION OR CLOTHING DESIGN

Fashion designers create original designs of wearing apparel for men, women and children. They design inner and outer garments, hats, purses, shoes, gloves, costume jewelry, scarves or beachwear. Designers usually work with one type of apparel, such as women's dresses, men's suits, or children's playwear.

Designers usually sketch the original idea for a garment, then begin to shape pattern pieces which make the garment. The pieces are then drawn to actual size on paper, cut out of material such as muslin, and sewn together for fitting on a model. Modifications are made before the design is complete. From the rough model, designers make sample garments which are presented to the management and sales staff or displayed at a showing to which press representatives and buyers are invited.

Designers are expected to produce or create a satisfactory number of successful styles for each of the manufacturers' four annual style changes--spring, summer, fall and winter--plus clothing designed for those who plan winter vacations or cruises and special styles for holiday seasons. They work on spring and summer designs during the fall and winter, and on fall and winter clothing during the warm seasons of the year. Since designing is a creative job, designers usually work without close supervision, but cooperatively with the head of the manufacturing firm or consistent with the ideas of their employers.

Personal qualifications for designers include originality, artistic ability, a talent for sketching, thorough knowledge of fabrics, keen sense of color, and ability to translate design ideas into finished garments. They should be acquainted with garment making techniques which may be learned by working briefly at various operative jobs such as machine sewing, draping, sample making and cutting. Designers should be imaginative with manual dexterity.

Fashion designing is a highly competitive business, so the better one is prepared, the broader opportunities will be. High school students should take as many courses as possible in art, clothing construction and textiles. A college degree in fine arts with a major in fashion design or graduation from special schools for this field are highly desirable qualifications for entrance into design. Employers seek those persons who have had courses in mathematics, anatomy, design, sketching, art history, costume history, literature, pattern-making, clothing construction and textiles.

Working conditions are varied and depend upon the particular place of employment. Cutting and design rooms are usually pleasant and in a separate area from the main sewing and pressing operations. They are well-lighted, well-ventilated, free from disturbances and neat in order. At worst, they may be cluttered and noisy but usually have only one or two people working in them. The designer usually has a private office

## Consumer and Homemaking Occupations

adjacent to these working spaces.

The work pace is less rapid for designers since accuracy, skill, individual talent and judgment are valued more than speed. Designers are key persons in the garment industry and good designers are always needed. Advancement in fashion designing varies a great deal as designers move from firm to firm and vacancies occur regularly. Aspiring designers should continue to create designs and should look for opportunities to show samples of their work to employers.

Fashion designers are found in almost every income bracket. Salaries depend upon the size of the firm and the volume of business. Salaries are above average for beginning designers, and with skill and experience, annual incomes are quite high. Theatrical designers usually work on a contract basis and may not exceed that of a designer or a regular salary due to periods of idleness between contracts.

Fashion designers hold an important place in the nation's standard of living, as the garment industry is important to the economy of the country. Changing styles create a demand for new clothing long before serviceable garments are worn out. This makes a real difference to the prosperity level of society and provides most rewarding and satisfying careers.

Consumer and Homemaking Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
FASHION OR CLOTHING DESIGN

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 99 Women and Men as Fashion Designers

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Fashion as a Career

Richards Rosen Press, Inc.  
New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Your Future in Fashion Design

Other Sources

American Apparel Manufacturers Ass'n, Inc.  
2000 K. Street N.W., Washington, D.C. 20006

American Fashion Ass'n, Inc.  
3651 Apparel Mart, Dallas, Texas 75207

International Ass'n of Clothing Designers  
12 South 12th Street, Philadelphia, Pa. 19107

National Dress Manufacturers Ass'n, Inc.  
470 Seventh Ave., New York, N.Y. 10018

National Outwear and Sportswear Ass'n, Inc.  
347 Fifth Ave., New York, N.Y. 10016

Texas Fashion Creators Ass'n  
3641 Apparel Mart, Dallas, Texas 75207

## Consumer and Homemaking Occupations

### MODELING

Models pose for artists, sculptors, and photographers. There are three types of models which include the artist's model who poses for different types of art; the photographer's model who poses for commercial advertisements; and the mannequin who models clothing in stores or at special shows by displaying the merchandise to the best advantage. Although the basic duty of each type model is to pose attractively, there are significant differences in the actual work done in each area.

The artist's model must be able to stand or sit in a certain position for several hours at a time, although permission is usually given to relax once every hour. Often the model must pose under hot and bright lights. One job may last a day, while another lasts for several weeks. This is the least demanding of all modeling work. The most important quality for this type of work is the ability to sit or stand for periods of time without movement.

The photographer's model poses to lend an attractive feature to an advertisement so as to enhance the product to be sold. These working conditions can vary widely. Rarely does the photographer's model work full-time. Pay is usually by the hour or day, and weeks may pass between one job and the next, especially for the free-lance model. Attractive, experienced models often have a contract with an agency and thus may have a much fuller schedule. The work may occasionally involve travel to other states or even to other countries so that photographs can be taken in beautiful, unusual, and exotic surroundings.

If the model has some acting ability, a job may be secured in a filmed television commercial. This is a more lucrative field, but the average model may find it difficult to break into this area. The most basic requirement is that the model photographs well. While beauty is desirable, such characteristics as wholesomeness and sincerity are often equally as important. In certain cases, photographic models must have some acting ability, for facial expression is important to create the desired mood or emotion.

Fashion modeling requires parading before prospective customers and displaying merchandise attractively and distinctively to create an image that can trigger public demand for a new look or product. It often requires the model to speak to the customers and give information about the garment such as material, model number and price. The fashion model may be employed by clothing manufacturers, dress designers or department stores. This model usually keeps regular business hours and models upon request for luncheons, conventions and industrial trade shows.

Fashion models must have immaculate grooming, with particular care given to the hair, hands and makeup. They must be graceful, have an erect carriage, be able to pivot, turn backwards and to the side. The

## Consumer and Homemaking Occupations

main requirement is physical appearance, yet there is no set standard for a physical description because many different types are needed. The majority of fashion models are required to be between the ages of 16 and 30 and must be at least 5 feet 5 inches in height. Most fashion houses employ one or more models in the middle age bracket, who may be above average weight, so as to suitably display garments for the more mature clientele. Those businesses which specialize in misses or women's sizes may use only models who wear sizes 8, 10 or 12. A female shoe model generally must be able to wear a size 5, and a hosiery model must have very long and graceful legs. In most cases, the male model should be able to wear trim clothing, usually a size 40 or 41 long suit.

All types of modeling are fatiguing occupations because of the many hours of standing and walking, or of sitting or standing still in uncomfortable positions. An important requirement therefore is good physical health and stamina.

Most fashion and photographic models must have special training in order to meet all the necessary requirements. Reputable modeling schools, charm schools or special classes in high schools may offer skills and techniques required. Some models take special courses in dancing or physical fitness in order to achieve suppleness and grace of carriage.

Most employers require a high school diploma, and a few prefer some college experience, especially in the liberal arts area. Each type of model should have a portfolio with photographic poses and other information such as name, address, telephone number, height, weight, coloring, and dress and shoe size.

The greatest demand for models is in large cities, mainly New York, the center of the fashion industry in the United States. Large numbers of models also find regular work in Chicago, Dallas, Los Angeles, Miami, San Francisco and other fashion centers. The earnings of a model vary considerably with type and place of employment, and the nature, frequency and duration of assignments.

Consumer and Homemaking Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
MODELING

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 150 Women in Modeling, Fashion Advertising

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Fashion as a Career

Other Sources

American Apparel Manufacturers Ass'n  
2000 K Street N.W., Washington, D.C. 20006

American Fashion Ass'n, Inc.  
3651 Apparel Mart, Dallas, Texas 75207

National Dress Manufacturers Ass'n, Inc.  
570 Seventh Ave., New York, N.Y. 10018

National Outwear and Sportswear Ass'n, Inc.  
347 Fifth Ave., New York, N.Y. 10016

Texas Fashion Creators Ass'n  
3641 Apparel Mart, Dallas, Texas 75207

## Consumer and Homemaking Occupations

### INTERIOR DECORATION AND DESIGN

Interior decorators or designers make plans and furnish interiors of homes, commercial and institutional structures, hotels, clubs, ships, and theaters, as well as do set decorations for motion pictures and television. These persons perform different jobs according to their type of employment. In general, they plan the functional arrangement of interior space and coordinate the selection of furniture, draperies and other fabrics, floor coverings, and interior accessories.

Designers must respect the tastes and amount of money clients wish to spend. They usually make preliminary sketches of plans, as well as cost estimates before proceeding with any work.

Some designers work in large department and furniture stores advising customers on plans for decoration and suggesting purchases. Others work in advertising or journalism, and a few become teachers or lecturers. Many designers establish their own businesses, not only as consulting services, but also to sell all or some of the materials used in their work.

Personal qualifications for successful interior decorators or designers include an artistic and creative talent, imagination, good business judgment, and the ability to deal with people effectively.

Formal training in interior design and decoration is becoming increasingly important for entrance into this field of work. Most department stores, well-established firms, and other major employers will accept only professionally trained people for beginning jobs. The minimum educational requirement is completion of either a two or three-year course at a recognized school of art or design. A person may also train in a four-year college course which leads to a bachelor's degree with a major in interior design and decoration. Courses in salesmanship, business arithmetic, and other general business subjects are also of great value to the designer or decorator. Membership in either the American Institute of Interior Designers (AIID) or the National Society of Interior Designers (NSID), both professional societies, is a recognized mark of achievement in this profession.

Working conditions vary in different areas of employment. Hours can be long, and irregular, patterned to suit clients. Decorators may work many evenings and weekends, and often deadlines must be met despite problems and delays on the job. The more successful designers become, the longer and more irregular their work is. The main objectives of designers are to please customers and to establish a reputation in the field.

Employment in the field of interior decorating and design is sensitive to changes in general economic conditions, because people often defer these kinds of expenditures when the economy slows down. Designers

## Consumer and Homemaking Occupations

who have average skill earn moderate incomes, while highly talented decorators who are well-known and are in demand earn very high incomes. Self-employed decorators have a wide range of earnings, with profits related to such factors as volume of business, prestige, economic level of clients, their own business competence, and the percentage of wholesale price which they receive from the sale of furnishings.

There are many satisfactions in this field, as designers have the chance to express themselves artistically, the pleasure of working with beautiful things, and of seeing the material results of plans and ideas. Once established, designers may open their own business and enjoy the independence of being self-employed.



Consumer and Homemaking Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
INTERIOR DECORATIONS OR DESIGN

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 196 Interior Decorator or Designer

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-52 Interior Designers and Decorators, 5c

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Your Career in Interior Design

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Interior Design and Decoration

Other Sources

National Society of Interior Designers, Inc.  
315 E. 62nd Street, New York, N.Y. 10021

Society of Interior Designers, Inc., Texas Chapter  
4007 Dallas Trade Mart, Dallas, Texas 75207

## Consumer and Homemaking Occupations

### OTHER CONSUMER AND HOMEMAKING OCCUPATIONS

Career fields in consumer and homemaking occupations, in addition to those already discussed, include the following:

Food Products Testers mix, cook or bake experimental food products such as cake mixes, refrigerated biscuits, cookies or rolls. They also suggest new products and product improvements.

Research Nutritionists perform research in improvement of food as related to appearance, palatability, and nutritional value. They study recent scientific discoveries in nutrition for application or future research and for interpretation to the public.

Consumer Service Specialists investigate consumer needs and interpret them to the producer. They may prepare folders, booklets or cookbooks for consumers, conduct store demonstrations and give talks to consumer groups. They also handle consumer correspondence and may be in charge of publicity and advertising.

Household Products Technicians compile data concerning products such as waxes, cleaners, insecticides and air purifiers. They evaluate the product, tabulate data from consumer surveys and answer customers' calls for product information.

Home Service Representatives demonstrate the use and care of appliances to promote sales. They also advise homemakers in their efficient use. They may explain the use, operation and care to community groups, dealers and salesmen. These persons may represent a company on radio or television, and may advise customers on kitchen planning and home lighting.

Home Service Directors plan, coordinate, and direct consumer education or research programs for equipment, food or utility companies to promote good will and sales. They may write articles and prepare instructional materials for product uses.

Consumer Service Specialists (Textiles) represent company products to consumers. They create an awareness of new textile developments, fashion trends, and innovations in patterns and sewing machine equipment. They handle consumer correspondence, and may test products to insure customer satisfaction.

County Home-Demonstration Agents instruct and advise women in developing programs to improve farm and family life. They also advise on nutrition, clothing, home management and child care through visits to homes.

Consumer and Homemaking Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OTHER CONSUMER AND HOMEMAKING OCCUPATIONS

American Home Economics Ass'n  
1600 20th Street N.W., Washington, D.C. 20009

Clothing Manufacturers Ass'n of U.S.A.  
135 W. 50th Street, New York, N.Y. 10020

Home Demonstration Ass'n  
Route 2, Box 261, Port Lavaca, Texas 77979

Home Economist, Utilities Companies, your city

Texas Dietetic Ass'n  
1619 South 15th Street, Temple, Texas 76501

# ENVIRONMENT



## Environmental Occupations

### GENERAL INFORMATION

Persons involved in the environmental sciences are concerned with the important area of ecology. Their jobs stress the effects of environmental influences upon our individual lives and society as a whole.

The work of these people emphasizes human, plant and animal life, most especially the existence of each in terms of the whole group. This is important work, whether it be in research and development of new plant varieties and horticultural crops, or in the application of regulations which protect an endangered species of fish.

Jobs range from that of the forester whose responsibilities are to defend and protect plant life, to the position of ecological engineer who designs equipment for the protection of citizens against air, water and waste pollution.

Regardless of specialty or branch, environmentalists' work is characterized by the need to protect and conserve nature, natural resources and inhabitants of our land. In addition to technical knowledge and skills, those persons employed in environmental occupations must possess a sincere interest and love for their surroundings.

The concern for the total environment began to emerge on the citizen level in the 1960's. That concern has grown into national movements aimed at protecting and preserving the environment for future generations. These national movements cover every conceivable aspect of ecology.

Quite naturally, this grave national concern is bringing great attention to all environmental occupations. More positions are becoming available and pay scales are beginning to climb upward. The future shows every evidence of bringing even more growth and opportunities to this field.

## Environmental Occupations

### FORESTRY

Persons who choose forestry as a profession will work to protect and manage forests so that they contribute to the national economy by providing raw materials, protection of water and wildlife resources, and majestic beauty for all citizens to enjoy.

They map locations and estimate amounts of timber and wildlife; determine areas for tree planting or disease control; and select and mark trees for cutting. They may also be in charge of lookouts and help in the detection and fighting of forest fires. They oversee campgrounds, collect camping fees, and give talks to campers on rules and regulations. In emergencies, they find lost campers and work to rescue climbers and skiers.

Most of the time foresters work out-of-doors, but they may also work inside in a laboratory or research center. They are responsible for keeping extensive records and maps of their work.

By the nature of this work, foresters must sometimes make quick decisions on the basis of sketchy knowledge. Due to this, they should be extremely self-reliant, and have considerable initiative. They should also possess patience, as nature changes slowly, therefore slowing the results of their work. A strong liking for the outdoors and a firm conviction that their work is important make successful foresters. They generally work alone, and the ability to withstand hours and even days of loneliness is essential. Good health is important due to the strenuous quality of this work.

Foresters usually work a forty-hour week, and live in or near a small town. Through tradition, they often travel to other forest areas in order to learn how problems are handled elsewhere.

The forester should be a graduate of a four-year university or college with specific training in forestry. High school course work should include math, chemistry, botany, zoology and physics.

Federal and state governments employ many graduates of forestry programs. Opportunities are increasing in the field due to population growth, the demand for wood products, and the ever-increasing awareness of conservation and ecological importance. Foresters may advance to positions in research work or enter forest industries as supervisors or managers.

Foresters gain satisfaction from their work in knowing it is for human good now and in the future. They realize their part in conserving nature's gifts, which gives deep personal satisfaction to this work.

Salaries are modest to good, and benefits are generally good providing a person works for a private company. If employed by the government, benefits are comparable to those of other Civil Service jobs.

Environmental Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
FORESTRY

Pamphlets

American Forestry Association  
919 17th Street N.W., Washington, D.C. 20006  
So You Want to be a Forester  
You Can Be A Conservationist

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 23 Forestry As a Career

State University College of Forestry  
Syracuse University, Syracuse, N.Y. 13210  
What Foresters Do

U.S. Forest Service  
Washington, D.C. 20250  
Careers in Forestry  
The Work of the U.S. Forest Service  
Foresters

Books

Dodd, Ed, Careers for the 70's, Conservation  
Crowell-Collier Press, New York, N.Y.

New York Life Insurance Co.  
New York, N.Y.  
Career Opportunities, Forester

Sidney, Howard ed., Agricultural, Forestry and Oceanographic Technicians  
J.G. Ferguson Publishing Co., Chicago, Ill.

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Forestry

Other Sources

Society of American Foresters  
1010 16th Street, N.W., Washington, D.C. 20036

Texas Forest Service  
Texas A&M University, College Station, Texas

## Environmental Occupations

### FLORICULTURE AND LANDSCAPING

The field of floriculture and landscaping is the art, science and business involving the commercial production, marketing and use of floral crops, garden flowers, shrubs and trees. It includes landscaping, or the fitting together of lands, plants and buildings for human use and enjoyment, and that of floral design and production to enhance interiors of homes, offices and churches for various occasions.

Requirements for the floriculture field include alertness, an eye for color, natural ability in creative arranging, and an enjoyment in working with one's hands. Good health is important, yet certain types of physical disabilities will not hamper a person in some areas of this career field.

Training varies with the particular job in floriculture and landscaping. General training necessary for the field is a study of the life processes and growth of various plants and shrubs; knowledge of structures and equipment utilized in greenhouse production; an understanding of soils, fertilizers, and plant insects and diseases. Those interested in working in floral design must be familiar with uses and characteristics of cut flowers, flowering pot plants, foliage plants, and containers and necessary supplies used in basic arranging.

Formal training can be obtained in technical schools and at some four-year colleges and universities. It ranges from short courses for floral designers to two and four-year programs in landscaping and design.

Working conditions depend upon the particular job. Most all floral arranging is done inside where working conditions are pleasant, with good benefits for those employed by large companies. Horticulturists usually work indoors in a greenhouse. Much of the nursery and garden center employees' work is done out-of-doors. Actual planting, cultivating and other work must be performed under favorable weather conditions, yet this employee often works in adverse conditions during the year.

Conditions associated with the landscaping field vary with types and sizes of firms. Persons may work as designers who prepare plans and specifications, or they may be landscape advisers or salesmen, who arrange with the customer the work to be done. In any case, these persons are also subject to a great deal of outdoor work, as well as working inside in modern, well-lighted office areas.

Opportunities for floral designers depend upon individual creativity. A person can specialize in the design field. Self-employment and ownership of a business is possible for successful designers. Salaries are average, but the work is both satisfying and relaxing.

## Environmental Occupations

The future for horticulturists is good, due to an increase in income and leisure time for these professionals. Demands for this type of person presently exceed the supply. Jobs may be found in commercial greenhouses as growers, plant propagators and supervisors. Nursery and garden center jobs include salesmen, foremen, and managers. Personal application on the job, education and experience determine the speed of advancement. Salaries are good, with pleasant surroundings and the chance to be of service to other persons while utilizing one's own creative abilities makes this an attractive career choice.

The lack of uniformity in wages and employment benefits for landscape designers is offset by the fact that this area of employment offers greater opportunities for individual expression and recognition. For those who wish to go into business for themselves, the landscape profession is one of the few remaining endeavors which can be begun with a small initial capital investment. Success and good pay are possible for those persons with specialized training, experience and creative abilities.

Environmental Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
FLORICULTURE AND LANDSCAPING

Pamphlets

American Society of Landscape Architects, Inc.  
2013 I Street N.W., Washington, D.C. 20006  
Landscape Architecture  
A Professional Career In Land Planning

The Institute For Research  
610 South Federal St., 7th Floor, Chicago, Ill. 60605  
No. 13 Landscape Architecture  
No. 63 Florist Shop Management

National Landscape Nurserymen's Association  
Box 4, Leesburg, Fla. 32718  
Have You Ever Thought of Being a Landscape Nurseryman?

Books

Messner Career Books  
Julain Messner Co., 1 West 39th, New York, N.Y. 10018  
Careers in Horticultural Science

Moore, S. B., Ornamental Horticulture as a Vocation  
Mor-Mac Publishing Co., Box 984, Fairborn, Ohio 45324

Richards Rosen Press, Inc., New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Aim For a Job, Florist

Universal Publishing & Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manuals, Horticulture, Landscape Architecture

Other Sources

American Society of Horticultural Science  
615 Elm Street, St. Joseph, Mich. 49085

Texas Association of Nurserymen  
3701 Kirby Drive, Room 1110, Houston, Texas 77006

Texas Landscape Association, Inc.  
3005 Silverleaf Drive, Austin, Texas 78767

Texas State Florists Association  
1005 Perry-Brooks Bldg., Austin, Texas 78701

CONSERVATION

Soil and mineral conservationists plan and develop practices for the protection of land and natural resources. They work closely with farmers and ranchers to give technical assistance in the planning, application and maintenance of structural improvements on individual and group water or land holdings, or on watersheds. Farmers and other land managers use this knowledge in making adjustments in land use to protect from soil deterioration. Through the conservationist they learn to rebuild eroded and depleted soils, thus stabilizing run-off.

Mineral conservationists study and diagnose mineral deposits, and plan for their proper use or extraction so that future crop requirements will not be endangered. These persons prepare maps outlining inventories of soil, water, vegetation and other details for the farmers' use in crop rotation, drainage, irrigation and permanent vegetation.

Conservationists must be in good health and possess stamina as their work is out-of-doors. They are constantly engaged in physical activity, such as walking long distances over rough terrain and climbing hills. Their enjoyment of the outdoors must span the cold winter season as well as the summer heat. They must be able to get along well with other persons, be convincing and have the ability to handle the frustrations associated with the effort of working to convince other persons of a plan of action. The soil or mineral conservationist mainly works in the company of others, often in a team effort.

Necessary requirements for conservationists include a bachelor's degree from an accredited college or university. Science and mathematics courses should be stressed in high school. Upon completion of college, a Civil Service examination must be taken to qualify for agencies of the federal government.

Conservationists may work almost anywhere from farm and ranch lands to mountain areas. Some jobs are in areas which entail offshore work in oil drilling and extraction. These persons work from aerial photographs, onsite pictures, and actual trips to a project site. The work week is usually about forty hours, with some overtime. A small amount of desk work is necessary so that detailed reports can be developed.

Numerous federal agencies employ soil and mineral conservationists, and many positions are available in large mining and drilling operations. Overseas assignments are possible. Job opportunities are also expanding with other organizations such as public utility companies which are interested in conservation. Openings occur in college teaching, particularly at the undergraduate level. Persons with aptitude in various phases of this work have good chances for advancement, with both salary increases and positions of greater responsibility.

## Environmental Occupations

Earnings for government employees are based on the Civil Service scale. Generally, salaries are moderate to good.

Conservationists have opportunities for travel and may be away from their homes and families for extended periods of time. These persons find satisfaction in the awareness that their work is important to the economy of the nation. Without their efforts, large portions of the country would become barren in only one generation.

Environmental Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
CONSERVATION

Pamphlets

American Forestry Association  
919 17th St. N.W., Washington, D.C. 20006  
You Can Be a Conservationist

Soil Conservation Service  
U.S. Dept. of Agriculture  
Washington, D.C. 20250  
Careers in Soil Conservation and Service  
An Engineering Career for You in Soil Conservation Service  
A Soil Science Career for You in Soil Conservation Service

Books

Dasmann, Raymond, Environmental Conservation  
John Wiley & Sons, New York, N.Y.

Dodd, Ed, Careers For The 70's, Conservation  
Crowell-Collier Press, New York, N.Y.

Messner Career Books  
Julian Messner Co., 1 West 39th St., New York, N.Y. 10018  
Nature's Guardians, Your Career in Conservation

Other Sources

County Agent, your county

Environmental Protection Agency  
Waterside Mall, 4th & M Streets S.W., Washington, D.C. 20460

Land and Natural Resources Div.  
U.S. Dept. of Justice, Washington, D.C. 20530

## Environmental Occupations

### POLLUTION CONTROL

The pollution control industry is concerned with air, water, and solid waste pollution in light of man and the total environment. This career field involves a combination of studies and several different areas of work. The basic levels of the field are engineering, engineering technicians and operators.

Individuals who enter pollution control must be concerned with their relationships with other people and with nature, and the effects on the total environment of those relationships.

Engineers are primarily responsible for the design of abatement equipment, while technicians assist in design, construction, and supervision of an operation. Operators are responsible for proper operation of pollution abatement equipment and the necessary chemical analyses for control purposes. Ecologists are required to work with citizen, scientific and ethnic groups in problem solving. They will also be involved with planning organizations and field work in determining effects of society on the environment.

Educational requirements vary with the position, but good mathematical aptitude and mechanical abilities are important to each. Engineers must have a bachelor of science degree in civil, mechanical or sanitary engineering. Course studies usually cover a five-year period. The technician must complete requirements for an associate degree, a two-year program. Operators must obtain training from State Health Department certified programs which are less than one year in length. The ecologist is quite often required to obtain a master's degree in ecology, which involves five years of schooling. Generally, the bachelor's degree is taken in a scientific or social scientific field.

Job opportunities in this new field are unlimited at this time. Employment for engineers and technicians is available in city agencies, consulting firms, industries, and regulatory agencies. Operators are largely employed by municipalities. Ecologists are employed with city, county, and regional organizations, as well as by industrial firms.

Operators, engineers and technicians often advance to positions of management within city governments. Monetary rewards are good to excellent, and are comparable to other professional positions in federal and state organizations. Salaries for ecologists largely depend upon qualifications and responsibilities of the individual.

SOURCES OF ADDITIONAL INFORMATION ABOUT  
POLLUTION CONTROL

Books

Dasmann, Raymond, Environmental Conservation  
John Wiley & Sons, New York, N.Y.

Richards Rosen Press, Inc., New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Aim For a Job, Your Future in Meteorology

Turk, Amos, Ecology, Pollution, Environment  
W. B. Sanders, Co., Philadelphia, Penn.

Other Sources

American Meteorological Society  
45 Beacon Street, Boston, Mass 02108

Ecological Society of America  
Connecticut College, New London, Conn. 06320

Environmental Affairs  
U.S. Dept. of Commerce, Washington, D.C. 20230

Environmental Protection Agency  
Waterside Mall, 4th & M Streets, S.W., Washington, D.C. 20460

National Institute of Environmental Health Sciences  
Box 12233, Triangle Park, N.C. 27709

Office of Environmental Affairs  
U.S. Dept. of State, Washington, D.C. 20520

## Environmental Occupations

### GAME, FISH AND WILDLIFE MANAGEMENT

Specialists in game, fish and wildlife management determine the best methods of conservation and propagation. They control predators and recommend limitations on hunting and fishing of species in danger of extinction. They encourage growth of fish and wildlife by reducing diseases, restoring vegetation and other food sources and by encouraging breeding.

These managers also enforce federal, state and local wildlife statutes. They may patrol areas by air, truck, jeep or horseback. They conduct censuses of wildlife populations and band migratory birds and fish.

Persons entering this field must have an appreciation of animal life and a desire to serve both the need for protection of species and the need of sport and commercial hunters and fishermen. They must be in good health, as there will be frequent physical exertion, including climbing and lifting as well as exposure to severe climatic conditions. The ability to make careful and keen observations from distances is necessary, but above all in importance is a love of the out-of-doors.

At times, wildlife specialists work alone, but they should also be able to work well with people for they will have frequent contact with the public, such as sportsmen and state officials. The ability to speak before a group is an asset because they will often be asked to make talks and presentations. Many reports are necessary to this job, so wildlife specialists must be able to express themselves well on paper.

A college degree is desired but not required for this job. Students interested in this career while in high school should take courses in mathematics, chemistry, physics, biology, geography and physical education. Formal training can be obtained at many post-secondary schools.

Most of the work is done out-of-doors, but some indoor work is required including making reports or compiling research data. A fairly stringent physical examination is required for many positions in this field. The work is often seasonal in nature, and at times long. During off-season the work is quite light. Some game and wildlife specialists work in comfortable laboratories, while others work in remote locations. Many positions require constant travel.

A relatively small number of persons are employed in this field; therefore, advancement possibilities are limited. Persons with research backgrounds may advance to positions of research directors. Most persons who enter this field work for Federal or state government. Salaries are often modest.

Game, fish and wildlife specialists have a role in a field which is vitally important to all persons. Without their interest and concern, our natural wealth in many kinds of wildlife could become extinct.

Environmental Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
GAME, FISH, AND WILDLIFE MANAGEMENT

Pamphlets

Fish and Wildlife Service  
U.S. Dept. of Interior, Washington, D.C. 20240  
Employment Possibilities in Fish & Wildlife Service

Books

Dodd, Ed., Careers for the 70's, Conservation  
Crowell-Collier Press, New York, N.Y.

Other Sources

National Wildlife Federation  
1412 16th St. N.W., Washington, D.C. 20036

Texas Parks and Wildlife Dept.  
J.H. Reagan Building, Austin, Texas 78701

Wildlife Management Institute  
709 Wire Building, Washington, D.C. 20005

## Environmental Occupations

### OTHER ENVIRONMENTAL OCCUPATIONS

#### Pollution Prevention and Control:

Radiation Monitors check plant facilities, personnel and the work environment to detect radioactive contamination. They collect airborne radioactivity, and give information on dangerous levels of radioactivity. They also instruct personnel in radiation safety.

Sewage Plant Operators are responsible for the operation of sewage treatment, sludge processing and disposal equipment. They perform laboratory tests on samples and check final effects of their tests.

Water and Sewer System Superintendents are responsible for installation, operation and maintenance of these systems. They analyze trends such as population and industrial growth areas.

#### Disease Prevention:

Entomologists study insects and their relation to plant and animal life. They aid in the control and elimination of harmful pests.

Exterminators work to control pests by spraying chemicals or setting traps to kill those which infest buildings and homes.

Food or Drug Inspectors inspect establishments where food and drugs are manufactured, handled or stored to enforce legal standards of sanitation, purity or grading.

Microbiologists (Food) investigate activities of micro-organisms in the manufacture, spoilage and deterioration of food other than milk products. They work to determine the source of contamination.

Public Health Bacteriologists conduct experiments to detect the presence of harmful or pathogenic bacteria in water, food or general environment of community areas. They work to control or eliminate the sources of possible pollution or contamination.

Sanitary Inspectors investigate public and private establishments such as restaurants, hotels and homes, and places of public gatherings to determine their compliance with or violation of sanitation laws and regulations.

Environmental Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OTHER ENVIRONMENTAL OCCUPATIONS

Books

Turk, Amos, Ecology, Pollution, Environment  
W.B. Sanders Co., Philadelphia, Penn.

Other Sources

American Institute of Biological Sciences  
3900 Wisconsin Ave. N.W., Washington, D.C. 20016

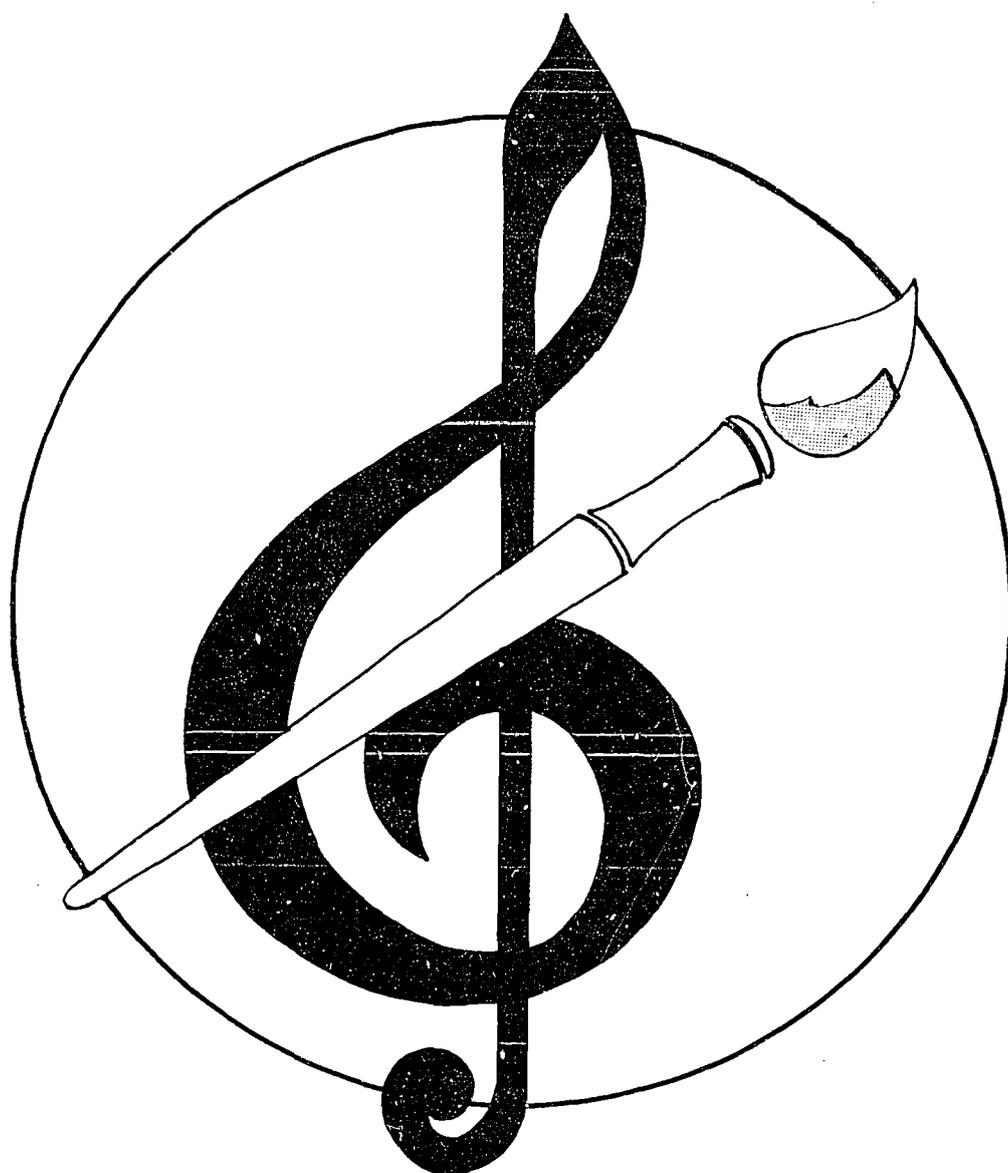
Environmental Protection Agency  
Waterside Mall, 4th & M Streets S.W., Washington, D.C. 20460

National Institute of Environmental Health Sciences  
Box 12233, Triangle Park, N.C. 27709

Soil Conservation Society of America  
7515 N.E. Ankeny Rd., Ankeny, Iowa 50021

U.S. Dept. of Health, Education, & Welfare  
Washington, D.C. 20025

# FINE ARTS AND HUMANITIES



## Fine Arts and Humanities Occupations

### GENERAL INFORMATION

The fine arts and humanities area includes the field of music, drama, art, writing, language and religious occupations. These diversified occupations have one element in common: providing enlightenment to persons who may or may not be highly knowledgeable in these areas.

The need for persons in fine arts and humanities will be perpetual due to the nature of the sometimes intangible products which emerge from those engaged in such fields.

Requirements for the many jobs in this occupational field are as different as each job. Yet they all require above average intelligence and creativity, either with words or motion to get a certain message across to the public. Each job requires a special talent whether it be the ability to create beautiful music or paintings, or the ability to create inspiration in a particular religious faith.

Many of the careers within fine arts and humanities occupations require inherent creativity and sensitivity. Although such traits can be nurtured through training, a basic drive and desire must exist if a person is to be successful. For example, a person can be taught the technology of painting, but unless this training is combined with imagination and creativity, the product will appear mechanical and sterile.

Much hard work, demanding tremendous self-discipline, is required in these fields. Often, long years are spent developing skills only to find these are not recognized. But the beauty and majesty of the world is caught and captured by those who dedicate themselves to these works. The world would be a cold and dismal planet without paintings, music, books, religious experience and the communication of beauty between people.

## Fine Arts and Humanities Occupations

### MUSIC

Classical musicians play in symphony orchestras, string quartets or trios. Dance band musicians in most cities usually work full-time in other jobs, and perform at night for public or private engagements. Accompanists are usually pianists who accompany vocal or instrumental soloists or choral groups. Those with exceptional talent and experience may be employed full-time by nationally known artists, so as to be available for daily rehearsals and to develop special musical arrangements. Church organists often double as choir directors and are paid a fee by the church. These positions are usually filled by skilled musicians who have other full-time jobs.

Full-time professional musicians are located principally in the larger cities, such as New York, Chicago, Boston and Los Angeles, but occasionally make concert tours throughout the country. Many qualified instrumentalists have other full-time jobs and only occasionally work as musicians.

Most performing musicians complete at least the four-year programs offered at college schools of music to obtain a bachelor's degree in musical education. Usually, musicians who play jazz and other popular music do not undergo this formal training. However, they must be highly skilled, and have musical aptitude, patience, persistence, and train with untiring effort to be recognized in their particular field.

Professional singing not only requires a fine voice, but a highly developed technique and a broad knowledge of music in order to progress in the operatic field, musical shows, or to secure engagements as concert soloists. Popular music singers perform in musical shows of all types, on the stage, in night clubs, in movies and on television. The well-known singers also make and sell many recordings, both as soloists or with a group. Since most singers, other than the top stars, have only part-time or irregular engagements, they frequently hold full-time jobs in other occupations. Some give voice lessons or train and direct choral groups. Again, the opportunities for professional singers are greatest in the largest cities.

In addition to high-level musical ability, perseverance, diligence and an attractive appearance, good contacts and luck often are required to achieve a successful singing career. All professional singers are members of one or more of the several national unions or guilds.

Many qualified musicians teach in schools or colleges on a full-time basis and thus seldom are paid for performing. Many of these persons also give private lessons in their homes or in pupil's homes.

Most people who become professional musicians begin studying an instrument, or voice, at an early age. Intensive training in addition to inherent talent is needed to achieve a successful career, either as

## Fine Arts and Humanities Occupations

a performer or teacher. Students with musical talent and skill can qualify for advanced study in schools of music which leads to a bachelor's degree in musical education.

As a career, the music field is expected to remain overcrowded through the seventies. Opportunities are not numerous enough to employ all the qualified instrumentalists and singers. Competition is keen. The employment outlook for qualified music teachers is considerably better than for those qualified as performers only.

Because of the wide range of a musical career, it is only natural that salaries vary. Star performers in opera, on the stage, in variety and night club acts often receive very high salaries. Yet, it must be remembered that their salaries must cover all their expenses, including the services of a manager or agent, accompanist and musical arranger, hairdressers, wardrobe and other services. Performers may have periods of unemployment between engagements; thus the overall level of earnings is generally lower than that of many other occupations. There are seldom any fringe benefits available, and some musicians cannot qualify for unemployment compensation.

Other occupations in the music field include music directors for television programs who are responsible for selecting, arranging and directing suitable music for various programs. They select musicians for live broadcasts, and direct them during rehearsal and broadcast. Most television musical directors work on a free-lance basis and are hired for specific assignments, although a few large stations employ staff musicians full-time.

Music librarians are also needed in the radio and television areas to provide musical programs and background music for other shows. Large stations which have extensive music libraries employ a full-time music librarian who maintains music files and provides whatever selections or types of music are requested. In some stations this person may be expected to perform other duties in clerical, sales or technical areas. Entry jobs in the broadcasting field require a high school diploma as a minimum qualification, and often a liberal arts degree is necessary.

The employment outlook in the broadcasting media is good, with pleasant working conditions. Salaries are good, with more earnings in large cities and within large stations. Generally, salaries are higher in the television field than those in radio.

Fine Arts and Humanities Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
MUSIC

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 11 Music as a Career  
No. 88 School Music Teacher  
No. 93 Popular Music as a Career  
No. 158 Careers as TV and Radio Performers  
No. 279 Career as Popular Singer and Entertainer  
No. 284 Musical Instrument Retailing as a Career

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-65 Performing Arts

Books

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Music Careers

Other Sources

American Federation of Musicians (AFL-CIO)  
641 Lexington Ave., New York, N.Y. 10022

American Guild of Organists  
630 Fifth Avenue, New York, N.Y. 10020

National Ass'n of Schools of Music  
One Dupont Circle N.W., Washington, D.C. 20036

Texas Singers Ass'n  
140 E. Long Street, Stephenville, Texas 76401

## Fine Arts and Humanities Occupations

### DRAMATICS

The glamour and fascination of acting attracts many to the profession of dramatic art. It is hard and demanding work that requires special talents and involves many difficulties and uncertainties. Aspiring young actors and actresses usually must spend many years in intensive training and practice before they are ready for public performances. They need not only great natural talent, but also determination, willingness to work long, hard hours, and an overwhelming interest in the profession. Many aspirants get their start in high school plays, and proceed through formal training in one of the special schools of the dramatic arts, which includes training in the liberal arts, speech, play production, history of the theater, and practical courses in acting. Outstanding talent and great interest and determination are essential for success in the theatrical field. Ability to memorize, a good speaking voice, good health and physical stamina to work long hours are all essential. The ability to sing and dance are also assets for those seeking an acting career.

New actors and actresses generally get their start in "bit" parts with only a few speaking lines. The next step is in a supporting role, where they may also serve as understudies for the principals. Stage plays, motion pictures and television, particularly television commercials, are the largest areas of employment. The larger cities, such as New York, Boston, Philadelphia, Chicago and Los Angeles, where there are theaters operating on a year-round basis, offer the best opportunities to aspiring young actors and actresses. Most larger cities have repertory theaters, or dinner theaters, which put on plays at regular intervals. These provide good opportunities for local talent as well as for professionals from other centers. Road shows moving from city to city are usually produced in New York, with casts selected there. Employment opportunities in motion pictures and film television are mainly centered in Hollywood, although some studios are located in New York, Chicago, Miami and Nashville.

This profession is expected to be overcrowded for many years. In all areas, job applicants far outnumber the jobs available. Even highly talented young persons are likely to face stiff competition, and economic difficulties add to the complications. Many are employed for only a small part of the year and thus need to be able to work in other occupations to make a living.

In some cases, salaries are only minimum, although well-known actors and actresses receive salaries which rate at the top of pay scales. The motion picture business offers the greatest salaries in the field, with large television productions ranging second.

On the legitimate stage, the workweek is usually eight performances with overtime being paid for any additional performances. The basic workweek, after the show opens, is approximately thirty-six hours,

## Fine Arts and Humanities Occupations

including limited rehearsal time. During the rehearsal period prior to a show opening, the work is always longer with late night and weekend work. Road shows require weekend travelling.

Full-time actors and actresses must belong to one or more of the several types of unions or guilds associated with the profession. Most full-time persons are covered by a pension fund, and some have fringe benefits such as hospitalization insurance. All union or guild members have paid vacations and paid sick leave; however most stage actors get little, if any, unemployment compensation because they seldom have sufficient employment in any state to meet the eligibility requirements. Consequently, they must be prepared when a show closes to obtain casual work in other occupations while waiting for another engagement.

Dramatics teaching offers the opportunity for those seeking a career as a teacher, rather than a performer, to become active in this field. Training requirements include the minimum of four years of college training in liberal arts, fine arts and drama, plus a teaching certificate in public schools. Most teachers have had some experience in drama, either as a performer or director, so as to have practical knowledge of the profession.

The opportunities for teaching jobs in dramatic arts are not numerous, and unusual talent as well as experience is required to secure positions in public schools or drama departments of colleges and universities.

Positions of dramatic coaches and production directors are usually held by persons who have had considerable previous experience and success in an acting career.

Fine Arts and Humanities Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
DRAMATICS

Pamphlets

The Institute For Research

610 South Federal Street, 7th Floor, Chicago, Ill. 60605

No. 49 Professional and Teaching Careers in Dramatic Art

No. 89 Careers in the Theater

No. 158 Careers as TV and Radio Performer

No. 292 Career as Movie Actor or TV Actor

U. S. Government Printing Office

Washington, D.C. 20402

No. 1300-65 Performing Arts, 10c

Books

Messner Career Books

Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018

Stagestruck: Your Career in the Theater

Universal Publishing and Distributing Co.

235 E. 45th Street, New York, N.Y. 10017

Vocational Guidance Manual, Dancing Career

Other Sources

Actors' Equity Ass'n

165 W. 46th Street, New York, N.Y. 10036

American Federation of Television & Radio Artists

724 5th Ave., New York, N.Y. 10019

Screen Actors Guild Inc.

7750 Sunset Blvd., Hollywood, Calif. 90046

Screen Extras Guild

3629 Cahuenga Blvd., West Hollywood, Calif. 90028

## Fine Arts and Humanities Occupations

### ART

Fine art includes paintings, sculptures and other varied forms of art expression. Fine art is work created by the artist for its own sake, or as a result of the artist's desire to express himself through this media. Artists may choose to work with many different types of materials including water color, casein, tempora, pastels, or oils. They can paint on paper, cardboard, wood, canvas, and even on glass and metal. Talent may lie in still life subjects or in portrait paintings. Artists may be realists, impressionists, expressionists, surrealists or abstractionists. They are free to choose their own style, as well as subjects and medium. Sculptors are artists with a special kind of sensibility for solid, three-dimensional shapes and forms. They express thoughts and emotions by working with wood, clay, stone or metal. They need more physical strength than painters, plus more technical know-how since each kind of material which they may use has its own peculiarities. The creation of art requires dedication, talent, and great desire.

All artists should possess creative imagination, good taste, and judgment of line and color. Artists find great inner rewards in their profession and in their creations. For careers in fine arts, a broad liberal arts education is a good foundation. In high school, students interested in entering this profession should take college preparatory courses with as many art courses as possible. Today more and more artists attend college. In larger cities, many go directly from high school into private art schools. For many young artists, formal training can save time and money.

The opportunity for income from fine art depends upon artists' selling abilities, as well as the quality of their work. Artists must take every opportunity to display their work in galleries and museums, art studios and art centers. Many cities hold art festivals during the summer months, and many artists get a start through participation in art shows and exhibitions are well attended.

Income of artists is usually small, and these persons often must have a second means of income. Frequently artists face much discouragement before recognition comes. Earnings are likely to come in spurts. Prints bring the lowest prices but sell in the greatest numbers. Drawings are next in price, with oil paintings highest. Portrait commissions may pay very well, depending upon the skill and experience of the artist. Most sculpture brings high prices, but prices depend upon size.

Fine Arts and Humanities Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
ART

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 38 Art Gallery Operation  
No. 97 Art as a Career

National Art Education Ass'n  
1201 16th Street N.W., Washington, D.C. 20036  
Careers in Art

Books

Holden, Donald, Art Career Guide  
Watson-Guptill Publications, Inc.  
165 W. 46th St., New York, N.Y. 10036

Roth, Claire, Art Careers  
Henry Z. Walck, Inc., 19 Union Square West, New York, N.Y. 10003

Other Sources

American Artists Professional League  
15 Gramercy Park, New York, N.Y. 10003

Texas Ass'n of Fine Arts  
P.O. Box 5023, Austin, Texas 78763

## Fine Arts and Humanities Occupations

### WRITING

Professional writers combine talent with the discipline that makes writing an art as well as a craft. This craftsmanship teaches one to write, while one's sensitivities tell what to write. Professionals write because of a compelling desire to express, to share observations, and to create. Writing takes many forms which include books, newspaper and magazine articles, plays, radio and television scripts, text book material and miscellaneous material. Some writing is considered literary, and some commercial. Literary writers are more likely to think of their work as satisfying personal standards, while commercial writers think of satisfying the public or client. Interpretative writing may take the form of biography, history, essay or editorial.

Primary requirements for professional writers are the ability to think creatively and to develop a deep power of observation. They should possess a strong interest in words and have the ability to put them together interestingly and effectively. Creativity cannot be taught, because it is largely instinctive, yet it can be awakened and sharpened.

Craftsmanship is also important and a foundation for all professional writers. Would-be writers should begin learning and practicing writing while in high school, particularly on the staff of a school newspaper, yearbook or other publication. This will provide valuable experience, plus give students an opportunity to select a field of interest. Writing courses are valuable because they teach techniques of the field in addition to developing the ability to give and take criticism. A college education has many advantages for writers, for it offers a wealth of background knowledge in many different subjects, the ability to evaluate and learn techniques of criticism, and the accessibility of generally excellent library facilities.

Not only must professional writers have creative ability and individual skill in interpreting ideas and concepts, but they must constantly find and satisfy markets for their work.

Today's opportunities are excellent for persons wishing to enter the writing profession, utilizing either objectivity or sensibilities. The demand for factual writing and the trend toward digest publications continues to increase.

Writers work anywhere and everywhere, but most writing is done at the writer's own desk. Materials needed are a typewriter or tape recorder, or possibly both, a good dictionary, a thesaurus, and a handbook on composition and punctuation.

Generally, careers as creative writers do not pay well, and few are in high income brackets. Free lancing pays considerably better for writers who can produce good work and can sell articles.

## Fine Arts and Humanities Occupations

While the hours of work are often up to the writer's own choosing, they may tend to be longer than those of a normal office. Novelists may spend months or even years on a single book. The manuscript is sent or taken to a publishing house, or very likely to a series of publishers before being accepted. If successful, writers sometimes are paid an advance on the royalties anticipated from the sale of the material. They may sign contracts to produce work at regular intervals as well. Most reputable publishers of books, magazines, and newspapers pay promptly for accepted manuscripts.

The disadvantages of professional writing careers are the problem of insecurity, the need for great personal discipline and constant drive in order to meet deadlines, and the uncertainty as to whether a piece will sell. Often, writers are also faced with slow responses from publishers for rejection or acceptance.

The attractions of a writing career include the exhilaration which comes from the very act of creating, the satisfaction of seeing one's own work in print after hours of tedious work, and the freedom of working at one's own pace. Other rewards include the constant challenge in exploring new subjects to gain fresh approaches, and the establishment of a reputation carrying with it a high degree of prestige.

Fine Arts and Humanities Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
WRITING

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor  
Chicago, Ill. 60605

No. 9 Careers in the Publishing Field  
No. 153 Writing for Radio and TV  
No. 167 Professional Writer  
No. 193 Magazine Advertising

Books

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manuals, Opportunities in Free Lance Writing  
Technical Writing

Other Sources

American Newspaper Publishers Ass'n  
750 Third Avenue, New York, N.Y. 10017

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

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

Society of Technical Writers and Publishers, Inc.  
Box 3706 Beechwold Station, Columbus, Ohio 43214

Society of Technical Writers and Publishers, Inc., Texas Section  
2400 W. Loop, Houston, Texas 77027

## Fine Arts and Humanities Occupations

### LANGUAGES

Because national interests throughout the world are becoming more and more intertwined politically, economically and culturally, the need for language specialists to communicate with people of other countries in their own language is increasing. Not only are such language specialists employed by many agencies of the United States government, but American business firms hire an equally large number for their foreign operations. Almost as many work for international organizations or in technical assistance programs overseas. Americans who are fluent in the language of the foreign country in which they live and work can perform duties more efficiently and intelligently in the language of that country than is possible when depending upon the skill and integrity of a native interpreter.

Foreign language specialists may use their skills as interpreters or translators. Interpreters translate the spoken passages of one language into another language. Interpreters work under a wide variety of circumstances and conditions. There are two types of conference interpreters, simultaneous and consecutive. The simultaneous interpreter is able to convert to a second language continuously, while a spoken sentence is being expressed in the first language. All international conference interpreters are simultaneous interpreters. A good example is the United Nations where the five official languages are English, French, Spanish, Russian and Chinese. No matter which of these languages is used by a speaker, the listener, by using headphones, may hear the speech in one of the other four languages as spoken by a simultaneous interpreter. This method is widely used wherever an audience is composed of people from many different countries.

Escort interpreters are engaged to travel with visitors who are touring this country, while others may be required to accompany a group of U.S. citizens on tours in other countries. Another avenue of employment for proficient interpreters is with embassies and consulates abroad. Because of the volume of trade between the U.S. and Brazil, and between the U.S. and Japan, there is an increasing need for interpreters and translators who are proficient in Portuguese or Japanese.

Translators are primarily concerned with transferring written or printed material from one language to another. There are times however when they also act as interpreters. Translators are frequently employed in a dual capacity by many American commercial and industrial companies to handle correspondence and orders received from abroad written in a foreign language. They may also meet and greet customers coming from other countries who do not speak English. Small firms that do not have sufficient foreign business to warrant hiring a translator full-time may employ one or more linguists who speak different languages and have other vocational skills, such as secretaries and technicians. Publishers of books, magazines and newspapers make wide use of translators.

## Fine Arts and Humanities Occupations

Persons interested in careers as interpreters or translators must have the mental qualifications of reason and memory, a good ear for accent, and the ability to imitate sounds of the language. They must have imagination and intuition in order to understand word and idiom meanings. A good understanding of the customs and traditions of the people who speak the language is also essential for these professionals.

Since the nation's high schools and colleges can obviously teach only a few of the foreign languages, persons who desire to become linguists can enroll in special schools of languages designed exclusively to give students intensive training in any of a large number of languages. Most of the large colleges and universities offer comprehensive courses in several languages as well. Other methods of learning a foreign language are through an individual teacher, often a native of the country whose language he or she teaches. Generally, such instruction is for the conversational method rather than for the grammar method.

An important asset for prospective interpreters or linguists is the experience of having traveled extensively, or having lived in a foreign country in whose language they wish to specialize.

Earnings of those who enter the field are considered good. Top-rank conference interpreters earn very high salaries. Language specialists employed by the government generally earn salaries equivalent to those paid to employees of the same grade in other areas of the service. There are endless opportunities for those who are proficient in another language in business and industry, as well as in free-lance work.

Armed with a proficiency in a foreign language, especially when combined with other vocational skills, young people can fill the great need for linguists to serve in many parts of our country and in the many countries abroad. These persons have the advantage of meeting people of different customs and traditions when they can communicate directly with others in their native tongues. Translators, interpreters and linguists realize they are filling a vital need in breaking down language barriers to achieve international understanding.

Fine Arts and Humanities Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
LANGUAGES

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 259 Careers in the Field of Modern Languages

New York Life Insurance Co.  
New York, N.Y.  
Career Opportunities, Foreign Service

Books

Cohn, Angelo, Careers with Foreign Languages  
Henry Z. Walck, Inc., 19 Union Square West, New York, N.Y. 10003

Krosney, Herbert, Careers and Opportunities in International Service  
E. P. Dutton & Co., New York, N.Y.

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manuals, Foreign Service  
Foreign Language Careers

Other Sources

Modern Language Ass'n of America  
6 Washington Square North, New York, N.Y.

## Fine Arts and Humanities Occupations

### RELIGIOUS OCCUPATIONS

Clergymen attend to the spiritual, moral and, in varying degrees, to the educational and physical needs of members of their church or synagogue. To render these services, clergymen perform a variety of duties. They prepare and deliver sermons and perform religious rites ranging from weddings to funeral services. They also officiate at auxiliary meetings, supervise the religious educational program of the church or synagogue, and maintain an interest in each department of the church. They also perform such duties as ministering to the sick, helping the needy, and taking an active part in community affairs.

Nuns belong to a special religious community. Different societies of nuns perform different duties, both in the United States and abroad. Some nuns are contemplative, some operate hospitals, children's and aged homes, and some teach. Nuns live in either an enclosed or cloistered convent, or an unenclosed or community convent. If cloistered, their day is usually spent in worship, prayer and contemplation, perhaps in silence, but completely isolated from the world. In an unenclosed convent, they fulfill their given tasks in the work of the order, ranging from teaching to nursing to administrative duties. Regardless of the work of the convent order, each sister follows a strict schedule of religious observances, as well as charitable service.

Rabbis are the spiritual leaders of their congregations, teachers, and interpreters of the Jewish law and tradition. They conduct daily services and hold special services on the Sabbath and on holidays. They also perform wedding ceremonies, visit the sick, conduct funeral services, prepare and deliver sermons. They too generally hold themselves available at all times for counsel to members, followers of Judaism, and the community at large. They may also write for religious and lay publications, or teach in theological seminaries, colleges and universities.

Protestant clergymen lead their congregations in worship services, and administer such church rites as baptism, confirmations and holy communion. Other duties are the same as those previously described.

Roman Catholic priests serve Catholics by attending the spiritual, moral and other needs of church members. They offer the sacrifice of the Mass, hear confessions, conduct funerals, administer the Sacraments, visit the sick, and counsel with those in need. All priests have the same powers; however, they are classified in one of two main categories depending upon their way of life and the type of work to which they are assigned. Diocesan, or secular priests, generally work as individuals in the parish. Religious priests are members of a religious order, such as Jesuits, Dominicans, or Franciscans. They generally work as members of a community in specialized activities such as teaching or missionary work.

Personal qualities significant in a clergyman's role include good

## Fine Arts and Humanities Occupations

health, both mentally, emotionally and physically. They must be capable of working with and enjoying people. It is of great importance to be skilled in writing and speaking techniques, because these individuals are often called upon for personal advice and for public speaking. They must be able to organize, plan and inspire; therefore, a genuine concern and love for people, a sense of dedication, a deep religious conviction, high moral and ethical standards, and a vigorous and creative mind are necessary.

A person who anticipates a life in the clergy is limited in terms of experience, yet he may begin by being active in church service groups, devoting time to the sick or the aged, and participating in other church programs. It is often difficult to test a decision to enter the clergy without making some kind of personal commitment. The person who feels he wishes to become a clergyman should discuss the matter with a minister, priest or rabbi. After much thought and self-study he should begin to fulfill the requirements demanded of a clergymen by his particular church, such as seminary training for Roman Catholic priesthood, or some type of theological seminary work for the ministry or rabbinate. Only as the prospective clergyman goes through this preparation will he find a realistic opportunity to decide whether this is the life for him. It should be remembered that a person must be motivated from the beginning by a sincere desire to become a clergyman, and should develop a reasonably accurate idea of the life of this person. The same holds true for nuns.

The prospective clergyman should have above average academic ability because the demand for higher education continues to increase. A Protestant clergyman is generally required to have some higher education. While some religious groups require little more than Bible training, the majority of denominations demand a bachelor's degree plus several years of specialized theological study. The Roman Catholic Church requires at least eight years of study beyond high school graduation. Jewish rabbis must have from three to six years of work in a seminary program upon the particular branch of Judaism involved.

Each order of nuns has its own requirements, which may vary greatly from one order to the next, depending upon the charitable work performed. It is not uncommon for an order to further educate its members, either by full-time enrollment in under-graduate or graduate school, or by seminars.

The newly ordained priest, minister or rabbi may first be given an assistantship or a small congregation with which to develop experience. From there, the clergyman's future will depend upon his individual interests, abilities and talents which he exhibits to his superiors.

There is a definite need for clergymen and women, as both spiritual leaders and teachers or administrators. Despite increased enrollment in all kinds of theological seminaries, the present shortages in all denominations cannot be met.

## Fine Arts and Humanities Occupations

A clergyman's salary does not measure up to income in other fields. However, benefits such as housing, retirement and other services are provided by the congregation. Usually, the amount of income depends upon the financial status and size of the congregation. Higher salaries are usually obtained in large cities or in prosperous suburban areas. Earnings do rise with experience and responsibilities.

A clergyman's work is very much involved in interpersonal relationships. His life is rewarding in the sense of spiritual values and achievements. He can find much satisfaction in the comfort and leadership he offers to his parishioners. Clergymen also find personal rewards in living a life congruent with religious belief.

In addition to the religious occupations discussed in detail, the following occupations are also common to the field:

Chaplains perform clerical duties as members of the Armed Forces, hospital staffs or other institutions.

Missionaries carry their faith to other areas, both foreign and at home. This group is comprised of clergy, teachers, doctors, nurses and dentists.

Ministers of Education are in charge of the church's education program.

Directors of Youth Organizations promote youth participation in extracurricular activities of a church. They organize, direct and supervise youth activities such as camps, retreats and social activities.

Music Directors select and arrange programs of music for religious services. They train and direct the choir and choral singing. They may organize musical groups to represent the church at civic and community events.

Fine Arts and Humanities Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
RELIGIOUS OCCUPATIONS

Pamphlets

New York Life Insurance Co.  
New York, N.Y.  
Career Opportunities, Clergy

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-78 Protestant Clergymen, 5¢  
No. 1300-82 Rabbi, 5¢  
No. 1300-87 Roman Catholic Priests, 5¢

Magazines

Royal Service  
October, 1971 The Missionary Vocation  
November, 1971 Career Opportunities in Missions

Soundings  
Summer, 1970 Career and Calling

Tell  
March, 1970 Opportunities for W.M.U. Professional Workers

The Window  
January 1970 Christian Vocations-Questions You Ask

Books

Richards Rosen Press, Inc.  
New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Your Future as a Minister

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Jewish Religions Vocations  
Protestant Religions Vocations

Other Sources

Your minister, priest or rabbi

## Fine Arts and Humanities Occupations

### OTHER FINE ARTS AND HUMANITIES OCCUPATIONS

Careers fields in fine arts and humanities occupations, in addition to those already discussed, include the following:

Dancers perform dances alone, with a partner, or in groups or chorus ensembles. They may perform classical, modern or acrobatic dances, or they may specialize in a particular style of their own.

Choreographers create original dances for ballet, musical shows or stage revues. They may also work in television, motion pictures or night clubs. Instruction of dancers is usually part of their job.

Stage Directors interpret play scripts for stage presentation, instruct performers, approve scenery, sound and lighting, supervise make-up and direct rehearsals.

Music Recording Technicians record on tape and records the musician's singing and/or playing. They operate control boards as to sound, inflection and special effects. Technicians attempt to interpret what the performer wants, and they must be familiar with electronic equipment.

Recording Directors supervise the overall recording of tapes and records.

Lighting Directors create light effects to enhance dramatic presentations, both on stage and screen.

Set Designers create settings to typify or suggest the background of dramas.

Wardrobe Designers design specific costumes to help establish the characters, mood, and time period of theatrical productions.

Fine Arts and Humanities Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OTHER FINE ARTS AND HUMANITIES OCCUPATIONS

Pamphlets

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-65 Performing Arts

Books

Marshall, Max L. Cowles Guide to Careers and Professions  
Cowles Education Corp., Look Bldg., 488 Madison Ave, New York, N.Y.  
10022

Richards Rosen Press, Inc.  
New York, N.Y. 10010  
Aim High Vocational Guidance Serie ·  
Opportunities in a Dancing Career

Other Sources

National Ass'n of Schools of Music  
One Dupont Circle N.W., Washington, D.C. 20036

ABC Records, Inc.  
1330 Avenue of the Americas, New York, N.Y.

Atlantic Recording Corp.  
1841 Broadway, New York, N.Y. 10023

Columbia Records/CBS, Inc.  
51 W. 52 Street, New York, N.Y.

Warner Bros. Records, Inc.  
4000 Warner Blvd., Burbank, Calif. 91505

# HEALTH



GENERAL INFORMATION

Through experiences at doctors' and dentists' offices, in hospitals and even in school, almost everyone is familiar with the general professional services and duties of physicians, dentists, assistants, pharmacists and hospital workers who administer to patients.

Less well-known, but still of equal importance is the work of large numbers of persons employed in other health occupations such as physical therapists, laboratory and X-ray technicians, optometrists, and medical technicians.

The largest area of these occupations is filled by highly trained, skillful nurses, physicians, pharmacists and dentists who have completed many years of pre-professional and professional training. Yet some health service occupations are filled by persons who have little specialized training. Generally, educational and other requirements for employment in health fields are as diverse as the health occupations themselves.

A continued rapid expansion of employment in this area is expected, although growth rates will differ among individual occupations. With expanding population, rising standards of living, increasing health consciousness, more insurance coverage, especially Medicare, and the rapid advancements in medical research, more persons will be needed to meet demands for health care in all areas in the future.

## Health Occupations

### PHYSICIAN OR SURGEON

Physicians or surgeons are educated and licensed to diagnose, prescribe medicine and treat disorders of the human body. They may specialize in one aspect of medical care or perform surgery.

A person's motivation for practicing surgery or medicine must be strong enough to last through the intensive schooling required. Many physicians are in their middle thirties before they begin to practice. These persons must have above average intelligence and an interest in study. They must spend a great deal of time keeping up with new developments in medicine. An aptitude for science is essential. Pre-medical students must be prepared to finance at least eight years of education after high school, with usually no opportunity for even part-time employment. Some scholarships are available to highly qualified students.

High school students preparing to be physicians or surgeons should enroll in college preparatory plans and take as many science courses as possible. Languages, especially Latin, and mathematics are essential. After completing high school, they should enroll in an accredited four-year undergraduate program. A liberal arts major in biology or a pre-medical course may be pursued. In college, concentration will be on sciences, but the humanities and languages are also valuable. While still in college, students should explore entrance requirements for the medical schools to which they propose to apply, and plan their studies accordingly. During sophomore or junior years, they should arrange with advisors to take the Medical College Admission Test. The score made on this test weighs heavily on eligibility for admission. Early in the junior year, applications should be made to at least three medical schools. There are many more applicants to medical schools than there are spaces available. Only candidates with very good grades and personal characteristics are accepted. Once accepted into medical school, students spend the first two years in classroom and laboratory studies. During the second two years they become actively involved with patients as part of a medical team under close supervision.

After completing the M.D. degree, they must take written and oral examinations before being licensed to practice. Licensing requirements vary from state to state and are not always transferable. It is advisable to be examined in the state in which one proposes to work, or to be certain that training will be accepted.

After licensing, students spend at least one year in an internship program. If they are planning to specialize, they then become residents in a hospital for a period of one to four years. At the conclusion of residency, they are qualified to practice.

At this time, doctors may choose private practice, group practice, employment on a hospital staff, in a medical school, in industry or in research. Some physicians are federal or state employees, but the

## Health Occupations

majority are in private practice.

Working conditions are usually pleasant and in well-equipped areas. The hours depend upon the number of patients a doctor is willing to see. In some cases much time may be spent in surgery, in hospitals and emergency rooms. They may be called out at any hour of the night or day. One advantage of group practice is that each member has definite times on and off duty.

Practicing medicine is found by most physicians and surgeons to be personally and financially rewarding.

Health Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
PHYSICIAN OR SURGEON

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 26 Medical Doctor  
No. 28 Osteopathy  
No. 104 Surgeon  
No. 105 Anaesthesia  
No. 110 Doctors, Ear, Eye, Nose, Throat  
No. 116 Psychiatrist  
No. 148 Medical Research  
No. 250 Industrial Medicine

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-71 Physicians, 5¢

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Your Career in Medicine  
Disease Detectives, Your Career in Medical Research

Nolen, W.A., A Surgeon's World  
Random House Publishing Co., New York, N.Y.

Other Sources

American Medical Ass'n  
535 N. Dearborn Street, Chicago, Ill. 60610

American Osteopathic Ass'n  
212 E. Ohio Street, Chicago, Ill. 60611

Texas Industrial Medical Ass'n  
Box 336, Bridge City, Texas 77611

Texas Medical Ass'n  
1801 N. Lamar Blvd., Austin, Texas 78701

Texas Surgical Society  
3424 Swiss, Dallas, Texas 75204

PHARMACIST

Most pharmacists compound and dispense medicines prescribed by physicians and dentists from inventories of various drugs and medicines maintained in hospitals or neighborhood pharmacies. They are rarely required to do the actual compounding of medications as in years past due to preparation by pharmaceutical manufacturers. The pharmacist weighs, measures and calculates dosages. Hospital pharmacists work closely with doctors and nurses in the care of patients. Quick and accurate filling of prescriptions are important.

Other pharmacists are employed by pharmaceutical companies. Some are employed as salesmen or "detail men" to call on physicians and other pharmacists to introduce new drugs, explain their uses and generally promote company products. They must travel frequently. A great deal of time is spent waiting for appointments with busy physicians, so patience is important, as is the ability to present a technical and concise report in a limited amount of time. Pharmacists may also work in research and development of new pharmaceutical products.

High school students interested in becoming pharmacists should enroll in college preparatory courses and take as much science and mathematics as possible. The university or college program for a bachelor's degree in pharmacy requires five years, and in some schools six, after high school. A pre-pharmacy course includes mathematics, physics, chemistry and biology.

Following completion of the degree program, a state board examination must be passed for licensing. In most states, a one-year internship must be served before the candidate is qualified to practice. Some states permit up to one-half of this time to be served during summer vacations prior to graduation from college. Hospital pharmacists may be required to serve a two-year internship. Community pharmacists must enjoy dealing with people and be able to keep accurately certain records required by law. Standing for long periods of time is necessary.

Pleasant and well-equipped working surroundings are common to a pharmacy. Areas for filling prescriptions are clean and sterile. Most states require that there be a pharmacist on duty whenever a pharmacy is open, including nights and on Sundays.

Advancement in pharmacy may come in the form of promotion to head pharmacist, owning one's own business, or promotion to higher positions in the business. Pharmacists may acquire a doctorate in order to teach in colleges and universities. Large chains of pharmacies and hospitals have retirement plans, and health and insurance programs.

Most pharmacists feel that theirs is a gratifying and interesting profession.

Health Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
PHARMACIST

Pamphlets

American Pharmaceutical Ass'n  
2215 Constitution Ave. N.W., Washington, D.C. 20037  
Shall I Study Pharmacy?

American Society for Pharmacology and Experimental Therapeutics  
9650 Rockville Pike, Bethesda, Md. 20014  
A Career in Pharmacology

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 44 Pharmacist  
No. 101 Drugstore Operations

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-68 Pharmacists, 5¢

Books

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Pharmacy Careers

Other Sources

Texas Pharmaceutical Ass'n  
1624 U.S. Highway 183 East, Austin, Texas 78752

NURSING

The term "nurse" is applied to those persons who are registered nurses, associate degree nurses, licensed vocational nurses, and nurses' aides. Each of these categories will be discussed separately as requirements and duties vary.

Registered nurses (RNs) are those who have graduated from a three, four, or five year accredited school of nursing and have passed a state license examination. To become a registered nurse, a person must have either a baccalaureate degree from a college or university, and pass a state license examination or have a diploma following three years of training in a hospital or an independent school, and pass a state license examination. A nurse with a baccalaureate degree is qualified to teach nursing.

Nurses work under the supervision of doctors and carry out doctors' orders for the care of patients. Their work includes recording patients' conditions, changing dressings, and assisting in examinations. They give injections, perform some laboratory tests, and attend to some clerical tasks. Registered nurses may work in hospitals, doctors' offices or on private duty, or may be employed by an industry to maintain a clinic and render first aid treatment. Nurses may also work in schools treating minor injuries or examining students for health conditions, or in public health clinics giving classes or visiting homes. Fields of specialization include pediatrics, or working only with children, psychiatric, or anesthesiology. Nurses usually work eight hours a day, with some shift work involving weekend work.

Nurses must have stable emotions, patience, tact, good judgment and a desire to be of service to the ill. They must also have good health and stamina. Registered nurses may become supervisors or instructors, or may take courses in a specialized field and be promoted. Jobs are plentiful at this time. The pay is good to very good. Benefits are determined by the hospital, company, or organization of employment. Registered nurses are keenly aware of their role in patient welfare and their positions are highly satisfying and rewarding.

The associate in arts in nursing (A.A.) is awarded after a two-year program of study in a junior college. Hospital training is given by cooperating hospitals in the vicinity of the junior college. Other factors are the same for this type of nurse, as with the registered nurse, with the exception that they may not be eligible for specialized nursing, have limited advancement possibilities, and pay is more moderate.

Licensed Practical (Vocational) Nurses (LVNs) perform services in caring for the ill under the supervision of physicians or registered nurses. Training required is the completion of a twelve month LVN course in an accredited school or an equivalent education obtained in

## Health Occupations

the military service. A state examination for LVN must be passed. The pay is only fair to good for the LVN. Advancement possibilities are few without additional training.

Nurses aides, or hospital attendants, perform certain duties not requiring professional training in caring for the hospitalized patient. Aides work under close supervision of registered nurses. These persons may give back rubs, take blood pressure, bathe the patient, assist in examinations, clean and sterilize equipment, change beds, take temperatures and generally assist patients.

Aides must have a high school diploma with training from a junior college or private school. There are almost no advancement possibilities except by salary increases. The pay is fair.

SOURCES OF ADDITIONAL INFORMATION ABOUT  
NURSING

Pamphlets

American Ass'n of Nurse Anesthetists  
Suite 3010, Prudential Plaza, Chicago, Ill. 60601  
Nurse Anesthetist Career  
Anesthesia--an Art, A Science

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 25 Nursing Careers  
No. 105 Careers in Anesthesia  
No. 139 Industrial-Occupational Health Nurse  
No. 187 Careers in Public Health Nursing  
No. 191 Career as a Licensed Practical Nurse

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Your Career in Nursing

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Nursing Careers

Other Sources

American Hospital Ass'n  
Division of Careers and Recruitment  
840 N. Lake Shore Dr., Chicago, Ill. 60611

American Nurses Ass'n, ANA-NLN Committee on Nursing Careers  
10 Columbus Circle, New York, N.Y. 10019

Licensed Vocational Nurses Ass'n of Texas  
412 Littlefield Bldg., Austin, Texas 78701

National Ass'n for Practical Nurse Education and Service, Inc.  
535 Fifth Ave., New York, N.Y. 10017

National Federation of Licensed Practical Nurses, Inc.  
250 W. 57th Street, New York, N.Y. 10019

Texas Ass'n of Industrial Nurses  
5618 Eskridge Street, Houston, Texas 77023

## Health Occupations

### MEDICAL TECHNOLOGIST OR TECHNICIANS

The three levels of clinical laboratory workers are medical technologists, medical technicians and medical assistants. They perform laboratory tests under the supervision of pathologists, other physicians or scientists. These workers analyze blood samples, tissue and fluids of the human body by using the microscope, special analyzers, electronic counters and spectrophotometers.

Medical technologists perform the more complicated chemical, microscopic and bacteriological tests. Some technologists specialize in different areas such as microbiology, hematology, histology, cystology and nuclear medical technology.

A baccalaureate degree is required for this profession, generally three years of college and a twelve month program in a school of medical technology. An examination is required to become a registered medical technologist. Medical technologists must be conscientious, dependable, have the ability to work under pressure, be accurate, and have hand-to-eye coordination as well as finger dexterity.

They work forty hours a week in laboratory conditions which are clean and well lighted. However, there may be unpleasant odors. Sitting at close work for long periods of time, eyestrain, and performing repetitive tasks are common to this job. Medical technologists must be careful so as not to be burned by chemicals, cut by glassware, or infected by diseased tissues.

Advancement can be rapid, often to the head of the department, or into the field of research. The employment outlook is favorable. Pay ranges from good to very good, with the satisfaction of a job which is extremely important to all people. Benefits depend on the particular employer.

Medical technicians are generalists or specialists who perform routine laboratory work at a lower level than technologists, and at a higher level than assistants. The work is basically the same in all three areas, but at different levels of skills and knowledge. Training for technicians may be obtained in programs of one or more years at junior colleges or four-year colleges, at technical schools and at some private schools. There will be very little advancement unless more education and training is received by the medical technicians. Salaries are usually good.

Radiological or X-ray technicians specialize in the use of X-rays, radium, borium and radioactive isotopes. The technicians takes X-ray photographs of portions of the body, and work under the supervision of a physician, who is usually a radiologist. Training programs are conducted by hospitals or medical schools, and usually last about two years.

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All approved schools require at least a high school diploma, and many require one or two years of college. A few schools offer a four-year degree program.

These technicians must have initiative, tact, sympathy, stamina, concern for details, good judgment, normal vision, good use of the hands and arms, and be able to follow instructions closely.

X-ray technicians work about forty hours a week and may be on call for emergencies. They work in hospitals, clinics or for private physicians. The work is done in laboratory conditions with generally good equipment, but the demands are great. Most tasks are performed while standing, and the technician may be required to help people in and out of wheel chairs onto the X-ray table. There is much moving around, the ever-present danger of exposure to radiation and generally hard work.

Advancement for these persons is in pay raises. The pay ranges from good to very good, with benefits dependent upon the employer. Employment opportunities are very good. X-ray technicians have the satisfaction of knowing they are members of an important team involved in helping others. Working with all types of patients can be stimulating, trying, and rewarding.

Biomedical equipment technicians are important to the field of medicine as it is their job to maintain, repair and calibrate medical electronic and electro-mechanical equipment. This relatively new occupation requires extensive training in electronics, mechanics, physics and chemistry. Programs may be found in junior colleges, technical or specialized schools; they are eighteen months to two years in length. These technicians work closely with doctors and other skilled professionals in the operation of life-supporting equipment. Many times, they will work under pressure.

Mechanical aptitude is essential to this job, as is a good background in electronics. Job opportunities are abundant both in hospitals and in industry which manufactures medical equipment. Salaries range from fair to good, with advancement to management positions in the health care industry possible. The primary reward for these technicians is the delivery of much better health care to the general public.

Medical assistants perform routine laboratory tests such as urinalysis, blood cell counts, and collection of specimens. They may be expected to clean and sterilize equipment. These persons should be high school graduates with on-the-job training. They must have completed an academic program in a hospital, junior college or technical school. The hospital program is usually one year in length, while junior college and other schools offer programs two years in length. Little advancement is possible without additional training. Salaries are fair.

Health Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
MEDICAL TECHNOLOGIST OR TECHNICIAN

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 22 Medical X-Ray Technologist  
No. 68 Medical Technologist, Medical Technician  
No. 148 Medical Research  
No. 200 Medical Assistant, Women

U. S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-59 Medical Technologists, Medical X-Ray Technicians  
and Medical Record Librarians, 10¢

Books

Paul, Grace, Your Future in Medical Technology  
Arco Press, Inc., New York, N.Y.

Other Sources

American Hospital Ass'n, Division of Careers and Recruitment  
840 N. Lake Shore Drive, Chicago, Ill 60611

American Society of Medical Technologists  
Suite 1600, Hermann Professional Bldg., Houston, Texas 77025

American Society of Radiologic Technologists  
645 N. Michigan Ave., Chicago, Ill. 60611

Ass'n of Operating Room Technicians, Inc.  
Denver Technological Center  
8085 E. Prentice, Englewood, Colo. 80110

Texas Medical Assistants  
1801 N. Lamar, Austin, Texas

Texas Society of X-Ray Technicians  
314 Highland Ave., Port Arthur, Texas 77640

DENTIST

Dentists maintain healthy teeth through preventive and repair practices such as extracting, filling, cleaning, or replacement of teeth. They also perform other corrective work such as straightening, treating diseased tissue of the gums, performing surgical operations on the jaw or mouth, and making and fitting false teeth.

Dentists must possess confidence and skill which are essential for putting a patient at ease. They must have a liking for people, the ability to act quickly in difficult situations, and skilled, steady hands. Manual dexterity is of utmost importance, as is scientific ability. Good vision is also a must.

The dental profession is selective and standards are high. College grades and the amount of college education are carefully considered. All dental schools which are approved by the American Dental Association require applicants to pass the Dental Admissions Test, which tests a student's ability to succeed or fail in dental school. Information on tests and testing centers may be obtained from the Council on Dental Education of the American Dental Association.

Prospective dental students should plan an academic program in high school which emphasizes science and mathematics. Liberal arts courses are also significant for meeting college entrance requirements. The minimum requirement for admission to dental school is two years of pre-dental study at an accredited liberal arts or junior college. The more years of college training applicants have, the better the chances of being accepted into dental school. Professional training in a dental school requires at least four years. Clinical training is frequently begun in the second year. Generally, the degree of doctor of dental surgery (D.D.S.) is granted upon graduation, although some schools give the degree of doctor of dental medicine (D.D.M. or D.M.D.). Dental students who wish to enter a specialized field should plan on post-graduate study ranging from two to three years. Dentists are required to qualify for a license in all states by graduating from an approved school and passing a state board examination, or in some states, the National Board of Dental Examiners' test.

Since most dentists are in private practice, they are free to set their own hours, establish offices and atmospheres suitable to their individual tastes. The beginning dentist must set aside expensive decorating plans in favor of suitable equipment. The dentist in private practice works after office hours only in emergencies. Salaried dentists working for clinic, hospital, or the Public Health Service are subject to conditions set by their employers.

Advancement for the newly licensed dentist in private practice is dependent upon personal skill in handling patients as well as performing

## Health Occupations

good work. Through the years, the successful dentist builds a reputation and thus advances with the confidence of patients. Advancement may take the form of becoming a specialist, requiring further study and generally providing higher incomes. Teachers of dentistry may look forward to administrative positions or to appointments as professors. Advancement or success for dentists, at least from a financial viewpoint, depends upon the location of practice. Dentists, having become established in business, earn some of the highest salaries of any profession.

Dentists find satisfaction in their work, in the fact that they have halted or prevented diseases of the mouth, and that they have relieved personal problems of some individuals which were caused by bad teeth.

SOURCES OF ADDITIONAL INFORMATION ABOUT  
DENTIST

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 10 Dentistry as a Career

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-29 Dentists, 5¢

Books

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Dentistry

Other Sources

American Dental Ass'n  
211 E. Chicago Ave., Chicago, Ill. 60611

Southwestern Society of Orthodontists  
404 Jesse Jones Library Bldg., Houston, Texas 77025

Texas Dental Ass'n  
3707 Gaston, Dallas, Texas 75246

## Health Occupations

### DENTAL ASSISTANT, HYGIENIST OR LABORATORY TECHNICIAN

Dental assistants assist the dentist in a dental office performing duties which include those of chairside assistants, bookkeepers, and receptionists. In some offices these persons also perform laboratory work. Dental assistants must know various kinds of dental instruments, the manipulation of dental materials, X-ray methods, and various general duties such as record keeping and supply ordering.

They must enjoy working with people, have a pleasing personality, and be neat, clean and in good health. The work is pleasant, with jobs located throughout the United States and foreign countries in private dental practices, community, state or government clinics, and hospitals. Some jobs are also available in school clinics.

There are great advancement opportunities in private dental practices, group dental practices, dental speciality firms, and a variety of other places of employment. Because of the great need for more dentists, dental assistants are being given more responsibilities, resulting in more rapid advancement.

To enter the dental assisting field, one must be a high school graduate, have at least one year of typing, and successfully complete a special test prescribed by the dental faculty of the particular school one is entering. Students must then complete a one-year program which includes both theory and practical experience. During the latter part of this program, each student is placed in private or governmental dental offices for additional training.

Dental hygienists are educated and licensed to clean teeth, but have recently been given other responsibilities under the supervision of the dentist. These other duties include education of patients in preventive dentistry, administering fluoride treatments, and taking X-rays.

In order to become a dental hygienist, a person must graduate from high school with an above average academic record. While requirements vary, most dental hygiene programs require a background or courses in high school mathematics and the sciences, including biology and chemistry. Beyond high school, a person may enroll in a variety of two or three year college programs which award certificates or associate degrees. Others may choose to enroll in four-year baccalaureate programs. For those who desire further study, several schools now offer master's degree programs. Applicants to any of these types of training are expected to have very good grades, and a sincere interest in the dental field.

Graduates of two or three-year certificates or associate degree programs are generally limited to dental office practice and some public health occupations. Graduates may later elect to continue their education in a baccalaureate or master's program. The hygienist with a bachelor's degree may work in private practices, and, with office experience, is

## Health Occupations

eligible for teaching, administrative and public health positions.

The dental hygienist must be neat, clean and in good health. A pleasing personality and enjoyment of other people is also an asset in this field.

Dental laboratory technicians are concerned with the design and fabrication of dental prosthetic appliances for the human mouth. These include full dentures, removable partial dentures, and fixed restorations such as crowns, inlays and bridges.

Motivation and a desire to improve general dental health are personal requirements important for the person in laboratory technology. Accuracy, manual dexterity, neatness, and patience are also important. The ability to work independently within the frame of the dental health team is also required.

To enter most approved schools which offer this type of training, a person must be a high school graduate and complete a special test in manual dexterity. The person must then complete two years of study, three years of practical experience, and successfully pass a professional examination.

Dental laboratory technicians work in commercial dental laboratories, dental offices, hospital dental laboratories, and in dental product manufacturing companies.

Health Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
DENTAL ASSISTANT, HYGIENIST OR LABORATORY TECHNICIAN

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605

No. 86 Women as Dental Hygienists

No. 205 Dental Technicians

No. 224 Dental Assistant

U.S. Government Printing Office  
Washington, D.C 20402

No. 1300-27 Dental Hygienists, 5¢

No. 1300-28 Dental Lab Technicians, 5¢

Books

Richards Rosen Press, Inc.  
New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Your Future in Dental Assisting

Other Sources

American Dental Assistants Ass'n  
211 E. Chicago Ave., Chicago, Ill. 60611

Dental Laboratory Association of Texas  
Box 322, Austin, Texas 78767

National Ass'n of Certified Dental Laboratories, Inc.  
3801 Mt. Vernon Ave., Alexandria, Va. 22305

Public Health Service, Division of Dental Health  
U.S. Dept. of Health, Education and Welfare  
Washington, D.C. 20201

OPTOMETRIST OR OPTICIAN

Optometrists examine and determine the condition of the eye to prescribe lenses or visual training to conserve or improve vision without the use of medicine, drugs, or surgery; when these are needed, patients are referred to medical doctors called ophthalmologists or oculists. They must have the abilities of getting along well with people, mechanical aptitude, good coordination, and must have above average intelligence.

Optometrists need five to six years of college work and a doctor of optometry degree (O.D.). A license is necessary to practice, and this is secured by taking a state examination following graduation from an accredited college of optometry.

Working conditions are generally excellent. The work is not strenuous, and optometrists may set their own office hours and vacations. They are seldom faced with emergencies. Most optometrists are self-employed, yet some work in clinics or governmental agencies. The latter usually start out with higher salaries, but in a few years the situation is usually reversed. Generally, salaries are good to high, and the success of this practice is related to the satisfaction of patients. Optometrists gain rewards in knowing they play a vital role in the health and welfare of the general public.

Opticians fit eyeglasses and make adjustments to them following prescriptions given them by ophthalmologists or optometrists. Opticians also assist customers in choosing frames, measure for size, and repair or adjust glasses. These professionals must exercise great skill and patience in fitting contact lenses as well.

Opticians must be able to get along with others, have accuracy, patience and a pleasing personality. To become an optician, one must graduate from a two-year college program or complete an apprenticeship program. Comfortable and pleasing surroundings are usually the rule for this profession. The work is not exerting, and is usually about forty hours a week. Opticians work for doctors, in optical shops, or wholesale optical laboratories. Most work in larger cities and in industrial areas.

Advancement depends upon training and experience. Some opticians become optometrists with further training, while others become salesmen in industry. The pay is good to very good. An optician finds personal contact and the ability to help persons rewarding.

The optical mechanic performs shop or laboratory work for prescription eyeglasses. This person does not make contact lenses. Employment is usually within optical laboratories and optical factories. A four-year apprenticeship is usually the entrance requirement to this profession, but a person may attend a junior college offering such specialized training. The pay is fair to good, and other characteristics of the job are similar to those of the optometrist and optician.

Health Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OPTOMETRIST OR OPTICIAN

Pamphlets

American Optometric Ass'n  
7000 Chippewa Street, St. Louis, Mo. 63119  
Optometry

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 27 Optometry as a Career  
No. 146 Men and Women Opticians--Careers

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-52 Optometrists, 5c

Books

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Optometry

Other Sources

American Board of Opticianry  
821 Eggert Road, Buffalo, N.Y. 14226

Guild of Prescription Opticians of America  
1250 Conn. Ave. N.W., Washington, D.C. 20036

Texas Optometric Ass'n  
502 International Life Bldg., Austin, Texas 78701

PHYSICAL THERAPY

Physical therapists treat disorders such as fractures, sprains, bone diseases, nervous diseases and heart trouble as prescribed by a physician, using all the therapeutic arts. They give exercises, administer massages and perform body manipulations. Most of the patients are accident victims, crippled children and disabled older persons.

Persons entering the field of physical therapy need to have emotional stability, a desire to help others, stamina, patience and a creative approach to their work. No two patients respond to the same kind of treatment, and the challenge of this work is in finding the right way to make a patient want to progress.

Educational requirements include a degree or diploma in physical therapy. Some persons who already have a degree in another field may be awarded a certificate for specialized therapy courses. All states but Texas and Missouri require a license. The applicant for a license must have a degree, diploma or certificate from a school of physical therapy, and pass a state board examination.

Physical therapists may work in a therapy room in a hospital, by the patient if he is confined to a bed, or in a special, heated pool. The environment of the work is usually good, with clean and adequate facilities. Physical therapists may be employed by a hospital, a private physician, in a rehabilitation center, a crippled children's clinic, or the Armed Forces.

Most of the advancement is in salary increases, or sometimes to supervisory capacities. A graduate degree is required for teaching physical therapy. Salaries are good to high, depending upon education and experience. The work is usually forty hours a week, and may include from five to 15 patients a day. Physical therapists may treat patients on an individual basis, or they may work with large groups.

There is great satisfaction in seeing a patient's gradual return to a normal mode of life, and the greatest gratification for this worker comes when a patient's attitude changes from the negative to the positive. The satisfaction of working with a medical team is also important to this profession. There is a large demand for physical therapists.

Health Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
PHYSICAL THERAPY

Pamphlets

The Devereaux Foundation  
Department of Publications  
Devon, Pa., 19333  
The Role of the Physical Therapist

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 102 Occupational Therapist  
No. 109 Physical Therapy, the Career  
No. 239 Rehabilitation Jobs

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Your Career in Physical Therapy

Other Sources

American Hospital Ass'n  
Division of Careers and Recruitment  
840 N. Lake Shore Drive, Chicago, Ill. 60611

American Occupational Therapy Ass'n  
251 Park Ave. South, New York, N.Y. 10010

American Physical Therapy Ass'n  
1156 15th Street N.W., Washington, D.C. 20005

HOSPITAL ADMINISTRATION

Hospital administrators organize and manage the many and varied hospital activities, and see that all of the objectives of the hospital are carried out. Administrators assist in planning current and future space needs. They oversee the hiring of all supervisory personnel, are responsible for setting fee schedules, purchasing supplies and equipment, and insuring maintenance of buildings and equipment. They must provide information and other services for patients and staff. They work closely with the governing board in development of plans and general policies, meeting regularly with the staff to discuss progress, do planning and help solve problems of the hospital. Administrators are the representatives of the hospital to the community.

Since much of the work of administrators consists of dealing with people, they must be successful in human relationships. Tact, sympathy and self-control are all necessary traits. They must understand budgeting, public relations and purchasing. They must be able to function effectively under heavy responsibility. A deep interest in health and the care of the sick and injured is of prime importance.

Administrators of most hospitals are required to have a graduate degree, which usually requires one year of graduate work after a bachelor's degree in liberal arts. The student must serve as an administrative resident, a full-time job in a hospital which is approved by the particular school in which the student is enrolled. In addition, a thesis may be required for the master's degree.

Hospital administrators will have centrally located offices, and will usually work five and one-half days each week. However the hours may vary, and they are on call around the clock.

Opportunities in this field are very good, but new graduates cannot expect to become administrators without having experience as assistants to this position. Graduates can also find jobs in health insurance programs and in foundations interested in the nation's health. Salaries depend upon the size and type of hospital and vary from good to very high. Free meals and sometimes housing and laundry services are provided. Other benefits include vacation time, insurance and retirement.

Administrative assistants aid the executive in staff capacities. They are usually managers of one phase or department of hospital work. Special kinds of hospitals often employ administrators who are physicians in the specialty of the hospital. Religious groups employ administrators of the same faith in their hospitals.

Hospital administration also includes the positions of medical officers, controllers, accountants, credit managers, personnel managers, purchasing agents, admitting officers, directors of voluntary services and executive housekeepers, some of which are discussed elsewhere in this handbook.

Health Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
HOSPITAL ADMINISTRATION

Pamphlets

American Medical Ass'n  
535 N. Dearborn Street, Chicago, Ill. 60610  
Horizons Unlimited

U.S. Civil Service Commission  
Washington, D.C. 20415  
Federal Careers

Books

Marshall, Max L., Cowles Guide to Careers and Professions  
Cowles Education Corp.  
Look Bldg., 488 Madison Ave., New York, N.Y. 10022

Richards Rosen Press  
New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Hospitals

Other Sources

American College of Hospital Administration, Executive Director  
840 N. Lake Shore Drive, Chicago, Ill. 60611

American Hospital Ass'n, Division of Careers and Recruitment  
840 N. Lake Shore Drive, Chicago, Ill. 60611

Texas Hospital Ass'n  
P.O. Box 4553, Austin, Texas 78765

OTHER HEALTH OCCUPATIONS

Career fields in health occupations, in addition to those already discussed, include the following:

Psychiatrists serve as heads of mental health teams. They study, diagnose and treat diseases and disorders of the mind.

Blood Bank Technologists handle all jobs pertaining to blood transfusions, the collection of blood from donors, and the classification of blood according to type. They also supervise the storing of blood so that it can be instantly available, either as whole blood or as plasma.

Electrocardiograph Technicians use the electrocardiograph machine to record variations in action of the heart muscle to provide data for diagnosis of various heart ailments.

Central Supply Supervisors are responsible for the cleaning, packaging and assembly of linens, gowns, dressings, gloves, treatment trays, instruments and other equipment used in a hospital. They also prepare solutions, arrange stock, and insure that aseptic techniques are employed by personnel in the preparation and handling of sterile items.

Ambulance Drivers drive the ambulance to transport sick, injured or convalescent persons. They administer first aid, splinting or oxygen.

Prosthetists-Orthotists write specifications for and fit artificial limbs, braces and appliances for body deformities and disorders following prescriptions of the physician or other qualified medical practitioners.

Audiologists specialize in diagnostic evaluations, re-habilitative services, and research related to hearing.

Chiropractors adjust spinal column and other articulations of the body to prevent disease and to correct abnormalities of the human body believed to be caused by interference with the nervous system.

Podiatrists diagnose and treat diseases and deformities of the human foot.

Speech and Hearing Technicians provide remedial speech services for disorders such as stuttering and articulatory problems associated with such impairments as cleft palates, cerebral palsy and aphasia.

Health Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OTHER HEALTH OCCUPATIONS

Pamphlets

McNeil Laboratories, Inc.  
Camp Hill Road, Ft. Washington, Pa. 19034  
Your Future in Research at McNeil Laboratories

Pfizer Inc., Informational Services Dept.  
235 E. 42nd Street, New York, N.Y. 10017  
Your Career Opportunities in Medicine

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Paraprofessions: Careers For the Future and Present

Richards Rosen Press  
New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Hospitals

Other Sources

American Chiropractic Ass'n  
2200 Grand Ave., American Bldg., Box 1535, Des Moines, Iowa 50306

Texas Podiatry Ass'n  
412 Austin Savings Bldg., Austin, Texas 78701

# HOSPITALITY AND RECREATION



## Hospitality and Recreational Occupations

### GENERAL INFORMATION

The expansion of available leisure time and increased standard of living reflects the nation's aspiration for a better and fuller life for all citizens. Most workers are engaged in jobs which occupy only forty hours each week, leaving ample time for travel and participation in many types of recreation.

Increased travel, both for business and pleasure, has vastly increased the need for a "home away from home". Thus, the demand for trained, competent personnel to direct hotels and motels is increasing rapidly. Opportunities range from management of a small, remote motel to management of a multi-million dollar resort motel.

As leisure time has increased, Americans have discovered exciting ways to spend their spare time. Organized recreation has undergone tremendous growth in the past decade. Physical, social and cultural programs are offered at camps, playgrounds, community centers, and schools across the nation. Programs are offered for pre-school age youngsters to senior citizens.

Trained recreation directors find employment at parks, playgrounds, resorts, schools, churches, civic agencies, and on ocean liners. Many of these jobs require a college degree, and strong leadership traits are a prerequisite.

Predictions point toward even further reductions in the average work week, which means more leisure time will be available to more people. This will continue to create a need for trained, competent people to work in hospitality and recreational occupations.

## Hospitality and Recreational Occupations

### HOTEL OR MOTEL MANAGEMENT

A hotel or motel manager is responsible for coordinating and directing personnel, publicizing the business, allocating funds for operating expenses, setting room rates, approving credit for guests, and seeing to their comfort and convenience.

Hotel or motel managers must be adept in dealing with people, whether guests or employees, and handling many business matters simultaneously. They must have a genuine liking for working with people, combined with patience and tact. The ability to make quick decisions and a flexibility are also important characteristics. There naturally are differences in the demands made upon the manager of a large metropolitan hotel in a convention area, and the manager of a small hotel or motel who must act as manager, desk clerk, and sometimes maid and bellman.

A high school education is essential and further education is advisable even for small operations. High school studies include business mathematics, and some social sciences are useful. Higher education may encompass business school, courses in two or four-year colleges, or home study courses offered by the Educational Institute of the American Hotel and Motel Association. This course of study includes hotel administration, hotel accounting, economics of food service, and general hotel engineering, in addition to liberal arts subjects such as psychology, history and language.

In practically all cases, even college-trained people start in lower echelon jobs such as desk men, registration clerks and later, department heads. A trainee may work in each of several departments in order to gain broad knowledge. Several years of experience in these entry jobs are necessary before promotion to responsible managerial positions is possible. This period of time may be shorter for college-trained persons.

There is a high turnover in non-managerial positions of a hotel staff. Thus, gaining experience in beginning jobs, such as bellmen, maintenance and kitchen workers is easy on a part-time or temporary basis. In smaller hotels, duties are less specialized.

Working conditions vary considerably. Professional managers usually live in the hotel. For trainees, some shift rotation will probably occur. The position of manager carries with it a certain amount of prestige.

Hospitality and Recreational Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
HOTEL OR MOTEL MANAGEMENT

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 34 Hotel, Motel, Resort Jobs  
No. 230 Professional Cook and Chef

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-47 Hotel Occupations, 10c

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Careers in Hotel Management

Richards Rosen Press, Inc.  
New York, N.Y. 10010  
Aim High Vocational Guidance Series, Hotels

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Hotel and Motel Industry

Other Sources

American Hotel and Motel Ass'n  
808 Fifth Avenue, New York, N.Y. 10019

Council on Hotel, Restaurant and Institutional Education  
1522 K Street, N.W., Washington, D.C. 20005

National Executive Housekeepers Ass'n, Inc.  
Business and Professional Bldg, Gallipolis, Ohio 45631

Texas Hotel and Motel Ass'n  
8602 Crownhill Blvd, San Antonio, Texas 78209

Texas Motel Ass'n  
Box 1521, Austin, Texas 78767

## Hospitality and Recreational Occupations

### PARKS, RECREATION OR RESORT MANAGEMENT

Park and recreational superintendents are responsible for all facilities, programs and staff related to these activities. They must interpret the programs to the board of directors and to the public. They must also work to maintain good relationships with local community agencies. They often give talks to organizations and clubs. Other responsibilities include budget preparation and purchase of all supplies.

Park directors act as supervisors of one or more parks in a city or area, seeing that they are maintained and used properly. They help in park site selection and layout.

Recreation directors supervise all recreational activities within the department. Their work includes overseeing playgrounds, community centers, swimming pools, golf courses and day camps. They purchase recreational equipment and other necessary supplies.

Resort managers oversee all aspects of a resort, greeting new arrivals, creating a friendly atmosphere, and seeing that guests have planned activities at hand. They encourage participation in group activities.

These persons must be dedicated to serving other people, have ability to use good psychology, and be natural leaders. Their personalities must appeal to both young and old groups. A combination of good physical, mental, emotional and spiritual qualities is essential. Other important qualities include imagination, adaptability, calmness, dependability, fairness, and the ability to use discretion in handling situations. They should have a high school diploma, and a college degree is emphasized more and more as a prerequisite today. Formal training may be obtained in both junior colleges and universities.

The work may be both inside and outdoors, usually in pleasant surroundings. Many of these jobs are in cities, while others are in national and state parks, private areas and on ships. The hours may be long and include evening and weekend work. These jobs are characterized by peak seasons. An adequate budget may be a problem to these employees since many jobs are in municipalities which depend upon tax money for support.

Advancement is usually through pay raises; however, many persons are moved to larger areas requiring more responsibilities. The pay ranges from good to excellent, depending upon an individual's education, experience, and the job location. Job opportunities are excellent due to the fact that more leisure time is becoming available to people.

There is a constant challenge to this work. Employees will work with people of all ages, and in many cases, the handicapped. Satisfaction comes from helping others to forget their problems and to become more constructive, and wholesome, through recreation.

Hospitality and Recreational Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
PARKS, RECREATION OR RESORT MANAGEMENT

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 34 Hotel, Motel, Resort Jobs  
No. 50 Recreation Leadership

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10010  
Your Career in Parks and Recreation

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Recreation and Outdoor Education

Other Sources

National Industrial Recreational Ass'n  
20 N. Wacker Drive, Chicago, Ill. 60606

National Recreation and Park Ass'n  
1700 Penn. Ave., N.W., Washington, D.C. 20006

Texas Beach and Pool Ass'n  
1100 W. 49th Street, Austin, Texas 78756

Texas Municipal Parks and Recreation Ass'n  
City Hall, Houston, Texas 77002

## Hospitality and Recreational Occupations

### PROFESSIONAL COACHING

The objective of professional coaches is the training of young people to win or perform their best in sports events. They also work to develop good leadership qualities, a knowledge of rules and theory, and effective teamwork in high school or college age students.

Qualifications include a high school diploma and a college degree. Professional coaches also must have dedication, loyalty, high moral standards, and excellence in the sport or activity.

Coaches must continually strive to improve their knowledge and coaching abilities in general by attending clinics, coaching schools and through individual study. Working conditions are generally good, provided the particular college or high school can compete for scholarships, has the necessary equipment, and the backing needed for the success of any athletic program.

Problems which coaches often encounter include injury to players, which drastically reduce the efficiency of the team; alumni pressure for more victories at any cost; and the curtailment of operational funds. A coach will be faced with acting as disciplinarian, father-confessor and diplomat to a diversified group of young, often headstrong, people.

The coaching profession is, in most cases, very rewarding. One of the most pleasant rewards is watching the development and maturing of team members into outstanding citizens in their respective communities. Salaries are usually very good, yet the real satisfaction lies in the awareness that coaches can help to mold and inspire their team members to become better sportsmen and individuals.

Hospitality and Recreational Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
PROFESSIONAL COACHING

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 6 Physical Education as a Career  
No. 29 Pro Basketball Player  
No. 46 Professional Golfer  
No. 142 Pro Baseball Player  
No. 168 Pro Football Player  
No. 198 Athletic and Sports Coach

Other Sources

Texas High School Coaches Ass'n  
Suite 11, Perry-Brooks Bldg, Austin, Texas 78701

## Hospitality and Recreational Occupations

### OTHER HOSPITALITY AND RECREATIONAL OCCUPATIONS

Career fields in hospitality and recreational occupations, in addition to those already discussed, include the following:

Lodging Facilities Attendants perform various clerical and other duties at a motel, trailer park, resort or lodge. They give information to guests, register guests, and collect rent.

Travel Agents sell services of airlines, bus lines and railways, sight-seeing companies, hotels, resorts and camps. They may plan trips and cruises for tourists and arrange accommodations.

Tour Directors accompany touring groups on trips to provide information about tour sites, and to make arrangements in case of emergency return transportation.

Ski Patrolmen patrol ski trails and slopes to aid and protect skiers. They report condition of trails, ski lifts and snow cover.

Ski-Tow Operators transport skiers up slopes on lifts and collect tickets or fares. They operate all levers and make adjustments in the speed of lifts.

Horse Trainers condition and train horses for racing. They familiarize the animal with all tack, such as bits, bridle and saddle, as well as train the horse to break from a starting gate. They exercise horses and supervise stablemen in the feeding and general care of the animal.

Jockeys ride racehorses at a racetrack. Prior to a race, they receive instructions from horsetrainers to determine how to give the horse the best ride. They must analyze abilities and peculiarities of their mounts to determine how to ride the horse to win.

Camp Counselors direct recreational and other activities of children or adults at vacation or work camps. They organize and lead groups in sports and nature lore, and maintain discipline and conduct of campers.

Amusement Attendants operate games of chance or skill or riding devices such as ferris wheels, merry-go-rounds and other rides at carnivals, fairs and circuses.

Hunting and Fishing Guides plan itineraries for hunting and fishing parties and trips, guide and transport sportsmen to hunting and fishing areas, often driving the boat or land vehicle. They also give first aid to group members if necessary.

## Hospitality and Recreational Occupations

Lifeguards watch swimming areas to prevent accidents. They caution swimmers regarding unsafe areas or actions, rescue swimmers in danger of drowning, and administer first aid. They also maintain order, and may clean the pool and surrounding area, and officiate at swim meets.

Zoo Keepers supervise the care and exhibition of animals and birds at a zoo. They examine animals to determine the need for medical care, and are responsible for feeding, watering and cleaning of animals and their cages.

Hospitality and Recreational Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OTHER HOSPITALITY AND RECREATIONAL OCCUPATIONS

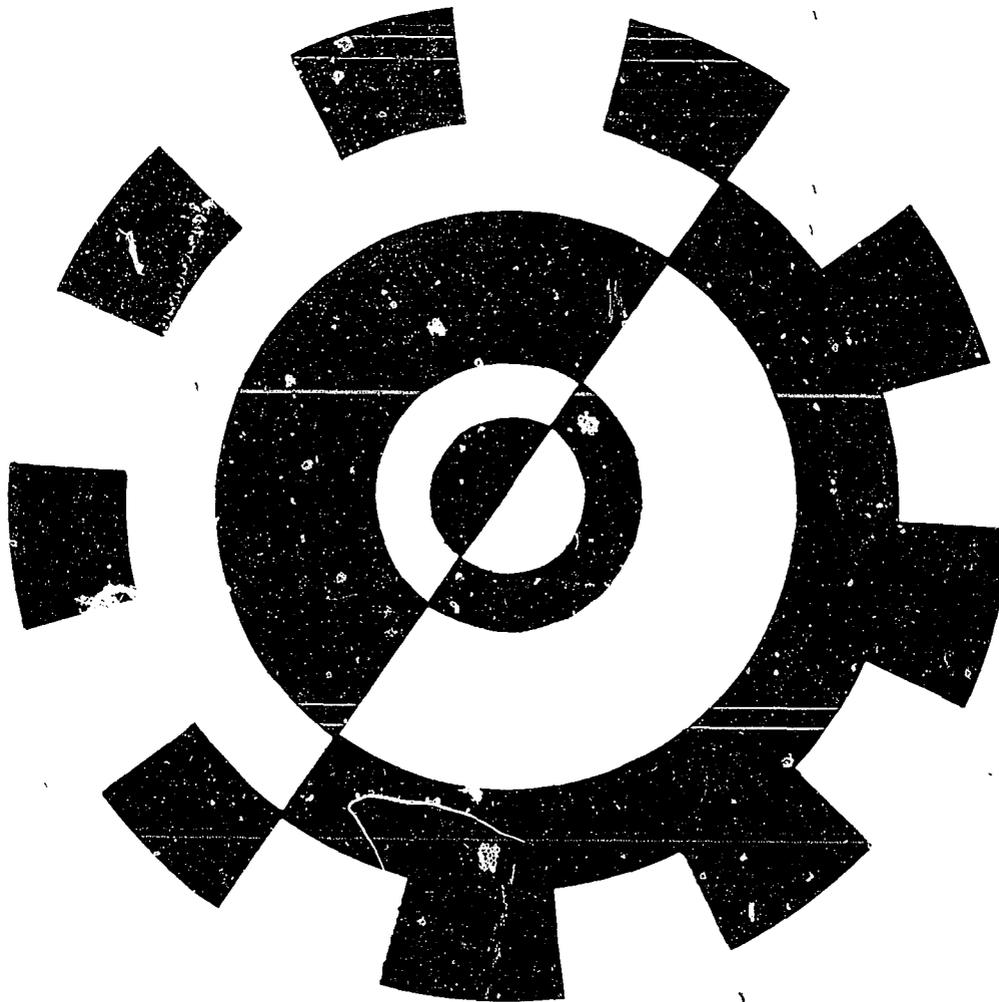
American Ass'n for Health, Physical Education and Recreation  
1201 16th Street, N.W., Washington, D.C.

Society of American Travel Agencies, Southwest Chapter  
2428 Guadalupe, Austin, Texas 78705

Texas Beach and Pool Ass'n  
1100 W. 49th Street, Austin, Texas 78756

Texas Parks and Wildlife Dept.  
J. H. Reagan Bldg, Austin, Texas 78701

# MANUFACTURING



GENERAL INFORMATION

The word "manufacturing" comes from a root word meaning "to make with the hands", which describes the original method of manufacture. Since the beginning of the industrial revolution, manufacturing has been largely done by machines, but the term still literally means "making". It covers every activity from the making of a simple product by an individual, possibly in the home, to the making of huge and complex devices.

Manufacturing offers employment to more people in the United States than any other activity. More than 1,600 different manufacturing industries and more than 8,000 job titles in manufacturing have been listed.

Manufacturing is developing rapidly in the State of Texas which has ceased to be a predominantly agricultural state and is becoming more industrialized with each passing year. Cities like Houston, Dallas and Fort Worth are highly industrialized with a large percent of the population actively engaged in manufacturing or dependent upon manufacturing enterprises for their income. Smaller cities can list more manufacturing enterprises than most people realize. During the 1970's, a strong move has been started to promote the industrialization of the smaller towns and rural areas by attracting manufacturing plants to those areas. The result is to bring more and more manufacturing jobs within reach of the average citizen of the state.

There are many ways of classifying manufacturing operations. One classification lists "durable" or "hard" goods, such as automobiles, appliances, aircraft and metal products, as one classification, and "non-durable" or "soft" goods, such as food and clothing, as another classification. The Directory of Texas Manufacturers, published by the Bureau of Business Research of the University of Texas, classifies Texas manufacturers into 28 major groups.

It is impossible to describe all of the careers available to persons in the manufacturing industry in Texas, so only a few of the major career areas are presented. Many careers which occur in other fields are repeated in manufacturing. For example, managers, accountants, clerks, secretaries, purchasing agents, salesmen, warehousemen, shipping clerks, and many others perform substantially the same functions for manufacturing plants that they would perform for any other employer in a position with the same or similar job title.

Certain advantages apply to careers in manufacturing, especially with the large companies. The positions are almost always stable, and wages and salaries are almost always above average. The fringe benefits provided by manufacturing concerns are usually the best available anywhere. Certain disadvantages tend to apply to careers in manufacturing, again especially with very large manufacturing plants. Probably the most widely recognized is the monotony of the work when an employee continuously performs only one small part of the overall manufacturing operation.

## Manufacturing Occupations

### RESEARCH AND DEVELOPMENT

There are two basic types of research though the activities in the fields are not as distinct as the definitions. The first type is "pure" research. This research deals with the development of new knowledge, the discovery of new truths. It is not necessarily associated with any specific objective or with any proposed applications of the discoveries. Since the possibilities of an immediate economic return from this type of research are slight, it is usually conducted by non-industrial concerns, such as universities or independent research organizations, and paid for by grants from governmental agencies or non-profit foundations. Only a few of the large manufacturing companies can afford to conduct pure research, but the contributions of these industrial research efforts have been highly significant.

The second type of research is known as "applied" research. Such research has at least a general, and usually a specific, objective. The objective may be to find a new product to fit a specific need, to discover new uses for existing products, to find better processes for the manufacture of existing products, or to develop processes to make existing products from different raw materials.

Usually there are prospects for added profit to the company if such research is successful. Most manufacturing enterprises engage in applied research; in fact, most must engage in such research activities if they are to remain competitive and continue to find markets for their products. Larger manufacturers spend a significant percentage of their income from the sales of their products for research. Smaller companies may be more sporadic in their research efforts. Many firms band together into associations which, among other things, conduct the necessary research for the whole association.

The term development refers to what may be considered a third type of research. It involves the translation of the discoveries of researchers into practical and profitable applications. Whereas most persons engaged in research are scientists, those engaged in development are more likely to be engineers.

Persons who work in research and development must possess a high order of creativity, originality, and inventiveness. They must be capable of analytical thinking and of intense mental concentration over long periods of time. Because major inventions and scientific breakthroughs in modern times are seldom the work of one person, the research scientist must be able to communicate effectively concerning abstract and theoretical matters.

Most research personnel are scientists, engineers, or mathematicians. Usually, the top researchers have earned doctor's degrees in their field, with their doctoral work being done in a research-oriented university. Many of them have had post-doctorial training at these universities, so that the normal training period for a top researcher after leaving high

school is from eight to ten years.

Below the top researchers, especially in large establishments, are many persons having less than a doctor's degree. These persons do much of the routine testing under the instruction of the top level researchers. Such persons may possess a bachelor's degree in their field. Many assistants are technicians, specially trained to do the "hands-on" work in the research laboratories. These technicians have had enough training, usually two years, to provide them with sufficient theoretical knowledge to understand the instructions and the needs of the scientist and/or engineer, plus enough knowledge of the equipment in the research laboratory to allow them to operate, maintain, and sometimes actually develop and build the equipment.

Working conditions of researchers are generally excellent, though in some cases, due to the experimentation with new and unknown processes and products, some danger may be involved.

Opportunities for accomplishment in the field of research are limited only by the capabilities of the researcher and the limitations placed on him by his company's objectives and financing.

Personal qualifications for research work are considerably different from those for most other activities in the manufacturing world. Therefore, researchers are not as apt to be placed in supervisory or management positions as persons from other fields of activity. In the well-organized and staffed research divisions there are almost always sufficient levels of recognition and sufficient salary inducements available to satisfy the needs and wants of most individuals, so that successful researchers tend to continue as successful researchers throughout their careers.

Manufacturing Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
RESEARCH AND DEVELOPMENT

Pamphlets

American Chemical Society  
1155 16th Street N.W., Washington, D.C. 20036  
Is Chemical Technology the Career for You?

Automobile Manufacturers Ass'n, Education Services  
320 New Center Bldg. Detroit, Mich. 48202  
Quest

General Motors Corp., Public Relations  
Detroit, Mich. 48202  
Can I Be a Scientist?

The Institute for Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 85 Research and Development in Industry  
No. 219 Scientific Careers in Chemistry

U.S. Atomic Energy Commission, Educational Materials Section  
Box 62, Oak Ridge, Tenn. 37831  
The Creative Scientist, His Training and His Role, by Glen Seaborg

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-22 Chemistry, Physics, Astronomy, 10c

Magazine

Chemical and Engineering News, June 29, 1970  
Industrial Research Careers (reprints 50c)

Books

Hodnett, Edward, So You Want to Go Into Industry  
Harper & Row Publishing Co. New York, N.Y.

Mattsfield, Jacquelyn, Women and the Scientific Professions  
M.I.T. Press, 28 Carlton Street, Cambridge, Mass. 02142

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Your Career in Chemistry

ENGINEERING OR TECHNOLOGY

The Engineer

Webster's dictionary defines engineering as "the application of science and mathematics by which the properties of the matter and the sources of energy in nature are made useful to man in structures, machines, products, systems and processes." Engineers are those who take the knowledge and theories of science and apply them to real, physical, practical operations. As the world of engineering has expanded, many separate and distinct branches have been developed. Some are found only or primarily in manufacturing. These may include the following:

Mechanical engineers plan and design the tools, engines, machines and other mechanically functioning equipment, both those used in the factory itself and those produced for sale to and use by others. They may also oversee the operation of such equipment.

Industrial engineers are involved in planning and arranging production equipment and utilization of manpower, materials and machines in the most effective way. They are concerned with plant layout, arrangement of equipment, work flow, work standards and measurements, efficient manpower utilization, and control of quality, costs, inventories, etc.

Electrical engineers design, develop, and supervise the installation of electrical equipment such as motors and generators. For companies specializing in electrical equipment, they may design components of such equipment and supervise the manufacture of them. Many electrical engineers work for industries other than manufacturing; for example, for power companies electrical engineers may design or supervise the installation or operation of electric power generating equipment or electric distribution equipment.

Metallurgical engineers are specialists in the technical applications of chemical and physical-chemical principles to the extraction, concentration, purification and alloying of metals for commercial and industrial purposes. They may be employed by the manufacturer of items made from special alloys and evaluate new metal products or new processes. They may be employed by a user of special metals and alloys and be interested in performance in use, durability, and the corrosion processes which may cause failure.

Manufacturing engineers are employed primarily by large

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manufacturing concerns which need specially-trained persons to bridge the gap between mechanical design engineers and final operating processes. Manufacturing engineers are concerned with actual production of a manufactured product in a "cost-effective manner", within the applicable time constraints, and with the machines available. They are more specialists in the operation and capabilities of the equipment used in manufacturing than in the design of the product.

Other branches of engineering occur in specialized types of manufacturing. Some of these are as follows:

Automotive engineers are a specialized branch of mechanical engineering dealing with the design and manufacture of automobiles.

Chemical engineers are concerned primarily with the development of chemical manufacturing processes, the design of equipment to carry out those processes, and the economic evaluation of both processes and the design.

Electronic engineers may work for a manufacturer of electronic equipment and be engaged in the design of items for the home, such as radios and television sets, tape recorders and record players, or of equipment used by industry or the armed forces, such as electronic instruments, computers, or radar and missile systems. They may also supervise the manufacture and testing of such equipment. If they work for a user of such equipment, they will be involved in the design of systems, supervision of installation, or the calibration, maintenance or repair of electronic equipment.

Petroleum engineers may be employed in the production phase of an oil company's operations and be engaged in planning or supervision of the operation and maintenance of oil wells. Or, they may be involved primarily in the distribution of petroleum products by pipelines and other means. If employed by manufacturing, they normally work in a petroleum refinery where they are concerned with the development of refining processes, the design of equipment for those processes, and the economic evaluation of the processes and the equipment.

Some other branches of engineering have relatively little concern with manufacturers. For example, mining engineers deal with the location and removal of minerals and mineral deposits from the earth. They may be responsible for determining if minerals can be extracted effectively without excessive cost, or may plan and design mine shafts and tunnels, devise means of extracting the minerals or select the methods to be used in transporting them to the surface. They may also supervise mining operations or be responsible for mine safety.

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Because of the continuing rapid increase in technology, new and specialized branches of engineering are continuously developing, with each one having the potential of providing major career opportunities. Some of these specialized branches which are of considerable importance include aerospace engineers, nuclear engineers, diesel engineers, gas engineers and ceramics engineers.

The personal qualifications for engineers are very similar from branch to branch. A personal choice of one specific field may be based more on personal preferences of the type of work to be done rather than on capabilities. For instance, all engineers must have considerable capabilities in the field of mathematics. All engineers must also possess considerable knowledge in the basic physical sciences. Design engineers, such as those who design mechanical equipment, must be strong in the ability to visualize objects in three-dimensional space. For some positions, engineers must have the ability to write technical reports. In others, they must be able to convey ideas through drawings. Design engineers must have originality and ingenuity. If they work in the supervision of manufacturing processes or installation or maintenance, ability to get along with other people becomes very important.

There are many engineers in industry today who have less than four years of college education and who have learned adequate engineering skills on the job. Due to the rapid expansion and increasing complexity of technology, at least a bachelor's degree has become almost standard for the new engineer. About the only exception to this rule is that some companies employ highly trained technicians or draftsmen and, through experience and on-the-job training, elevate them to engineering positions. For most engineering positions in manufacturing, a bachelor's degree (which often now requires five rather than four years) is considered sufficient for the entry level, and in much engineering work experience is considered more valuable than additional college training. However, master's and doctor's degrees are often advantageous and sometimes actually required.

The working conditions for engineers are generally good. Most design engineers work in air conditioned, quiet, well-lighted offices, often private. Where supervision of manufacturing processes, installation, or maintenance or repair is involved, engineers may be exposed to the same conditions as the operating personnel, which may involve noise, heat and some degree of other discomforts. The engineers' exposure to such conditions are seldom as great as those of the operators or craftsmen. Petroleum engineers, mining engineers, agricultural engineers, and so forth, may spend large portions of their time out of doors, but their exposure to undesirable conditions is generally much less than others with whom they work.

Opportunities for advancement in engineering are normally good, especially in the larger companies. Such companies provide several classifications or "layers" of engineering responsibility, with higher

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salaries as a person develops technical abilities and is able to contribute more to the progress of the company. Many companies look with favor on an engineering background as a qualification for selection for supervision or management positions and eventual promotion into top management.

### The Engineering Technologist

The increasing complexity of the engineering field has led to the development of a new career field known as technologist. When compared to the work of an engineer, the work of a technologist involves less theoretical and scientific knowledge, possibly less sophistication in mathematics, more practical application, and more "hands-on" activities. The modern technologist has been described as the "four-year engineer of other days". Engineering courses are tending toward five-year curriculums, but training for an engineering technologist still requires four college years. Many universities offer both engineering and technologist training in the same career field. Students are able to select training, and future careers, based on capabilities and interests in theoretical and mathematical concepts on the one hand, or practical applications on the other. Training for a technologist also includes more engineering graphics or drafting than current training for engineers.

Though the distinction between engineer and engineering technologist is usually quite clear at the university level, and is also quite clear as to actual job assignments in many industries, especially the larger ones, there are other industries that make little or no distinction. Many companies have continued to use the modern engineer in the same capacity as his predecessor, with much less scientific and theoretical training, was used. These companies generally welcome the new engineering technologists and assign them to the same work as their engineers. In fact, some companies bestow the title "engineer" on technologists, either at the time of employment or as soon thereafter as they have proved themselves.

### The Engineering Technician

The increasing complexity of modern technology has given rise to still another new career field called "technician". Though the term "technician" is used in many fields, with many different meanings, when it is used as "engineering technician" it refers to a career intermediate between that of the scientist or engineer on the one hand, and the craftsman or operator on the other. The training and work of the technician are more closely related to that of the technologist than to either the craftsman or the engineer or scientist. In fact, in those universities which offer training for both technicians and technologists, the training for the technician is often identical to the first two or three years of the training for the technologist.

The work of engineering technicians, involving bridging gaps between theoretical engineers or scientists on the one hand, and the skilled

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craftsmen or operators on the other, requires that they receive some training in both fields. They must be exposed to quite a bit of the engineers' theory, basic science and mathematical concepts, but they must also have "hands-on" training of the craftsmen and develop considerable comprehension of their skills.

Working conditions, pay scales, and other rewards, and the opportunities for advancement of technicians are intermediate between those of the engineer and the skilled craftsman. In many companies they may, after a sufficient period of on-the-job training and development, actually be recognized as engineers and assigned the same duties and given the same pay and other advantages of engineers. They may also have considerable opportunities, again after sufficient experience, to become foremen or supervisors of skilled craftsmen or operators.

Because of the growing demand for well-trained technicians, adequate training courses in a wide range of technologies have become available. For persons interested in a career in manufacturing, these fields include drafting and design, electronic technology, mechanical technology, electro-mechanical technology, fluid power technology, chemical technology, plastics technology, petroleum technology, instrumentation technology, automation technology, quality control technology, and laser electro-optics technology.

Manufacturing Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
ENGINEERING OR TECHNOLOGY

Pamphlets

American Society for Metals, Career Guide Dept.  
Metals Park, Ohio 44073

Does Engineering Appeal to You?

The Institute For Research  
610 South Federal Street, Chicago, Ill 60605

No. 16      Chemical Engineering  
No. 36      Mechanical Engineering  
No. 37      Electrical Engineering  
No. 76      Metallurgy and Metallurgical Engineering  
No. 107     Industrial Design  
No. 149     Electronics Technician  
No. 201     Engineering Draftsman  
No. 206     Industrial Engineer  
No. 233     Automotive Engineer

U.S. Government Printing Office  
Washington, D.C. 20402

No. 1300-31   Draftsmen, 5c  
No. 1300-37   Engineers, 15c  
No. 1300-96   Technicians, 10c

Books

Messner Career Books  
Julian Messner Co. 1 West 39th St., New York, N.Y. 10018  
Engineers Unlimited

Richards Rosen Press, New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Drafting

Other Sources

Joint Engineers Council  
345 E. 47th Street, New York, N.Y. 10017

MANUFACTURING PROCESS OPERATIONS

The greatest number of job opportunities in manufacturing, and the most varying types of work and skills, occur in manufacturing process operations. Two very common careers are presented as examples of the highly skilled careers available in manufacturing.

In the "durable" or "hard" goods manufacture, much of the manufacturing process includes the working of metals. Such operations may involve the forming or shaping of the metal; other operations involve the fastening of metal parts. Typical of the shaping operations is the work of machinists or machine operators. They may begin with a simple block of metal and produce an intricate part meeting precise specifications. Skilled machinists may work primarily with one machine in one type of operation in a large manufacturing plant, or they may work alternately with many machines and many operations in a smaller manufacturing plant. They must be mechanically inclined and temperamentally suited to perform highly accurate work which requires concentration and physical effort. These skills may be acquired in a high school metal trades course, in a post-secondary machine operator course, or in an apprenticeship training program conducted by unions and/or employers. First jobs may be as helpers or machine operators until experience develops the skills to make true "craftsmen".

The process of fastening metal parts together may be accomplished by using many types of fastening devices, such as bolts, rivets, etc., or it may be accomplished by welding. There are 40 different welding processes which join pieces of metal by applying heat. Most of these processes fall into three categories - arc welding, gas welding, and resistance welding. Arc and gas welding can be performed manually, though in manufacturing operations they are usually machine processes. Resistance welding is mainly a machine process. Welders may also obtain training in high school metal trades courses, in post-high school one- and two-year training courses, or in an apprenticeship program. These training programs prepare only for the entrance level. True "craftsmen" are developed only after long experience.

Though we tend to think of manufacturing occurring in huge plants employing many people, the fact is that most manufacturing establishments are small and hire few people. In these smaller plants it is essential that the workers have a much broader range of skills and sometimes be capable of performing any one of many operations. In the large manufacturing operations, each worker is usually limited to one rather specific and limited contribution to the manufacture of the product as it moves along an assembly line. Though the assignments may change somewhat as processes, products, or models change, assignments for a given period of time usually remain quite restricted. Persons in such assignments must possess or develop highly specialized skills which are seldom taught anywhere except in the specific manufacturing plant employing those skills. Most new employees in these careers enter as apprentices or helpers in a trainee capacity. Initial training may be quite

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brief, and the major skills developed through experience on the job. Many manufacturing plants are unionized and the employees must satisfy the requirements of the union as well as the employer, both for employment and for advancement.

Workers in process operations must be able to withstand the monotony of working at essentially the same task continuously. Most employers require a high school education and most appreciate either training or experience in an activity similar to that to be encountered on the job. For example, high school training in welding, machine shop operations, or auto mechanics will help develop manual dexterity and demonstrate interest in mechanical operations, important skills to manufacturing employers in the "durable" or "hard" goods manufacturing plants. Experience in typing and playing musical instruments is helpful in developing finger dexterity required for delicate assembly operations common to electronics manufacturing and similar types of industries. The ability to operate a sewing machine in the home is good training for industrial sewing operations.

Other than the monotony encountered in the large plants, working conditions for manufacturing process operators are generally good. In certain operations, employees may be subjected to extremes of temperature or high noise levels, but in such circumstances employees are provided equipment which will make the conditions tolerable. Other jobs may seem to involve considerable danger of injury, but all major manufacturers provide safety and protective equipment, training in safe methods, and continuous programs of safety inspection. So extensive are the safety programs in most manufacturing plants that these plants have become safer than private homes.

Many manufacturing employees are paid on a piece-work basis, so that earnings are limited only by ability to produce. All employees are subject to extra pay if they work more than the normal workweek, plus special pay for working on holidays if required. In any manufacturing operations which must be carried on continuously employees must do shift work. This may mean rotating regularly from one time shift to another or even working continuously at an undesirable time, such as starting in late afternoon or finishing work in the early morning. Most manufacturing plants pay what is known as "shift differential," so that the pay rate is significantly higher when working other than the normal daytime shift.

The chief opportunity for increased earnings in manufacturing process operations is in increased skill and productivity which comes with experience.

Manufacturing Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
MANUFACTURING PROCESS OPERATIONS

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605

- No. 32 Management Careers in Manufacturing
- No. 165 Machinist-Machine Shop
- No. 219 Scientific Careers in Chemistry
- No. 272 Production Manager

U. S. Government Printing Office  
Washington, D.C. 20402

- No. 1300-11 Automobile Manufacturing Occupations, 10¢
- No. 1300-1 Baking Industry, 10¢
- No. 1300-35 Electronics Manufacturing Occupations, 10¢
- No. 1300-38 Factory Occupations not Requiring Specialized Training, 10¢
- No. 1300-42 Foundry Occupations, 10¢
- No. 1300-56 Machining Occupations, 15¢
- No. 1300-101 Welders, Oxygen and Arc Cutters, and Boilermakers, 10¢

Magazine

Industrial Education, Sept., 1972, Careers in Metals-Machining  
Oct., 1972, Careers in Metals Industry

Books

Richards Rosen Press, Inc., New York, N.Y.

Aim High Vocational Guidance Series

Welding

Foundry Occupations

Iron and Steel Industry

Steel Industry

Universal Publishing and Distributing Co.

235 E. 45th Street, New York, N.Y. 10017

Vocational Guidance Manual, Machine Shop Trades

Messner Career Books

Julian Messner Co. 1 West 39th St., New York, N.Y. 10018

Your Career in Electronics

Hodnett, Edward, So You Want to Go Into Industry

Harper and Brothers, New York, N.Y.

## Manufacturing Occupations

### TESTING, INSPECTION AND QUALITY CONTROL

With the increasing complexities of manufacturing operations and the extreme variations in types of products being manufactured, the control of quality in the finished product has become more important and forms a larger segment of the manufacturing organization.

The process starts with acquisition of raw materials. Since it is impossible to make good products from poor raw materials, these must be thoroughly tested and inspected either before purchase or before they are introduced into the manufacturing process. Testing and inspection must be continued during various steps of the manufacturing process and, finally, the finished product must be thoroughly tested before it is placed on the market.

The type of testing and inspection varies widely with the product, the type of material from which it is made, and the uses for which it is intended. Thus, intensity and severity of quality control efforts varies accordingly. At one extreme, many cosmetics are manufactured from standard formulas which involve little or no quality problems, either with the raw materials, the manufacturing process, or the finished product. The success of manufacturers of such products depends to a small extent on their quality control and to a large extent on the effectiveness of merchandising efforts, advertising, etc. At the other end of the scale are the pharmaceuticals in which the quality of the product is preeminent. A slight fault in the raw materials or the manufacturing process can cause the pharmaceutical product not only to be useless but actually dangerous to consumers. Most products stand somewhere in between these two extremes.

For solid products, such as wood or metal parts and fabrications, much of the testing and inspection may be involved with the size and shape of the product because, in use, these products must fit with very close tolerances. For example, in the modern automotive and aircraft industries, allowable variations are almost completely nil. Solid items may also be tested for hardness, strength, degree of expansion, composition of the alloy, resistance to wear or corrosion, or many other qualities. Other materials may be tested for color, electrical properties, conduction of or resistance to heat, resistance to exposure to water or atmospheric conditions, long life in use, safety, or purity. When the product is an assembly of parts, such as an engine, each part must be carefully tested and inspected, and then the final assembly tested for quality of performance.

Depending on the complexity of the tests involved, they may be performed by relatively unskilled or untrained personnel on the one hand, or by graduate scientists on the other. Most testing lies somewhere between these two extremes and requires skill at least equivalent to the skill of persons engaged in production. Inspectors must be extremely conscientious and able to give close and rigid attention, sometimes to the smallest details, over the continuous period of the

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workday. Successful testing and inspection usually involves a greater knowledge of the various aspects of the product, both scientific and practical, than does its manufacture. Technicians are widely used in quality control, especially in testing laboratories. This is particularly true of chemical, electronic, metallurgical and biological testing.

Relatively few institutions offer training exclusively for testing, inspection or quality control, though such programs are becoming more available at the post-secondary level. Most curriculums for technicians at the post-secondary level do include considerable training in these activities. Otherwise, much of the training is provided by the manufacturer, with many employees in the field being selected and transferred from other activities.

Working conditions usually compare favorably to the conditions under which production employees work, as much inspection must occur during the production process at the point of operation. Where inspection is accomplished in a special laboratory, working conditions are usually excellent.

Opportunities for advancement are generally in the area of supervision and management of the quality control functions, though persons who can meet the other necessary qualifications are often transferred into such activities as sales, sales engineering, customer service, or even supervision and management of the production process.

Manufacturing Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
TESTING, INSPECTION AND QUALITY CONTROL

Pamphlets

American Society for Metals, Career Guide Dept.  
Metals Park, Ohio

A Career in Metallurgy Will Extend Your Reach  
Career Opportunities in Metallurgy

Automobile Manufacturers Ass'n, Education Services  
320 New Center Bldg. Detroit, Mich 48202

Quest

The Institute For Research  
610 South Federal Street, Chicago, Ill. 60605

No. 149 Electronics

U.S. Government Printing Office  
Washington, D.C. 20402

No. 1300-96 Technicians, 10¢

Other Sources

American Society for Non-Destructive Testing  
914 Chicago Ave., Evanston, Ill. 60202

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

American Society for Testing Materials  
1916 Race Street, Philadelphia, Pa. 19103

## Manufacturing Occupations

### MANUFACTURING MAINTENANCE AND REPAIR

Manufacturing and repair personnel include many of the same crafts as the building trades plus such industrial crafts as mechanics, machinists, welders, boilermakers, riggers, tool crib operators, pipe fitters, instrument mechanics, etc. Each job will have its unique requirements with the objective of maintaining or servicing plant operational equipment. Particular applications will be determined in part by the employer and/or union descriptions.

These disciplines, being craft-type in nature, require a degree of mechanical aptitude and awareness of safety practices. Persons anticipating a vocation in these crafts should be in good physical condition, and be prepared for a robust life. In some manufacturing plants, much of the work will be performed outdoors and the employees should be willing to work in somewhat adverse conditions at times. In other plants workers may be subjected to high or low temperatures, relatively high noise levels, and/or work with greasy or dirty machines or equipment.

At least a high school education is required by most employers, with preference given to applicants with some post-secondary education or training. Many manufacturing companies are operated by union personnel, and these unions will have rigid entrance requirements. Once employees have been allowed entrance, they are required to undergo training programs approved by the union. Practical experience is usually preferred over "theoretical" training.

Persons engaged in one of these crafts can generally choose a geographical location. In most large companies, employees will be required to work some shift work. Often, employees are placed on a permanent rotating shift schedule. Maintenance personnel are expected to accept indoor or outdoor assignments as made by the supervisor, and wear protective clothing as dictated by the particular craft.

Craftsmen's advancement will be related to skill attainment and job efficiency. Many companies have a regular salary increase program established along longevity lines. Craftsmen are usually paid on an hourly basis with compensation for overtime and holiday work.

Manufacturing Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
MANUFACTURING MAINTENANCE AND REPAIR

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 12 Machinist and Machine Shop

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-49 Instrument Repairmen, 5c  
No. 1300-57 Maintenance Electricians, 15c  
No. 1300-60 Millwrights & Industrial Machinery Repairmen, 5c  
No. 1300-101 Welders, Oxygen & Arc Cutters & Boilermakers, 10c

Books

Richards Rosen Press, Inc., New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Welding  
Maintenance Fields

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Machine Shop Trade

Other Sources

American Welding Society  
345 E. 47th Street, New York, N.Y. 10017

Instrument Society of America  
530 Wm. Penn Place, Pittsburgh, Pa. 15200

International Brotherhood of Boilermakers, Iron Shipbuilders,  
Blacksmiths, Forgers and Helpers  
Eighth at State Ave., Kansas City, Kan. 66101

## Manufacturing Occupations

### OTHER MANUFACTURING OCCUPATIONS

Many careers which occur in other fields are repeated in manufacturing. For example, managers, foremen, accountants, clerks, secretaries, purchasing agents, salesmen, warehousemen, shipping clerks and many others perform substantially the same functions for manufacturing plants that they would perform for any other employer in a position with the same or similar job title.

Many crafts that are known in the building trades are common to manufacturing plants, either in the manufacturing process or maintenance. For example, carpenters, painters, masons, electricians, plumbers, sheet metal workers and many others in manufacturing perform much the same tasks and require much the same skills.

The following careers are listed, not because they are typical but only to provide some idea of the wide range of jobs available among the more than 8,000 which have been listed in manufacturing:

Safety Engineers apply knowledge of industrial processes, mechanics, chemistry, psychology, and industrial health and safety laws to prevent or correct hazards to persons or property. Inspect premises for fire hazards and adequacy of fire protection. Educate workers to dangers existing in plants through safety-first campaigns.

Die Makers lay out, machine, fit, assemble and finish castings and parts. Make and repair stamping dies, analyzing specifications and applying knowledge of die design and construction. May operate power press, perform final shaping and smoothing operations on die press.

Lithographers sketch designs and numbers on metal, stone, or glass with or without specifications, and engrave plates for printing scale parts, using lithographic photo-engraving, and photo-lithographic techniques. Draw design on plate, using acid-resistant greasy ink, ruling pens, graduating machines, brushes, and lithographic tools, including engraving needles and beam compass, or transfer designs to plates.

Milling Machine Set-Up Men set up milling machines for milling machine operators involved in production, and operate machines to mill first-run work pieces.

General Assemblers arrange layout of work on assembly line following written specifications and oral instructions to facilitate electronic component production.

Layout Men lay out metal stock or work pieces such as castings, plates, or machine parts to indicate location and dimensions of processing to be done such as machining, welding,

## Manufacturing Occupations

or assembly, analyzing specifications and computing dimensions according to knowledge of product, subsequent processing, shop mathematics, and layout procedures. Study blueprint, sketch, model, or other plans layout.

Kiln Operators tend battery of rotary kilns that heat minerals such as lime, chrome ore and manganese preparatory to mixing them with molten metal to form steel.

Oxygen Furnace Operators operate oxygen furnace and auxilliary equipment from pulpit to produce specified types of steel.

Charging Machine Operators control charging machines to charge open-hearth furnaces with materials such as limestone, pig iron, and metal scraps. Also known as Chargers, Furnace or Furnace Charging Machine Operators.

Casting Operator control pouring stations in which aluminum and aluminum alloys are cast into ingots.

Core-Makers, Pipe make clay cones around which ferrous and non-ferrous pipe is cast.

Platers, Hot Dip tend equipment to coat iron and steel products with corrosion resistant molten non-ferrous metal.

Blenders control equipment to blend straight run or natural gasoline.

Candy Makers mix together and cook candy by following given recipe to meet certain specifications.

Butter Makers control equipment to make butter by either churn or chill method.

Extruder Operators tend one or more extruders that form particle board from wood chips treated with glue.

Banbury-Mix Operators operate Banbury machine to mix ingredients into compounds for processing into such articles as rubber inner tubes and phonograph records.

Absorption Operators control equipment that absorbs gases and liquids into water or other solvents to produce chemicals such as hydrochloric acid or ammonia hydroxide.

Casters cast non-ferrous metal into pigs and transport them to storage, using hand-tools and fork lift.

Bench Grinders move metal objects, such as castings, billets, machine parts, and sheet metal sub-assemblies against abrasive

## Manufacturing Occupations

wheel of bench grinder to grind, or rough finish objects to specifications.

Air Conditioning Coil Assemblers assemble pre-punched aluminum fin plates and copper tubing to form cooling coils for air conditioning, using handtools and other equipment.

Model Builders make parts for and assemble prototype of metal furniture according to specifications.

Batter-Mixers tend machines that mix ingredients that produce batter for cakes and other bakery products.

Doughnut Makers set up and operate machinery involved in doughnut manufacturing.

Cannery Workers work in the canning process and may be involved in dumping, sorting, peeling, and trimming of the product to be canned.

Bindery Workers tend various binding machines to perform duties involved in binding books, magazines, pamphlets, directories, and catalogs.

Manufacturing Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OTHER MANUFACTURING OCCUPATIONS

Pamphlets

American Society for Metals, Career Guide Dept.  
Metals Park, Ohio 44073

A Career in Metallurgy Will Extend Your Reach  
Career Opportunities in Metallurgy  
Does Engineering Appeal To You?

General Motors Corp., Public Relations  
Detroit, Mich. 48202

Industrial Careers  
Can I Make The Production Team?

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605

No. 32 Management Careers in Manufacturing  
No. 35 Personnel-Employment Management  
No. 60 Freight Traffic  
No. 94 Purchasing  
No. 98 Cost Accounting  
No. 246 Labor Relations  
No. 290 Executive-Manager in Business and Industry

Manufacturing Chemists Ass'n., Inc.  
1825 Connecticut Ave. N.W., Washington, D.C. 20009

A Bright Future For You as a Chemical Technician

U.S. Government Printing Office, Washington, D.C. 20402

No. 1300-13 Baking Industry, 10¢  
No. 1300-35 Electronics Manufacturing Occupations, 10¢  
No. 1300-48 Industrial Chemical Industry, 10¢  
No. 1300-67 Petroleum Production & Refining Occupations, 10¢  
No. 1300-81 Purchasing Agents & Industrial Traffic Managers, 10¢

Magazines

Industrial Education, Oct., 1972, Careers in the Metals Industry  
May-June, 1973, Careers for the 70s in Plastics

Books

Hodnett, Edward, So You Want to Go Into Industry  
Harper & Row Publishing Co. New York, N.Y.

Messner Career Books

Julian Messner Co. 1 West 39th Street, New York, N.Y. 10018

Your Career in Chemistry  
Your Career in Electronics

# MARINE SCIENCE



## Marine Science Occupations

### GENERAL INFORMATION

The ocean covers more than two-thirds of the earth's surface and serves to provide food, fossils and minerals, as well as a means of transportation for persons all over the world. The ocean influences and effects weather patterns, the extent of which is still under intensive study.

Occupations and careers common to the ocean and marine-related industries range from the centuries-old trade of fishing to oceanography research employing some of today's most sophisticated equipment and techniques.

Each area of marine science is quite different from the next, thus the educational requirements and personal characteristics necessary for entering a particular field vary greatly. Of course, marine science occupations require a definite attraction for the sea, the ability to work in close quarters over prolonged periods with fellow crew members, and an appreciation of the potential of the ocean.

Just as space exploration represents a new frontier, the promises and potentials of the world's sea masses represent a virtually untapped resource. Within the past two decades, much study has been given to the feasibility of farming on the floor of the ocean; conversion of salty sea water into water usable by humans; equipping humans to explore at greater depths and lengths of time than ever before possible; and the recovery of various minerals from great depths.

Since the beginning of recorded time, humans have attempted to tap the mysteries and promises of the sea. Today's marine scientists express the belief that only a minute fragment of the sea's potentials has been realized.

Large scale experiments in living beneath the sea are being conducted with funds made available by governments of many nations. Nations cooperate in joint explorations and scientific projects--cooperation which overcomes political and language barriers imposed on many other fields.

Careers in the marine science occupations offer challenge, excitement, and realistic financial rewards. These positive aspects should be considered in comparison to the relative isolation, degree of danger, and tedium often associated with life on or near the sea.

## Marine Science Occupations

### OCEANOGRAPHY

Oceanographers study the ocean--its characteristics, movements, physical properties and possible utilization. The results of their studies not only extend basic scientific knowledge concerning plant and animal life, but they contribute to the development of practical methods valuable to our daily lives. These contributions include weather forecasting, fishery improvement, ocean resource mining and national defense.

Planning extensive tests and observational programs are integral parts of oceanographer's tasks. They are also concerned with conducting detailed experiments and surveys about the ocean. These studies involve ocean tides, currents, waves, temperature, density and acoustical properties.

Electronic computers are often used by oceanographers to analyze samples, specimens and data collected. To present findings, they must prepare maps, charts, tabulations, reports, manuals and scientific papers.

The usual minimum educational requirement for beginning professional positions in oceanography is a bachelor's degree with a major in oceanography, biology, a geo-science, one of the other basic sciences, mathematics or engineering. Important undergraduate courses for the profession should specialize in a particular science which is closest to the specific area of interest in oceanography. Some of these are biological oceanography, the study of plant and animal life in the sea; physical oceanography, the study of physical properties; geological oceanography, the study of topographic features; marine meteorology, the study of the interaction of the atmosphere and the ocean, causing weather over the ocean; and oceanographic engineering, dealing with the design and building of systems, devices and instruments used in research and operations.

Oceanographers may work in classrooms in the teaching profession, therefore never getting near the seas they are studying. However, many engaged in research must take ocean voyages which could last a few weeks or several months at most. Such voyages will require oceanographers to work and live in cramped quarters with other members of the crew or team. Because of these conditions, prospective oceanographers must have a great degree of success in getting along with others. This, along with persistence, open-mindedness and natural curiosity and objectivity, are important to an adequate and acceptable performance in the field of oceanography.

For those with a liking for the ocean and its mysteries, coupled with the ability to methodically research and study these mysteries, the varied fields of oceanography can be satisfying, rewarding and profitable. After showing competence in the field, oceanographer's pay scales range from moderate to excellent. With the ocean becoming more important to man and his needs, oceanographers will become sought-after technicians in ocean operations around the world.

SOURCES OF ADDITIONAL INFORMATION ABOUT OCEANOGRAPHY

Pamphlets

International Oceanographic Foundation  
1 Rickenbacker Causeway  
Virginia Key, Miami, Fla. 33149  
Training Courses in Marine Science

Smithsonian Press  
Washington, D.C. 20560  
Opportunities in Oceanography, \$1.00

Magazines

American Journal of Physics, July 1968  
Physical Oceanography for the Non-Science Major

Changing Times, April 1970,  
Those Alluring Careers in Ocean Sciences

Science, March 21, 1969, Biological Oceanography  
June 26, 1970, Future Aspects of Physical Oceanography Science

Books

Bergaust, Erik, Oceanographers in Action  
G. P. Putnam's Sons, New York, N.Y.

Carlisle, Norman, Riches of the Sea: the New Science of Oceanography  
Sterling Publishing Co., New York, N.Y.

Richards Rosen Press, Inc., New York, N.Y.  
Aim High Vocational Guidance Series, Your Future in Oceanography

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Opportunities in Oceanographic Careers

Other Sources

American Society of Limnology and Oceanography  
Kellogg Biological Station, Michigan State University  
Hickory Corners, Mich. 49060

National Oceanic and Atmospheric Administration  
NOAA Career Opportunities  
U.S. Dept. of Commerce, Washington, D.C.

UNDERWATER CONSTRUCTION AND SALVAGE

Underwater construction and salvage employs applied mechanics, underwater welders, plumbers, riggers and master divers. Oil, chemical, and mining industries are the prime areas into which underwater construction and salvage workers enter.

Underwater technicians must be mechanically inclined. They must have no fear of the water and be good swimmers. A work site on the ocean floor is no place for persons who are easily excitable or inclined to have claustrophobia. Craftsmen wishing to join undersea operations must be in top physical condition. They must have a great desire to do this type of work and a respect for the sea.

Previous knowledge or willingness to learn diving techniques, underwater physiology diving procedures, and underwater physics are essential. The highly specialized areas of welding, demolition and underwater cutting are also ones in which they must be knowledgeable.

A high school education or equivalent with a minimum of two years' experience in some mechanical field are prerequisites for underwater technicians. Several years of actual training are necessary before becoming a full-fledged underwater diver.

Work will always be out-of-doors, with most of the time spent under the water. Job opportunities are great enough to take well-trained divers anywhere in the world. Often, this will require travel or relocation.

There is a demand yet to be met for qualified diver-technicians to work in construction and salvage. Persons who are just entering this area must be prepared to start on the beginners level and prove various capabilities before advancement to better positions.

The rank of master diver may be achieved in three years. Salaries at this level are excellent around the world.

Only a few thousand qualified divers exist, so many opportunities are open to qualified and dedicated technicians capable of meeting the exacting requirements in education, training, attitude, and physical condition.

SOURCES OF ADDITIONAL INFORMATION ABOUT  
UNDERWATER CONSTRUCTION AND SALVAGE

Magazines

Machine Design, October 16, 1969  
Sunken Sub Retrieval from Bottom

Books

Gulf Publishing Company  
3301 Allen Parkway, Box 2608 Houston, Texas  
Ocean Industry, Engineering, Construction and Operations

Hobart Brothers Company  
Troy, Ohio 45373  
Submerged Arc Welding; Process and Applications

Petroleum Publishing Co.  
211 South Cheyenne, Box 260, Tulsa, Okla. 74101  
Offshore, The Journal of Ocean Business

Quinn, A.D., Design and Construction of Ports and Marine Structures  
McGraw-Hill Book Co., New York, N.Y.

Thompson, Frank E., Diving, Cutting, and Welding in Underwater Salvage  
Operations  
Cornell Maritime Press, Cambridge, Md.

Zinkowski, N.B., Commercial Oil-Field Diving  
Cornell Maritime Press  
Cambridge, Md.

Other Sources

American Welding Society  
345 E. 47th Street, New York, N.Y. 10017

Fluor Ocean Services, Inc.  
6200 Hillcroft, Box 36878, Houston, Texas 77036

International Brotherhood of Boilermakers, Iron Shipbuilders,  
Blacksmiths, Forgers and Helpers  
8th and State Ave. Kansas City, Kansas 66101

J.J. Marine Diving Co.  
Box 4117, Pasadena, Texas 77502

Le Tourneau Offshore, Inc.  
2001 Kirby Drive, Suite 713, Houston, Texas 77019

## Marine Science Occupations

### OTHER MARINE SCIENCE OCCUPATIONS

These highly specialized career fields are listed to demonstrate the variety of opportunities available to persons interested in working on or near the oceans of the world.

#### Research:

Marine Geophysicists study the physical aspects of oceans such as density, temperature, and ability to transmit light and sound. They investigate seismic, thermal and magnetic forces which affect ocean movements and properties. Marine geophysicists work to compile data about the ocean floor, its tides and currents as well as compiling charts using information obtained through these studies.

Marine Geologists are concerned with the composition, structure and history of rocks and sediment covering the ocean floor. These geologists help locate deposits such as minerals, gas and petroleum under the ocean floor. They assist in the preparation of reports which analyze and summarize geological explorations for scientific and industrial use.

Marine Meteorologists study the complex interaction of the atmosphere and the ocean; the process by which weather over the ocean is generated. They compile and analyze weather data. Such work often occurs onboard an ocean-going vessel.

Hydrologists seek information about the distribution, disposition and development of waters in land areas. They chart waterflow and disposition of sediment by studying nature and the movement of glaciers. Evaluation of data concerning flood and drought forecasting is another important part of this specialized career area.

#### Fishing:

Clam Dredge Operators are responsible for the operation of hydraulic clam dredges aboard a large boat or ship which harvests clams at low tides.

Fishermen (Pot & Trap) fish for crab, eel or lobsters using pots or cages equipped with funnel shaped openings.

Fishermen (Spear) catch eels, salmon and swordfish with a barbed spear or harpoon. They may work from a platform built into a stream, or they may fish from a vessel or river bank.

Fishermen (Diving) gather sponges, abalone or pearl oysters from the sea bottom. Their equipment includes diving and scuba gear.

## Marine Science Occupations

Kelp Cuttermen work on the sea bottom to cut kelp and other seaweed using a mower and grabhook so that the catch can be brought up to a boat.

Fish Icers weigh dressed fish to determine quality, then pack fish in ice for shipment.

Fish Cleaners prepare and clean fish aboard a fishing vessel. The fish may be cut to specific sizes or fillets.

### Aquaculture:

Fishery Bacteriologists conduct laboratory research and experiments to discover ways to control bacteria.

Fish Culturists supervise workers engaged in cultivating fish for use in stocking streams and ponds.

Hatchery Men feed fish, regulate temperature, and sort fish according to size and species, as well as cleaning tanks in the fish hatchery.

Alligator Farmers raise alligators in a controlled environment, then kill them and sell the hides for luggage, shoes and other leather products.

Frog Farmers raise frogs suitable for food, remove edible legs, and ship the iced legs to market.

Fish Farmers raise finfish such as trout, catfish or salmon in stock ponds for commercial use.

Shellfish Growers cultivate and harvest beds of clams, oysters and shrimp. They lay out and stake tide flats to control water at low tide, then collect and pack the shellfish for commercial use.

### Marine Technology:

Marine Architects design and oversee construction and repair of marine craft and floating structures such as ships, barges and tugs, submarines, dredges, and floats.

Marine Engineers design construction projects for marine powerplants, propulsion systems, heating and ventilation systems in shipping docks and marine facilities.

Skin Divers perform various underwater jobs wearing insulated suits and using an air supply from pressure tanks. They locate submerged objects and perform repair work of various kinds.

## Marine Science Occupations

### Surface and On-Shore Support Personnel:

Marine Engine Machinists install and repair gasoline engines in boats, tugs, yachts, trawlers and other vessels.

Motorboat Mechanics repair and adjust gasoline powered engines. They also work to align engines to the propeller shaft.

Motorboat or Tugboat Operators operate boats to carry passengers and freight. They maintain liaison between ships, tows, and work to guide other boats and barges. Operators may work on charter boats, sight-seeing boats, or may haul fish from a deep-sea vessel to the shore.

Dockmasters supervise workers engaged in drydocking vessels for painting, cleaning and repair work.

Dockmen maintain drydock and piers. They perform various duties such as cleaning the exteriors of ships. They use pneumatic tools particularly for rust removal on vessels.

Marine Science Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OTHER MARINE SCIENCE OCCUPATIONS

Pamphlets

Fish and Wildlife Service  
U.S. Dept. of Interior, Washington, D.C. 20240  
Employment Possibilities in Alaskan Fishing Industry  
Shrimp Fishing in the Gulf of Mexico  
Farm Fish Ponds and Their Management  
Fish Culture as a Livelihood

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 254 Scientific Careers, Fisheries

Magazines

Feedstuffs, Feb. 15, 1969, Commercial Fish Production in U.S.  
April 5, 1969, Growth in Fish Farming

Fishmeal, April 11, 1968, Agricultural Input From the Sea

Scientific American, Sept. 1969, Food Resources of the Ocean  
Dec. 1970, Marine Farming

Books

Gullion, Edmund, Uses of the Sea  
Prentice-Hall, Inc., Englewood Cliffs, N.J.

Other Sources

American Geophysical Union  
2100 Penn. Ave. N.W., Washington, D.C. 20037

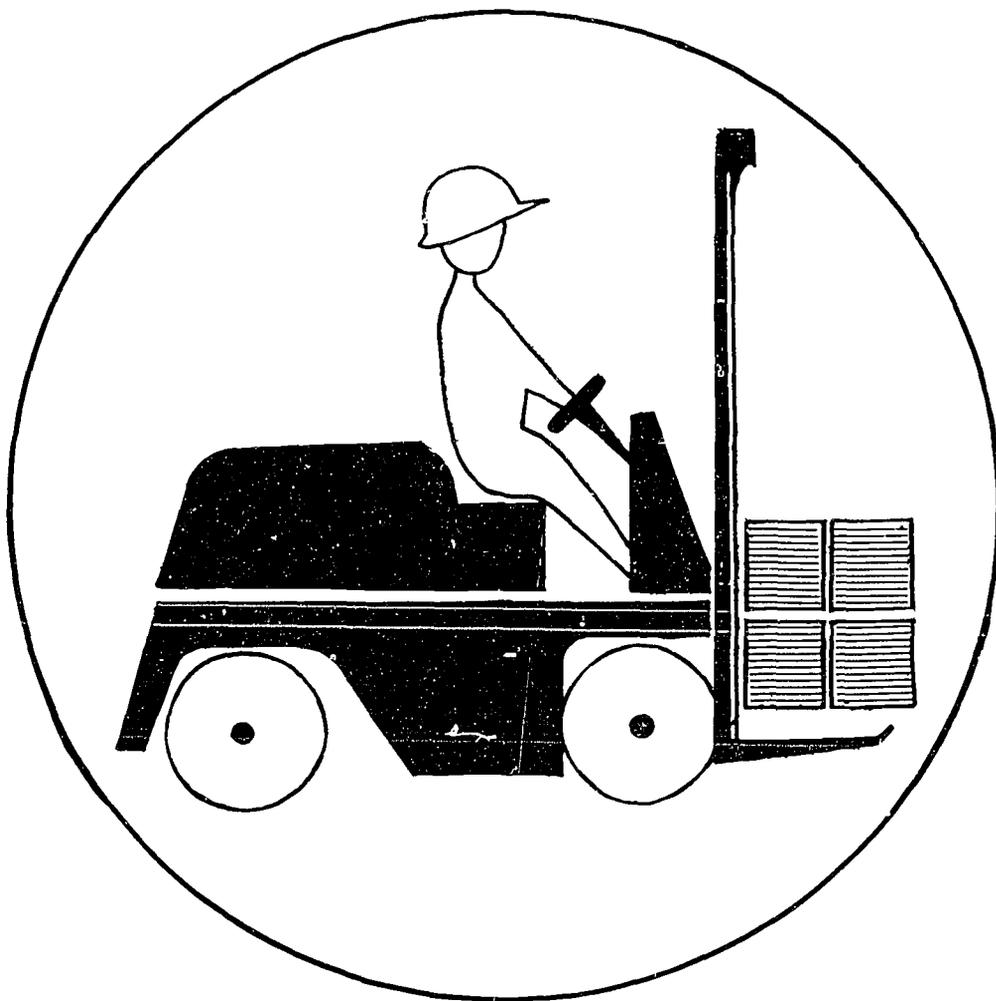
American Meteorological Society  
45 Beacon Street, Boston, Mass. 02108

Brazosport College  
Department of Oceanic and Marine Technology  
500 College Drive, Brazosport, Texas 77566

Shrimpers Ass'n  
Brownsville, Texas

Society of Exploration Geophysicists  
Box 3098, Tulsa, Okla. 74101

# MARKETING AND DISTRIBUTION



## Marketing and Distribution Occupations

### GENERAL INFORMATION

Selling and related factors of inventory, warehousing, marketing, merchandising, promotion and advertising make up the complex world of marketing and distribution.

Before a product reaches the market, research and marketing specialists have forecasted sales, selected a brand name, package and design for the product, determined the kinds of advertising most likely to attract customers, and selected a means for moving the goods.

Today all of these areas are specialized fields which have been augmented by highly trained professionals. Advertising and public relations are no longer "publicity," but encompass much communicative and editorial research.

Creative, talented individuals are necessary to design and produce successful campaigns and materials in order to sell products. Because selling, warehousing and inventorying are necessary elements to marketing and distribution, even more persons are needed to work as sales clerks, warehousemen and stockers.

Merchandise is apt to become faulty, and equipment eventually breaks down; therefore qualified service personnel must be available to keep conveniences such as air conditioning and small appliances in top running order.

Here too, as in numerous other career fields, the key for success is specialization. Because the marketing and distribution area forms one of the largest and most highly diversified industries in America, it is characterized by changing trends and stiff competition. The growing complexities of this field will expand opportunities for even more employment in the coming years.

## Marketing and Distribution Occupations

### RETAIL OR SPECIALIZED SELLING

Retail sales personnel assist customers in finding merchandise in the retail store, demonstrate products, receive payments for goods sold, and in some cases, wrap the customer's purchase. Their duties usually include checking inventory, ordering stock and arranging merchandise. In a small retail store, sales clerks are sometimes responsible for arranging attractive window displays as well. Appliance salesmen may sell only a few items during one week, whereas clerks in a bargain basement must help several customers at one time. Regardless of the type of store in which a sales person is employed, each must work to create the desire for the customer to buy a product.

A pleasant speaking voice, natural friendliness, tact and patience are helpful characteristics for successful sales clerks. They must also be able to operate a cash register and make correct change. Helpful traits include a natural flair for selling plus the ability to make good sales presentations. No special education or training is required to enter this field of selling. A high school education is desired for sales clerks. A college degree is nearly always necessary for advancing to top positions in sales management.

Working conditions depend upon the type of products clerks sell. Most salesmen work indoors on a 40 to 48 hour per week basis. They must adjust to periods of high activity or dull, non-productive days. Selling jobs are available in virtually any city or town, in any type of retail or wholesale operation.

Opportunities for advancement have been rather limited but are becoming much better. Pay scales for sales persons range from low to moderate. Many persons work on a commission, that is, a percentage of their total sales.

Routemen drive vehicles over established routes to deliver products such as milk, soft drinks, laundry, dry cleaning, household supplies and cosmetics. These jobs mainly entail driving and deliveries, but loading and demonstrating the product are also necessary in many instances.

Routemen must be able to get along with people and be pleasant in manner. They must keep current customers happy, as well as attempt to gain new ones. Self-confidence, tact and initiative are important in these jobs. They must also be able to work without supervision. Good driving ability is essential.

A high school diploma is desired for routemen. Advancement is generally slow in this area of selling. Pay is low to moderate, and the workweek may extend to as many as 60 hours. These factors vary, depending upon the nature of the route and season of the year. Routemen have considerable freedom and may work at their own pace. If routemen have established good service routes, they have the possibility of promotion

## Marketing and Distribution Occupations

to supervisory jobs.

Manufacturing representatives or salesmen display, demonstrate or describe products made by one or more companies in an attempt to sell them to potential customers. These sales persons usually call on their customers, which include wholesalers and retailers, at their places of business. The type of product affects the nature of work for manufacturing representatives. Some spend their time traveling from town to town, while others remain in one city. They must know their product as well as study all new, similar products on the market.

These persons are required to have a high school diploma. An increasingly high percent are required to be college graduates. Representatives in engineering, chemical and pharmaceutical fields should have college degrees with considerable training in their particular field. Successful manufacturing representatives are generally cheerful, optimistic, sociable and tactful. They work on their own a great deal of the time; therefore, they must be self-motivated.

Advancement to the supervisory level is quite possible in manufacturing sales. Experience provides a good background for those who wish to own their own business. Some persons move from selling to training new salesmen.

The hours are long, irregular and may require traveling in the evening. These salesmen are away from their family a great deal of the time, particularly during the week. Salaries are good to excellent, and there is generally a commission plus travel expenses for these positions. There are no set weekly hours which apply to this job. Vacation time and fringe benefits are liberal.

Salesmen who sell highly technical machinery and parts or complex office equipment are known as sales engineers. They are required to prepare extensive sales presentations consisting of precise information on equipment for sale or for rent. Sales engineers often work with research and development departments within large corporations.

Sales engineers should have at least a bachelor's degree. Salaries are good to excellent. Qualifications necessary in general sales work also apply to this specialized area of salesmanship.

Marketing and Distribution Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
RETAIL OR SPECIALIZED SELLING

Pamphlets

The Institute For Research

610 South Federal Street, 7th Floor, Chicago, Ill. 60605

- No. 33 Salesmanship as a Career
- No. 48 Merchandising
- No. 55 Women's Clothing Shop as a Career
- No. 56 Childrens Clothing Shop as a Career
- No. 65 Book Store Manager
- No. 79 Office Supply Store Retailer
- No. 87 Gifts and Art Shop Retailer
- No. 101 Drug Store Operations
- No. 112 Boats, Sales and Service
- No. 117 Men's Clothing Stores
- No. 119 Paint Store Operations
- No. 121 Careers in TV, Radio, Records and Hi-Fi Retailing
- No. 151 Antique Shop Operation as a Career

Books

Messner Career Books

Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018

Your Career in Selling

Universal Publishing and Distributing Co.

235 E. 45th Street, New York, N.Y. 10017

Vocational Guidance Manual, Sales Careers

Welinsky, Harriet, Careers and Opprortunities in Retailing

E. P. Dutton Co., New York, N.Y.

Other Sources

National Ass'n of Retail Merchants

100 W. 31st Street, New York, N.Y. 10001

National Automobile Dealers Ass'n

200 K Street N.W., Washington, D.C. 20006

National Automotive Parts Ass'n

29 E. Madison Street, Chicago, Ill. 60602

Retail Merchants Ass'n of Texas

Box 1625, Austin, Texas 78767

## Marketing and Distribution Occupations

### ADVERTISING

The purpose of advertising is to inform the public of products and services on the market. Advertisements may be visual, such as those seen on the pages of national magazines, in the newspapers and on billboards along major streets and highways. Advertisements may combine visual effects with sound, resulting in advertisements seen on nationwide television each day. Radio advertising employs the audio for its sales message.

Advertising jobs may be broken into two major categories: those of advertising agencies and advertising departments within a company or business. Persons in each group do basically the same type of work.

Various positions in the general advertising field include managers, copywriters, artists, technical or research personnel, and salesmen. In a small ad agency or department, one or two persons usually do all the necessary work. A larger organization will often employ a staff of many persons to perform highly specialized tasks.

Advertising managers direct entire operations. They are responsible for budgets and the final products used by media. If the organization is a business which uses an advertising agency on a consulting basis, it is up to the manager to choose the agency.

Copywriters are responsible for writing descriptive copy in the form of headlines, jingles or slogans to best attract the attention of buyers.

Artists and layout men prepare finished art which is then submitted to printers who turn out the finished form. They often use photographers to aid in art preparation.

Media directors, or space buyers as they are sometimes called, are responsible for determining which media will be the most effective for a particular campaign. They must know types of media, their costs, as well as the audience they reach.

Research directors process and analyze information needed to make the client's campaign successful. It is their job to conduct local, regional or national surveys to determine potential sales. They may research competitor's products, and distribute product samples for opinions from the users.

Advertising salesmen attempt to sell space or time for a type of advertising. They also inform businesses of the various kinds of advertising available, and which will be most beneficial or suited to the business needs.

There is not a definite set of abilities necessary for the advertising field. Most agencies today hire college trained persons or those

## Marketing and Distribution Occupations

with special training or experience in related fields such as marketing and journalism. Information about professional training for artists in the advertising field can be found under the classification Commercial Art or Illustration.

Positions in an advertising agency or department usually mean indoor work, with the exception of advertising salesmen. They will be traveling throughout the city, and into outlying areas, and possibly across the nation.

Advertising agencies are numerous in cities and large towns. Advertising departments are found in some businesses in almost any city or town.

Hours for persons in advertising are based on the 40 hour workweek in most cases. However, they may be irregular because deadlines must be met regardless of how much time is entailed.

Pressures are great in this business, but it is a satisfying career for the person seeking variety, challenge of creative ability, and competition. Advertising personnel get great satisfaction in seeing or hearing a finished project when it appears in print, on television or on radio.

Salaries range from average to very good, depending upon the quality of skills possessed. Advancement possibilities are good at the present time because more job opportunities are available in the advertising world.

Marketing and Distribution Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
ADVERTISING

Pamphlets

American Advertising Federation  
Bureau of Education and Research  
655 Madison Ave., New York, N.Y. 10021  
Jobs in Advertising

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 17 Advertising Careers  
No. 133 Advertising Copy Writer  
No. 150 Women in Modeling, Fashion Advertising and TV  
No. 193 Magazine Advertising as a Career

U. S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-2 Advertising, Market Research and Public Relations  
Workers, 10¢

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Your Career in Advertising

Universal Publishing and Distributing  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Advertising Career

Other Sources

American Ass'n of Advertising Agencies  
200 Park Avenue, New York, N.Y. 10017

Ass'n of Industrial Advertisers  
41 E. 42nd Street, New York, N.Y. 10017

Outdoor Advertising Ass'n of Texas  
Box 1625, Beaumont, Texas 77704

Southwestern Ass'n of Advertising Agencies  
7007 Preston Road, Dallas, Texas 75205

## Marketing and Distribution Occupations

### COMMERCIAL ART OR ILLUSTRATION

Commercial art is a basic part of the advertising world with its chief product being that of ideas. It is concerned with the illustration, lay-out and design of any type of promotional materials which sell or explain a product or service.

Commercial artists produce drawings which, combined with descriptive literature, serve to inform, interest and motivate the customer. Their work must be both realistic and technically correct. Commercial artists use many means to create pictures and ideas in the interpretation of a product or company image. They do illustrations, lay-outs, lettering and poster art, as well as employ photographic methods to present a particular visual sales message. Commercial artists must know how to adapt their techniques to fulfill requirements of sophisticated multi-color printing processes in widespread use today.

Somewhat akin to commercial art is work in the area of technical illustration. This work may serve to tell a customer or product user how to operate the new product through means of drawings in leaflets, books, or manuals. In this application, illustrators must be adept at producing diagrams of controls, knobs, levers, switches and other moving parts necessary to produce operation. Maintenance manuals provide an area of work for technical illustrators to detail various stages of disassembly of a piece of equipment or machinery.

Technical illustrators must be able to convert ideas of engineers into visual forms easily understood by the layman. They produce charts, graphs and diagrams, as many of their projects deal with the step-by-step process of constructing a building, manufacturing a product or putting together a "do-it-yourself" plan.

Commercial art is a serious business which involves the application of talent, time and money. Artistic aptitude, motivation, and a knack for putting onto paper what the mind's eye sees are qualifications for the commercial artist. Good taste, accuracy, neatness and patience are also desirable characteristics. Those interested in technical illustrations must have mathematical aptitude, plus the ability to work from blueprints or models. Commercial artists and illustrators must be able to work independently within the framework of a team effort. They will be working closely with advertising managers, copywriters and design engineers in planning and creating visual effect with eye-appeal.

Part of the ability of commercial artists is natural--part is learned. Two to four years of commercial art and training in mechanical drawing in a technical or professional school will give aspiring artists a basic foundation necessary to enter the commercial art and illustration field.

The working environment is usually indoors with excellent facilities.

## Marketing and Distribution Occupations

Areas of employment fall within the categories of advertising agencies, individual advertisers, media, and product suppliers. Commercial artists working for an advertiser will find themselves preparing layouts for retail or wholesale companies, manufacturers, and products. They will be involved in the preparation of the firm's own ads for media. Included in the media grouping are magazines, newspapers, outdoor ad agencies, and television networks. These "mass media" employ many commercial artists in highly specialized areas which include printing and photography.

Opportunities for advancement in commercial art and illustration are dependent upon willingness to achieve, talent and training. Above average ability added to several years of training will secure commercial artists the best jobs in the field. Today's mass production of complex machines and equipment has increased the need for technical illustrators.

Although this type of work involves many long hours, much private criticism and great pressures, commercial artists can gain much zest from meeting and beating tough competition. Illustrators have the satisfaction of utilizing their own talent and imagination in the preparation of art for many exciting new products.

Working conditions are often confining in terms of space, and many long hours are spent in one spot. In general, employment in commercial art and illustration is not as glamorous as portrayed in books, movies and on television. The work of the technical illustrator is now being augmented by computerized devices which reduce time-consuming preliminary perspective layouts.

The pay is high for talented, achieving persons who enjoy the creative aspects of problem solving.

Employment is abundant in big cities for commercial artists and illustrators. Most persons in this field receive a regular salary. Many artists work on a free-lance basis selling artwork to any customer with a product to sell or idea to be presented to the public.

Marketing and Distribution Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
COMMERCIAL ART OR ILLUSTRATION

Pamphlets

American Advertising Federation  
1225 Conn. Ave. N.W., Washington, D.C. 20036  
The Commercial Artist

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 14 Careers in Commercial Art  
No. 97 Art as a Career  
No. 134 Advertising Art for Women  
No. 188 Cartooning as a Career

National Cartoonists Society, Educational Director  
152 Colonial Parkway, Manhasset, L.I., New York 11030  
Comic Art, An Occupation

U.S. Printing Office  
Washington, D.C. 20402  
No. 1300-24 Commercial Artists, 5c

Books

Biegeleisen, Jacob, Careers and Opportunities in Commercial Art  
Dutton Publishing Co., New York, N.Y.

Rodewald, Fred, Commercial Art as a Business  
Viking Press, New York, N.Y.

Other Sources

National Association of Schools of Art  
One Dupont Circle N.W., Washington, D.C. 20036

## Marketing and Distribution Occupations

### PUBLIC RELATIONS

Persons holding public relations positions are responsible for developing and maintaining favorable public opinion for the organization or business represented. "PR" persons may be employed in a consulting capacity, or work within the organization. Their work involves providing information to news media such as daily and weekly newspapers, and radio and television stations. They are responsible for the image of a particular business or institution which is conveyed to the public.

Positions in public relations may be located in corporations, retail businesses, educational institutions, or public service companies. The work involves activities which include writing news releases and employee newsletters and editing in-house or employee publications. Much of their time is spent handling special news events such as conventions, press parties and open houses involving the press. Booklets, brochures and general advertising also fall within the realm of work for the public relations staffer.

A college degree is necessary for public relations directors. They must have experience and training in journalism, management, English, speech or business administration. Knowledge in each of these areas is beneficial to both the director as well as staff members.

A good understanding of people and the ability to analyze situations is vital in this career. PR practitioners need to make important decisions, sometimes very quickly. They should possess good verbal skills, have creative ability and be self-starters. An outgoing personality is a must for the successful public relations director or employee.

Work may be both in and out-of-doors, and will often involve travel. The offices housing public relations departments afford employees good working conditions with necessary equipment and secretarial help to get the job done in a professional manner. Size of both office and staff will depend upon the type of organization as well as the size of the city or town in which it is located.

Salaries in this career field are good to very good. Night and weekend work is sometimes necessary; however, most jobs are based on the 40 hour workweek. Expense accounts are usually provided for entertaining a variety of persons.

There is glamour and prestige in public relations, but it involves much more hard work than is realized. Public relations people have the tremendous task of interpreting company policy to outsiders as well as to employees. These are demanding jobs at which PR employees must work to keep many others happy. Although the hard work is always at hand, the personal contact and many new faces make public relations a rewarding career field.

Marketing and Distribution Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
PUBLIC RELATIONS

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 136 Careers in Public Relations

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-2 Advertising, Market Research and Public Relations  
Workers, 10¢

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Your Career in Public Relations

Other Sources

The Information Center, Public Relations Society of America, Inc.  
845 Third Ave., New York, N.Y. 10022

Public Relations Ass'n of Texas  
Box 7818 University Station  
Austin, Texas 78712

Public Relations News  
127 E. 80th Street, New York, N.Y. 10021

## Marketing and Distribution Occupations

### SERVICE AND REPAIR

This is the fastest growing field of employment in the nation, with new areas of service and repair constantly developing. Because every piece of equipment is specialized, whether it be a color television or dishwasher, various skilled repairmen are needed to solve maintenance problems.

Careers in the air conditioning, heating, ventilation and refrigeration field require several thousand technicians each year for troubleshooting, maintenance and installation. Persons in this field work on equipment ranging from small window units to large central systems which heat and cool plant-type operations. Air conditioning technicians install motors, compressors and evaporators, connect duct work and piping, then charge units with refrigerant.

When the equipment breaks down, these service men make diagnoses and repairs which may entail checking relays, thermostats and refrigerants. Air conditioning and refrigeration technicians use a variety of tools in their work.

Mechanical aptitude, an interest in machinery, good physical condition and the ability to work independently are important qualities for this technician.

A high school diploma is beneficial for the apprentice in this career field. Three to four years of on-the-job training is the minimum requirement necessary before becoming service men or mechanics. Graduates of formal training programs such as those offered in technical schools enter the field as technicians. These persons may work in installation for retail air conditioning companies, in testing for design engineers, or in maintenance for building and factory owners.

Most of the work is out-of-doors and requires lifting, climbing ladders, working on roof tops and under buildings and homes in all kinds of weather. Duct men work inside most of the time, often in cramped quarters. Mechanics may work inside a repair shop on some days. The hazards of this job include electrical shock, burns, falls and the stress of lifting heavy objects.

Job opportunities exist all over the country with positions available as contractors, factory representatives, designers and inspectors. Many air conditioning contractors are self-employed. Advancement possibilities and pay are very good, with long hours in the peak summer season. This type of job is not monotonous, and problems encountered by technicians are a challenge to their mechanical abilities.

Many air conditioning and refrigeration concerns have benefits which include insurance, stock bonus plans, vacation time and retirement.

## Marketing and Distribution Occupations

Appliance service men install and service all kinds of electrical and gas appliances ranging from small items to complex control systems.

Refrigerators, freezers, dishwashers, garbage disposals, washers and dryers, and ranges are items which are generally repaired in the home. Small appliances such as percolators, toasters, vacuum cleaners and irons are taken into a repair shop.

It is up to the service men to determine why a particular appliance is not working properly. These persons then make adjustments, repair or perform installation of new parts. They may check for gas leaks and frayed electrical cords as well. They also advise the customer on care and proper use of their appliances. Some service men specialize in only one or two kinds of appliances.

Service men must have mechanical aptitude, dexterity, patience and strength. They should enjoy working independently, and must be able to deal with people efficiently.

A typical way of entering the field is as an assistant, although training can be obtained at specialized or technical schools.

Appliance service men generally work forty hours per week, with most work done through calls to customers' homes. Some lifting is required, and service men may work in cramped quarters. The pay is fair to good, with advancement in raises. Service men sometimes must train others, and they often go into business for themselves.

This type of work proves to be a challenge, and is interesting because of its variety. Service men work alone with a minimum of supervision which appeals to most workers.

Radio and television service men are skilled workers who maintain, install and repair various types of electronic devices. Their work includes servicing radios, televisions, high-fidelity sound equipment, phonographs and tape recorders. They also may work on aircraft and other two-way radios and marine electronic devices.

These persons also must possess the ability to troubleshoot, as this is the key to repairing radios and television sets. They test tubes, color connections, and sound using complicated equipment. They make calls to the homes of customers as well as performing more complex repairs in the shop.

Radio and television service men must have dexterity, mechanical aptitude and a thorough knowledge of electronics. They must have good vision, accuracy and patience, plus the ability to get along with the public. They must be able to take criticism in stride, as well as handle customers' complaints effectively.

## Marketing and Distribution Occupations

Apprentice on-the-job training is done in this career field, but most repair men are graduates of electronic schools and technical institutes. Because continual improvements are being made in electronics, service men must be willing to constantly educate themselves so their knowledge will not become obsolete in a short period of time.

A great deal of driving is involved in traveling to and from customers' homes. These technicians must climb ladders in the installation of television antennas, and lifting is common to the work. The workweek is usually forty to forty-eight hours in length, with overtime. These persons work with a minimum of supervision.

Advancement is usually in raises in pay, and opportunities arise for these technicians to go into business for themselves. The pay is moderate to good, with benefits and vacation time provided by companies.

This occupation is rewarding for those persons who enjoy electronic equipment and its complexities.

Marketing and Distribution Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
SERVICE AND REPAIR

Pamphlets

American Society of Heating, Refrigerating and Air-Conditioning  
Engineers, Inc.

345 E. 47th Street, New York, N.Y.

Your Future in Air-Conditioning, Heating and Refrigeration Engineering

The Institute For Research

610 South Federal Street, 7th Floor, Chicago, Ill. 60605

No. 67 Air-Conditioning Service Technician

No. 121 Refrigerating Engineering

No. 236 TV Repair

No. 248 Telephone, Radio and TV Repair

No. 276 Business Machines Service

U. S. Government Printing Office, Washington, D.C. 20402

No. 1300-4 Air-Conditioning and Refrigeration Mechanics, 5c

No. 1300-8 Appliance Servicemen, 5c

Books

Richards Rosen Press, Inc.

New York, N.Y.

Aim High Vocational Guidance Series

Appliance Service

Electronics

Air-Conditioning and Refrigeration

Other Sources

Air-Conditioning Trade Ass'n

2016 Canton Street, Dallas, Texas 75201

Ass'n of Home Appliance Manufacturers

20 N. Wacker Drive, Chicago, Ill. 60606

Gas Appliance Manufacturers Ass'n

1901 N. Ft. Meyer Drive, Arlington, Va 22209

National Appliance and Radio-TV Dealers Ass'n

318 W. Randolph Street, Chicago, Ill. 60601

National Electric Sign Ass'n

600 Hunter Drive, Oak Brook, Ill. 60521

Refrigeration Service Engineers Society

433 N. Waller Ave., Chicago, Ill. 60644

## Marketing and Distribution Occupations

### OTHER MARKETING AND DISTRIBUTION OCCUPATIONS

Career fields in marketing and distribution, in addition to those already discussed, include the following:

Wholesalers manage an enterprise which buys merchandise from manufacturers in large quantities. They inform retail customers of new developments in the market.

Market Masters manage a fruit or vegetable market usually by leasing space. They supervise the collection of fees and building maintenance for this enterprise.

Warehouse Managers direct all warehouse activities including the establishment of procedures and policies for receiving, handling and dispensing of warehouse stock, or maintenance of inventory.

Industrial Traffic Managers arrange transportation of products and are responsible for the route, carrier, freight classification and regulations to and from business firms.

Foreign Traffic Managers determine the best routes and procedures for movement of cargo. They must be familiar with traffic flow, packaging and packing requirements as well as cargo handling, claims procedures and booking of freight.

Market Research Analysts conduct systematic studies of market conditions through surveys and interviews with specialists in various fields. They then interpret and report results to determine potential sales and forecasts or trends.

Interviewers or Survey Workers interview the public in homes or by telephone, then compile information on buying habits or other marketing characteristics.

Foreign Trade Consultants use their extensive experience and knowledge to evaluate, advise and interpret data for organizations in an area which is unfamiliar to employees of that firm.

Buyers and Purchasing Agents study consumer wants and buying trends. They make visits to manufacturing show rooms where they choose and order merchandise or equipment, comparing quality, price, and discounts so that they may make the best buys.

Brokers negotiate sales and bring the seller and buyer together. They furnish information about market conditions.

Jobbers (also known as Distributors) purchase products from wholesalers or producers and retail them under a company or

## Marketing and Distribution Occupations

brand name.

Importers bring in to the country merchandise from foreign merchants for use or resale. They should be fluent in more than one foreign language.

Customer Service Specialists write special orders for services and merchandise, perform personal services, and arrange for such things as gift wrapping. They may act as Bridal Consultants, or Personal Shoppers.

Shoppers (Personal or Comparison) visit various stores and salesrooms to gather information on style, quality or price of merchandise to aid in buying and pricing. They also fill orders and arrange for mailing or deliveries.

Wholesale Field Representatives supervise several retail outlets for a major company. They are responsible for sales, operations, credit customers, and counseling of dealers.

Auctioneers sell commodities to the highest bidder at a public auction.

Coin-Vending Machine Attendants drive vehicles to various places in order to refill various types of coin-vending machines. They collect and record the amount of money received, as well as anticipate the needs of customers for their product at various locations.

Warehousemen receive, store, ship and distribute materials and products. They also load and convey materials to storage areas and sort, inspect and fill orders.

Shipping or Receiving Clerks perform clerical duties in the shipping and receiving of merchandise, materials and products.

Material Handlers load and unload materials, convey them from storage areas to vehicles, open containers, and count and weigh merchandise.

Warehouse Trafficmen supervise and coordinate activities of workers engaged in loading and unloading vehicles. They are responsible for scheduling and dispatching, and the direction of traffic to and from the warehouse.

Traffic Clerks compute rates, schedules and costs, and prepare reports and records for incoming and outgoing freight data.

Marketing and Distribution Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OTHER MARKETING AND DISTRIBUTION OCCUPATIONS

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 244 Careers in Wholesale Merchandising and Distribution  
No. 265 Career as a Wholesale Gasoline and Oil Distributor

Books

Davis, Kenneth R., Marketing Management  
Ronald Press Co., New York, N.Y.

Elling, Karl A., Introduction to Modern Marketing  
McMillan Co., New York, N.Y.

Frey, Albert W., ed., Marketing Handbook  
Ronald Press Co., New York, N.Y.

General Services Administration  
Federal Supply Service, Washington, D.C. 20406  
Warehouse Operations

Nolan, Carloll and Warmke, Roman, Marketing, Sales Promotion  
and Advertising  
South-Western Publishing Co., Dallas, Texas

Warner, Daniel, Marketing and Distribution  
McGraw-Hill Book Co., New York, N.Y.

Other Sources

Consumer and Marketing Service  
U.S. Dept. of Agriculture  
536 S. Clark Street, Chicago, Ill 60605

Texas Agricultural Marketing and Development Ass'n  
Texas Farm Bureau  
7420 Fish Pond Road, Waco, Texas 76710

# PERSONAL SERVICES



## Personal Service Occupations

### GENERAL INFORMATION

Long-term growth in the American economy has created a growing demand for personal services of all kinds. Workers in service occupations clean homes and buildings, serve food, aid in grooming and appearance, and in numerous other ways provide special services to millions of Americans.

For many service occupations, personality traits and special abilities are as important as formal schooling. For others, such as mortuary science and cosmetology, which require a state license, professional schooling is essential. Most of the occupations require a willingness on the part of the employee to keep skills and knowledge updated.

Physical strength and stamina are important to some service occupations. A pleasing manner and the ability to get along with people is essential to nearly all personal services careers.

Many service workers go into business for themselves, thus making better salaries with added responsibilities. In general, advancement is difficult from service occupations which require little specialized training and skill. A good basic education and a knowledge of the business in which a person is employed will contribute towards a more successful future in any personal service job.

Many personal service occupations are represented by small firms. Owners and managers must, in addition to their specialized skills, understand good business practices, plan their advertising campaigns, maintain financial records, supervise employees, and deal with customers. A good, general understanding of business management is always advisable.

## Personal Service Occupations

### BARBERING AND COSMETOLOGY

Both barbering and cosmetology careers deal with the services of grooming and hair care, including cutting, shampooing, coloring, and styling. In addition, they may include facials, scalp treatments, and advice to customers concerning matters of grooming and styling. Both barbers and cosmetologists may work with artificial hair pieces. Cosmetologists advise on and give care to the hair, skin and nails, including permanent waving and straightening, manicures, pedicures, and make-up analysis. Some highly trained cosmetologists may specialize in only one service, such as permanent waving or coloring. In small barber and beauty salons, duties may include making appointments, cleaning equipment and sterilizing instruments.

Both professions require a great deal of time spent standing, with the arms raised to shoulder level. Some persons find this extremely tiring. Manual dexterity, an eye for design, and a pleasant and even temperament are advisable for entering either of these areas. Ability to work well with people cannot be overemphasized.

Educational requirements depend on the state in which the student is being licensed. Most states have age requirements, and one must have a health certificate. A barber in almost all states must be a graduate of a state-approved barber school. Usually, they are first licensed as apprentice barbers, then after a period of 18 months take another written and practical examination to qualify as master barbers. Licenses are not transferable from state to state. Most schools for barbers require 1,000 to 1,800 hours of formal instruction, including courses in hygiene, anatomy and diseases of the skin and scalp. Some schools give training in business practices as well. Requirements for cosmetologists are similar, with the training requirements varying from 1,000 to 2,500 hours depending upon the state. Private schools may offer courses lasting from six to fifteen months. Vocational high school programs may cover a span of two to three years and also include normal academic subjects.

Surroundings are usually attractive and pleasant since they must be so to attract customers. Hours may be rigorous and strenuous, and some operators develop skin irritations because of continued exposure to water, shampoo and chemicals. Hours of work may include Saturdays, and evening appointments are possible.

Most barbers and cosmetologists work on a commission basis, some on a salary plus commission. Tips are an important part of their earnings, and salaries range from fair to good. The availability of fringe benefits varies, usually depending upon the size of the operation. Chains of shops and large establishments are more likely to offer benefits. A person may advance to managing a shop, owning one's own shop, or becoming a teacher in a school of barbering or cosmetology. Teaching requires additional academic training and exceptional skill.

Both of these occupations offer variety and can be a continual challenge to a person's creativity and imagination.

Personal Service Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
BARBERING AND COSMETOLOGY

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 54 Beauty Shop Operation as a Career

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1550-7 Barbers, Cosmetologists

Books

Richards Rosen Press, Inc.  
New York, N.Y. 10010  
Aim High Vocational Guidance Services, Barber

Other Sources

Associated Master Barbers and Beauticians of America  
219 Greenwich Road, Box 17782, Charlotte, N.C. 28211

National Ass'n of Barber Schools, Inc.  
750 Third Avenue, Huntington, W. Va. 25701

National Ass'n of Cosmetology Schools, Inc.  
3839 White Plains Road, Bronx, N.Y. 10467

National Hairdressers and Cosmetologists Ass'n  
175 Fifth Avenue, New York, N.Y. 10010

Texas Ass'n of Beauty Culture Schools  
1621 W. 25th Street, Odessa, Texas 79761

Texas Hairdressers and Cosmetologists Ass'n  
1500 Jackson Street, Suite 711, Dallas, Texas 75201

## Personal Service Occupations

### MORTUARY SCIENCE

Morticians, undertakers, or funeral service practitioners, as these persons are called, are responsible for transporting human remains, assisting in funeral arrangements and services, and embalming and preparing the body for burial. They aid the family in arranging details such as selection of casket, determination of location and time of burial, and they may help to procure officials for religious rites and music. These persons may also assist in all funeral home managerial duties.

Embalmers prepare bodies for interment in conformity with legal requirements. They reshape disfigured or maimed bodies, using such materials as wax, clay, cotton, plaster of paris, and cosmetics. Also, the embalmer dresses the body and places it in the casket.

The funeral home manager is responsible for the supervision of employees and for the total operation of the funeral home. He may also be the mortician and embalmer.

Personal qualifications include a sensitivity to the emotional needs of people during a difficult time. Funeral practitioners must be able to inspire confidence in others, in addition to having trust in themselves. They must have tolerance and understanding, emotional stability, and good physical health.

These persons must have a high school diploma or its equivalent to enter funeral service school. Course length ranges from nine months to three years, in addition to an apprenticeship program of from one to three years. The graduate must then pass a state test for a license.

Work is both indoors and outdoors, with irregular and long hours, sometimes on weekends and often during all hours of the night. There is some danger to health, because the funeral practitioner comes into physical contact with diseases causing death.

Advancement is possible with more education and experience. Often these persons go into business for themselves. Pay is good to very good. Satisfaction is gained in this profession through the act of helping others in a time of need.

Personal Service Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
MORTUARY SCIENCE

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 72 Funeral Service and Mortuary Science

Books

Richards Rosen Press, Inc.  
New York, N.Y. 10010  
Aim High Vocational Guidance Series, Funeral Personnel

Other Sources

Funeral Directors and Embalmers Ass'n of Texas  
Suite 1-5, Perry-Brooks Bldg, Austin, Texas 78701

Morticians of the Southwest  
Box 2683, Dallas, Texas 75221

National Foundation of Funeral Service  
1600-1628 Central Street, Evanston, Ill. 60201

## Personal Service Occupations

### LAUNDRY, DRY CLEANING AND ALTERATIONS AND REPAIR

There are several different types of service in the field of laundering including businesses which cater solely to domestic trade; those of strictly business nature which contract with hospitals, hotels and institutions; linen supply services; diaper services; and industrial laundries.

Managers of laundering establishments direct and coordinate the activities of employees, set up and maintain an orderly schedule of work, order supplies, keep abreast of the latest developments in both machinery and fabrics, and are alert to operational costs and competition. Managers must know how to deal satisfactorily with the demands and complaints of the public. They must be versatile, tactful and have mechanical abilities to repair minor breakdowns, be good organizers, and good businessmen.

A bachelor's degree is recommended but not required. Managers should have at least a high school diploma with preferably two years of college. Important courses are chemistry, business, accounting and public relations. Short courses are offered by the National Institute of Dry Cleaning, at Silver Spring, Maryland, and by the American Institute of Laundering, at Joliet, Illinois.

Most dry cleaning plants are hot and humid. There are seasonal rush periods when the managers have to deal with demands and complaints of customers. The hours are long and may require working nights and on Sundays.

People with drive and ability can make their establishment grow into a larger and more successful business. Expanding services to include drive-in windows and offering more diversified services will produce more benefits for these businesses.

The pay is usually good to very good, and sometimes high depending on the type of plant and service. Since managers are usually owners, they have the satisfaction of being their own boss and doing things in a way which they think correct. They have the enjoyment of coming into contact with many different people, and enjoy being respected as businessmen. Benefits usually include vacations, insurance and retirement.

Other occupations in the laundry, dry cleaning and alterations and repair fields are listed below:

Laundry Foremen supervise and coordinate activities of workers engaged in receiving, marking, washing and ironing clothing and linens.

Flatwork Tiers fold, stack and wrap ironed flatwork, and write customers' names on bundles.

Wet Wash Assemblers assemble washed laundry according to lot numbers

## Personal Service Occupations

before tumbling, starching and ironing.

Ticket Girls compute cost of laundry, make out customers' lists and prepare weekly or monthly statements.

Laundrymen tend machines which wash different types of clothing and other articles.

Laundrette Attendants assist customers to launder or dry clean clothes using self-service equipment.

Dry Cleaners operate the machines which clean garments with solvent. They must know fabrics and coloring so as not to damage articles. They must identify stains and use the proper solvent to remove them.

Pressers operate steam pressing machines to remove wrinkles from dry cleaned articles. They may also block or shape knitted garments after cleaning.

Clothing Alterers work in clothing stores or independently to alter newly purchased clothing to fit the buyer.

Shoe Repairmen repair and refinish shoes to customers' specifications. They may also repair belts, luggage or purses.

Hatters clean, block, trim and make minor repairs to hats.

Personal Service Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
LAUNDRY, DRY CLEANING AND ALTERATIONS AND REPAIR

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 70 Dry Cleaning and Laundry Management

National Institute of Dry Cleaning  
909 Burlington Ave, Silver Spring, Maryland 20910  
Opportunity and a Future in the Dry Cleaning Industry

Other Sources

Qualified Dry Cleaners Ass'n  
3217 Merida, Fort Worth, Texas 76109

Texas Laundry and Dry Cleaning Ass'n  
Box 1992, Austin, Texas 78767

Textile Maintenance Institute of Texas  
1400 Ethridge, Austin, Texas 78703

## Personal Service Occupations

### OTHER PERSONAL SERVICE OCCUPATIONS

#### Domestic Services

Maids clean homes and perform other routine household work. They sometimes care for children, cook, serve meals, and render other personal services.

Yardmen keep yards and grounds in orderly condition. They may also serve as Chauffeurs by driving automobiles, keeping the car clean and making minor repairs.

Butlers supervise household workers engaged in domestic duties. They may also mix and serve cocktails, answer the telephone and announce guests.

Valets tend to employer's clothing, run errands, and they may answer the telephone or door, shave and massage the employer. They may also drive employer's car.

#### Lodging Services

Boarding House Managers supervise workers in a boarding house who are engaged in providing meals and lodging for transient or permanent guests.

Lodging Facility Managers work for small apartment houses, small hotels, and trailer parks. They may supervise other employees and coordinate other activities.

House Mothers work for boarding schools, college fraternity or sorority houses, or children's homes. They supervise other employees, assign rooms, order supplies, and advise occupants.

#### Domestic Animal Care

Kennelmen attend to dogs or cats in kennels. They clean pens, feed and water animals, and may exercise them.

Dog Groomers bathe dogs, trim and shape toenails and hair, using scissors and clippers.

Stablemen care for horses and are responsible for the feeding and watering. They may trim manes and tails, clean horse stalls, and saddle horses for riders.

Dog-Pound Attendants attend to animals picked up and brought into the pound. They feed and water animals and disinfect pens.

Personal Service Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OTHER PERSONAL SERVICE OCCUPATIONS

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 155 Pet Shop Store Management

Other Sources

Health Studios in your area

Texas Apartment and Motel Managers Ass'n  
1621 Main Street, Dallas, Texas 75201

# PUBLIC SERVICES



## Public Service Occupations

### GENERAL INFORMATION

Public service occupations involve many people in jobs beneficial to society as a whole. Because there are children to be educated, laws to be enforced, and lives to be protected, the related occupations which deal in these areas are the necessary life-blood of the American way.

This area includes the largest of the professions, teaching. In addition, thousands of persons involved in other professions teach part-time. Among these are scientists, physicians, accountants, and large numbers of craftsmen who instruct in vocational and technical schools. The number of teachers needed by America's schools depends upon the number of students enrolled.

A continuing expansion of business activity and population, combined with the increased use of legal services by low and middle-income groups of persons will require more young men and women to enter the legal profession. Yet, the chief employment source for lawyers at the present time is governmental agencies, law firms and big corporations. The opportunities are numerous as well for law school graduates to enter a variety of other salaried positions which require a knowledge of law.

The constant problems which many of society's members face demand the need for organized social services. Social workers form the link from poverty, broken homes and physical, mental and emotional handicaps to a better way of living, or, at least, a more tolerable existence. The increased population of the very young and the very old, the age groups most in need of social work services, will contribute to the need for more of these services.

Many avenues of educational training are available through the Armed Forces. While protecting and serving the country, an individual can receive valuable training in such fields as electronics, metal work, or aircraft maintenance, or make a lifetime career of this unique existence. The Armed Forces are now maintained through voluntary enlistment, and offer many benefits which include counseling, training, and placement following discharge.

Many of the public service occupations have raised their employment standards significantly in recent years. Advancement in these occupations is usually based on acquiring additional educational experience.

## Public Service Occupations

### TEACHER OR TEACHER'S AIDE

Teaching, whether in preschool, primary, secondary, college, or university, implies instructing students in specific subjects. Teachers are responsible for keeping attendance and grade records, administering and grading tests or examinations, and myriad other duties associated with this profession. To these people is entrusted the responsibility of shaping and challenging the minds of students. Teachers of younger children generally deal with many subjects instead of specializing as high school or college instructors do. Teachers also may carry on research, write for publications, or serve as consultants to educational programs.

One who plans to teach needs to have above average intelligence, be fond of studies and learning, and especially have a genuine enthusiasm for working with other people, both adults and children. Teachers must keep abreast of current knowledge and developments. Personal conduct and behavior are subject to close scrutiny at all times.

Teaching in a public, preschool, elementary or secondary institution requires at least a bachelor's degree and a teaching certificate. Private schools have varying requirements. Certification requirements vary from state to state. High school students who plan to become teachers should take a college preparatory course, and seek admission to a college or university which is noted for a strong school of education. A master's degree is required for the person who hopes to teach in a college or university. Doctorates are essential for advancement beyond instructor.

A school is usually a pleasant place to work. Some buildings, however, are old with ineffective lighting and poor or no air conditioning. The caliber of the student can vary a great deal too. Teachers rarely have their own secretary but usually share secretarial services with other teachers. After classroom hours are over, teachers must plan lessons, grade papers, confer with students and parents, and attend meetings. Some teachers have the benefit of summer breaks.

Usually the first few years of teaching are on a trial basis, after which the teacher's effectiveness is reviewed. If good, tenure may be granted. Teachers may advance to the positions of principal, department head, administrators, or to special aspects of teaching.

Most teachers enjoy an adequate base salary with regular increases, plus a variety of fringe benefits, including teacher retirement plans. The work with students and other faculty members can be rewarding in human terms for teachers.

Teacher's aides assist teachers in keeping records, giving out and correcting assignments, checking equipment and doing other work not requiring professional training. Some aides may assist students who need special attention. Aides are being used more and more in classrooms to

## Public Service Occupations

perform routine chores so that professional teachers may spend more time in instructional activities. Teachers aides are often used to supervise playgrounds and cafeterias during school hours. There is a growing demand for aides in public school systems across the nation. Employment opportunities are good, although pay is moderate. However, the use of aides has permitted many persons to participate in educational work who have previously been barred because of their lack of college training. Teachers aides are usually trained on-the-job and through in-service programs after school hours and on weekends.

Public Service Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
TEACHER OR TEACHER'S AIDE

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605

<u>No. 52</u>	<u>Teaching as a Career</u>
<u>No. 75</u>	<u>Teacher of Art</u>
<u>No. 88</u>	<u>School Music Teacher</u>
<u>No. 106</u>	<u>Kindergarten Teacher</u>
<u>No. 164</u>	<u>College Teacher</u>
<u>No. 183</u>	<u>High School Teacher</u>
<u>No. 199</u>	<u>Elementary School Teacher</u>
<u>No. 214</u>	<u>Nursery School Teacher</u>
<u>No. 231</u>	<u>Vocational-Technical School Teacher</u>
<u>No. 243</u>	<u>Industrial Arts Teacher</u>
<u>No. 273</u>	<u>Commercial Education Teaching</u>
<u>No. 283</u>	<u>Home Economics Teacher</u>

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-95 Teachers and School Counselors, 15c

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Your Career in Teaching

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Teaching Careers

Other Sources

American Council on Education  
1 Dupont Circle, N.W., Washington, D.C. 20036

Office of Education  
U.S. Dept. of Health, Education and Welfare, Washington, D.C. 20202

Texas Classroom Teachers Ass'n  
Box 1489, Austin, Texas 78767

Texas State Teachers Ass'n  
316 W. 12th Street, Austin, Texas 78701

SCHOOL OR VOCATIONAL COUNSELOR

School counselors advise students, usually in junior or senior high schools and colleges, and presently in some elementary grades, on careers, curriculum planning, and counseling in educational and social problems.

Vocational counselors may be school counselors or they may be employed in a state or federal rehabilitation agency in consultation with medical and psychological advisors. These persons advise physically or mentally handicapped persons in order to help them choose suitable work or training according to individual abilities.

Both types of counselors must be able to communicate well with others, and must be interested in their clients and their welfare. Counselors must be familiar with a large amount of information to be able to channel students to the proper sources of help, and to give realistic advice. They utilize testing methods of various kinds and must handle confidential information in a discreet manner. Counselors must be able to remain objective and positive in outlook and not become personally involved in serious problems. They must help, not by advising, but by helping the counselee to make decisions after learning the choices.

To qualify as a school counselor, a bachelor's degree is required, and in about one-half of all states, the master's degree is needed. Most states require some teaching experience. College courses of importance are humanities, social science and psychology. Mathematics is also important because of the statistical and mathematical bases of testing programs. Requirements for the vocational rehabilitation counselor include the same general course of study as mentioned above, in addition to a master's degree in rehabilitation counseling, educational guidance or counseling. The master's program is generally a two-year program.

Both types of counselors usually have their own offices. The school counselor may work more than forty hours per week, which is normal for the vocational counselor. The outlook for employment in this field is good. Salaries are generally higher than those of teachers.

School counselors work under the school principal. Advancement is usually to positions of coordinating with other counselors, administrative positions, counselors for school systems or to industry or government agencies. Some counselors obtain advanced degrees and become professors in colleges or universities.

Public Service Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
SCHOOL OR VOCATIONAL COUNSELOR

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 73 Vocational and Educational Counseling

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-95 Teachers and School Counselors, 15c

Other Sources

American Council on Education  
1 Dupont Circle, N.W., Washington, D.C.

Office of Education  
U.S. Dept. of Health, Education and Welfare, Washington, D.C. 20202

Texas State Teachers Ass'n  
316 W. 12th Street, Austin, Texas 78701

LIBRARIAN OR ASSISTANT

Librarians work in public or private libraries ordering and cataloging books, periodicals and visual aids. Librarians assist patrons of the library in selecting material for their use. They may coordinate one or several departments or perform research. Library assistants aid the librarian by checking out and renewing books, sending overdue notices, collecting fines, ordering new material, cataloging, shelving, filing and attending to the upkeep of books. Library assistants are usually closely supervised.

To become a librarian, a person should hold a master's degree in library science. Many library schools offer work-study programs, during which time the student performs the duties of a librarian assistant. To qualify as an assistant, a person should have a high school education, with two years of college. Courses in English are important, as are physical sciences and foreign languages. Typing skills may also be necessary for some positions.

Advancement for librarians may mean going from an assistantship to head of a department, then to head of the library. Those with Ph.D. degrees will find it easier to reach top administrative levels. Assistants may receive regular promotions and pay raises. If pursuing a degree in library science, a person may advance upon graduation to professional librarian status.

Library employees in a municipal or school library receive fringe benefits equal to those of other municipal or school employees. Both usually include a forty-hour workweek, with some of the hours in the evening, paid vacations, sick leave, and various insurance and pension plans. The benefits in a private library vary.

For assistants, and librarians without assistants, a good deal of physical activity is required such as lifting, bending, climbing ladders and shelving books. A considerable amount of reading is necessary. Working conditions vary with the age of the facility.

Public Service Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
LIBRARIAN OR ASSISTANT

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 8 Librarianship as a Career  
No. 159 School or College Librarian  
No. 209 Special Librarian, Business, Industry, Scientific

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-55 Librarians, 5c  
No. 1300-59 Medical Librarians, 10c

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Challenging Careers in the Library World

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Library Careers

Other Sources

American Library Ass'n  
50 E. Huron Street, Chicago, Ill. 60611

American Medical Record Ass'n  
875 N. Michigan Ave, Suite 1850, Chicago, Ill. 60611

Secretariat Federal Library Committee  
Room 310, Library of Congress, Washington, D.C. 20540

Special Libraries Ass'n  
235 Park Ave. South, New York, N.Y. 10003

Special Libraries Ass'n, Texas Chapter  
Box 2068, Longview, Texas 75603

Texas Library Ass'n  
7918 Fairdale Lane, Houston, Texas 77042

LAW

Lawyers or attorneys are qualified by education to advise clients on their legal rights and obligations, and to represent them in courts of law. There are different types of lawyers and legal specialists. They may advise businesses and individuals on tax matters, arrange for issuance of stock, handle real estate, or act as trustees, guardians or executors of estates. They may draw up wills and advise on contracts. Some work solely with court proceedings and may further specialize in civil or criminal matters; some lawyers do research on legal precedents and interpretations. The state and federal governments both employ lawyers to draft and research laws and to serve as judges.

Necessary for law students and lawyers is the ability to read and retain large amounts of detail. Intellectual ability above average is necessary to complete the intensive educational program of law. Lawyers must be able to express themselves in written and verbal forms and must be able to reason logically. The ability to work with people is important, as is the ability to conform with ethical behavior.

The minimum education required is a high school diploma with a college preparatory background, plus six years of higher education. To enter a law school approved by the American Bar Association, a student must complete three years of college, and in some cases four. A liberal arts course is advisable before entering law school.

After completing law school, prospective lawyers must pass a written examination before they can be admitted to the state bar. They then are usually eligible to practice in any state after meeting standards of good character and legal experience. Two states accept the study of law by correspondence. Formerly, several states permitted "reading law" in a law office for a period of years, after which time the apprentice was permitted to take the bar examination. Most have discontinued this practice, however. Some states require a period of internship following graduation from law school before admittance to the state bar.

Lawyers with ability may advance rapidly in their profession. These persons may become senior partners in a law firm or open their own practice. Many lawyers go into politics or into business positions. Outstanding graduates, especially of top law schools, will have no difficulty in finding jobs. Those who are not so highly qualified may be forced to take positions where a knowledge of law is required, but law is not practiced.

Lawyers may spend a great deal of time in office and courtroom surroundings. They may find it necessary to visit clients, do research in libraries, and often work evenings and weekends in preparing cases. They must also keep up with the many changes in the law.

Law is generally considered a financially and personally rewarding profession.

Public Service Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
LAW

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605

No. 7 Career as a Lawyer  
No. 21 Corporation Lawyer  
No. 207 Tax Lawyer  
No. 253 Patent Attorney

U.S. Government Printing Office  
Washington, D.C. 20402

No. 1300-54 Lawyers, 5¢

Books

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manuals, Law Career

Other Sources

The American Bar Ass'n, Information Service  
1155 E. 60th Street, Chicago, Ill. 60637

The Ass'n of American Law Schools  
Suite 370, 1 Dupont Circle, N.W., Washington, D.C. 20036

State Bar Ass'n  
Box 12186, Capitol Station, Austin, Texas 78711

Texas Trial Lawyers Ass'n  
Westgate Bldg, Suite 201, Austin, Texas 78701

LAW ENFORCEMENT

Law enforcement employees include those employed as city policemen, state highway patrolmen, county or federal government police officers, and detectives who work in private business. City, state and county employees are usually involved in work of a protective nature and are responsible for preserving peace, preventing criminal acts, enforcing the law, investigating complaints, and arresting violators of the law.

The Federal Bureau of Investigation, Secret Service, Border Patrol, and Treasury Agents investigate violations of federal law, such as bank robberies, extortion, kidnapping, interstate transportation of stolen property, and numerous other federal matters. Private policemen and detectives are usually employed by business and industries for security purposes. These three broad classifications of law enforcement officers must meet different qualifications.

Policemen in a large city may perform very specialized jobs, while in a small community their duties are many and varied. Requirements for entry vary, and some cities have local civil service requirements. Good vision, usually 20/20 uncorrected, is necessary, with good hearing, and weight in proportion to height. Some cities have minimum height requirements. Most job regulations restrict applicants to those holding United States citizenship. Usually, written tests, in addition to tests of skill and strength, are administered. Character references are required, and the candidate's background is checked thoroughly. A high school education is necessary and some college specialized training may be required. Federal agencies are the most rigorous in their qualifications. Necessary personality traits for all jobs of this nature are an even temperament and stable character.

Working conditions vary from out-of-door work on foot or in patrol cars, to office and desk jobs. A person may be required to work at any hour of the day and night in any kind of weather. The duties are often hazardous.

Advancement depends upon the length of service, performance, education and written examinations. Special positions, such as supervisory ones, may be filled by appointment. The field of law enforcement is strenuous and tiring, as with many public service occupations, but it carries the potential to be challenging and rewarding.

Public Service Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
LAW ENFORCEMENT

Pamphlets

Federal Bureau of Investigation  
U.S. Dept. of Justice, Washington, D.C. 20535  
F.B.I. Opportunities

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 42 Criminologist  
No. 172 Police and Crime Prevention Work  
No. 218 Careers in the F.B.I.  
No. 227 U.S. Secret Service Agent  
No. 271 Careers with the State and County Highway Police

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-75 Policemen and Firemen, 10c

Books

Messner Career Books  
Julian Messner Co., 1 W. 39th Street, New York, N.Y. 10018  
Your Career in Law Enforcement

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Law Enforcement

Other Sources

F.B.I. National Academy Associates of Texas  
Dallas Police Dept, Room 313, Dallas, Texas 75201

International Ass'n of Chiefs of Police  
11 Firstfield Road, Gaithersburg, Md. 20760

Law Enforcement Officers of Texas  
Box 13127, Fort Worth, Texas 76118

Sheriffs' Ass'n of Texas  
Box 4488, North Austin Station, Austin, Texas 78751

Texas Department of Public Safety  
Austin, Texas

Texas Police Ass'n  
Box 4247, Austin, Texas 78751

## Public Service Occupations

### FIRE FIGHTING, PREVENTION AND RESCUE

Firemen or firefighters have the responsibility of fighting fires, protecting lives and property, as well as educating the community in fire prevention. They are also called upon in other emergencies.

Firefighters need to be agile, strong and able to follow orders calmly in distracting or life-threatening surroundings. About ninety percent of all non-volunteer firemen are local civil service employees and must pass written and physical examinations. Preference is given those who score the highest on the tests, and to those who have had fire fighting experience in military or volunteer areas. Prospective firefighters should have a high school diploma or its equivalent, with courses in chemistry, physics, mechanical drawing and blueprint reading. They should also have a valid driver's license. Recruits will receive a varying amount of on-the-job training and classroom work after they are hired.

Working conditions may involve long periods of duty at the fire station. Firemen may be on duty twenty-four hours a day, then have the same amount of time off. The job of fighting fires is extremely hazardous, and these persons are exposed to flame, smoke, sparks, chemicals, gases, and the danger of collapsing buildings.

Turnover in these areas is low. After qualifying to be hired, firefighters usually serve a probationary period of up to one year, and then receive more training for as long as two years. If trainees are sufficiently motivated to stay through this period, they usually become career employees.

Promotions occur within the department and depend upon test scores, seniority and performance. Firemen are usually permitted to retire at a comparatively early age.

Protective clothing is usually furnished for firemen, and they are paid overtime for additional hours served. Important fringe benefits are liberal pension and disability plans, sick leave and paid vacations.

Public Service Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
FIRE FIGHTING, PREVENTION AND RESCUE

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 177 Fire Departments, Fire Fighters, Fire Prevention

International Ass'n of Fire Fighters  
905 16th Street, N.W., Washington, D.C. 20006  
The Professional Fire Fighter

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-75 Policemen and Firemen, 10c

Other Sources

Fire Chiefs Ass'n of Texas  
Box 220, McAllen, Texas 78502

National Fire Protection Ass'n  
60 Batterymarch Street, Boston, Mass. 02110

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

SOCIAL AND WELFARE WORK

Social work may be divided into case work, group work, and community organizational work. Social workers are employed by community, governmental or privately funded agencies to evaluate and alleviate social problems caused by poverty, illness, trouble with family relationships, or behavioral problems. The specific problems dealt with depend upon the nature of the agency for which these persons work.

These workers must be able to perform their duties easily with all kinds of people and be genuinely interested in them and their problems. A well-balanced and mature emotional outlook is essential, in view of the fact that a social worker may deal with people who are upset and have difficult problems.

High school students hoping to enter the social welfare field should take college preparatory courses. In college they may major in sociology or psychology. Other possible majors are human growth and development, English, criminology, education, economics, political science, biology or other natural sciences.

There are a few positions open to those with only a four-year degree in sociology. However, to hold more responsible and financially rewarding positions, a master's degree in sociology is necessary. A doctorate is essential in order to teach at the college level. Upon graduation, the college placement office can advise prospective social workers of job openings in the fields related to their specific degrees.

Social workers may work in an office or in the field. There is time spent both in interviewing clients and in writing reports. A car is a necessity, as these persons may be required to visit schools, recreation centers, hospitals, courts, jails, and slum areas. The workweek is usually forty hours in length.

Social workers who are well qualified academically and have experience may advance to become the head of an agency. These workers may be on call for emergencies and must often deal with discouraging situations; therefore they must have a great amount of devotion to the job in order to perform effectively. Problems may have no solutions and such workers may only be able to advise on how persons can adjust to them. The obvious reward in social work is that of helping others.

Public Service Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
SOCIAL AND WELFARE WORK

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 43 Social Work as a Career  
No. 190 Psychiatric Social Work as a Career

New York Life Insurance Co.  
Career Information Service  
Box 51, Madison Square Station, New York, N.Y. 10010  
Should You Be a Social Worker?

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-92 Social Workers, 5¢

Books

Marshall, Max L., Cowles Guide to Careers and Professions  
Cowles Education Corp.  
Look Bldg, 488 Madison Ave., New York, N.Y. 10022

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Social Work Careers

Other Sources

National Ass'n of Social Workers  
2 Park Ave, New York, N.Y. 10016

State Welfare Agency  
Austin, Texas

U.S. Dept. of Health, Education and Welfare  
Office of Welfare, Washington, D.C. 20202

MILITARY

The Armed Forces offer both single professions or trades and a great variety of jobs in a distinctive way of life. There are five branches of the Armed Forces: the Army, Navy, Air Force, Marine Corps, and Coast Guard. All are similar but sufficiently different to make available five different careers for men and women who choose the military.

The Navy, more than the other services, has a special way of life. The sea dictates a shipboard life which can be strange, irksome and wonderful all at the same time. The Air Force is a newer, more relaxed service where almost everyone is a skilled worker or professional. The Army is a more cumbersome organization, which is both solid and successful. Persons in the Army are the nation's basic fighters, and believe that they can do without some of the frills of other services. The Marine Corps is made up of specialists in quick, tough war. It is a small, close-knit organization which has more spirit than the other services. Physical action rates higher in the Marines than anywhere else. The Coast Guard appeals to men who like a naval life but have no urge to travel abroad. It is a small organization with high standards.

The broad differences between the requirements for enlisted men and officers is in academic education. There is no rigid rule, but usually officers have college degrees and enlisted men do not. A high school diploma is desired but not required for entrance, and advancements are few for those persons who have less schooling.

The minimum age for men in all branches is 17. Army enlistments are for three to six years. Special examinations are given to qualify persons for military specialists in the Army. Navy enlistments are for four to six years. High school graduates may choose from five special fields. Air Force volunteers enlist for four years. Those with enough education may choose training in electronics, mechanical, administrative and general fields. Marines may enlist for two to four years. They are basically fighting men, but may train in a variety of fields. Coast Guard recruits enlist for four years. The leading graduates of the basic training program can choose assignments in a particular Coast Guard district.

Women interested in enlisted or officers jobs must be 18 and unmarried. Minimum enlistment terms are three years for all services except the Navy, which requires four years. Women can usually choose their particular job or training.

There are many routes to an officer's commission. The best, for the nation's top high school graduates, is through the service academies which include the Military Academy, West Point, New York; Naval Academy, Annapolis, Maryland; Air Force Academy, Colorado Springs, Colorado; Coast Guard Academy, New London, Connecticut; and Marine Corps Officer Candidate schools. Grad-

## Public Service Occupations

uates receive an officer's commission and a bachelor of science degree. To qualify for admittance to an Academy, persons must have a high school diploma and pass physical and mental examinations. Nominations are made by Congressmen and by the President of the United States. Qualifications may also be met under special laws for the sons of deceased veterans, officers, and enlisted men. The appointments are highly competitive. Cadets are paid while in an Academy.

Another route for officers' commissions is through Reserve Officer Training Corps. These units are located at over 300 colleges and universities. Students take regular courses plus three to five hours of military science each week, and spend time in summer camp. Students are paid nominal fees while in ROTC training.

The services have twelve separate plans which pay part or all expenses of military people who want to improve their education. They range from spare-time work for a high school diploma to a full four-year course in college, with a major in a subject of the persons choice. This schooling is very valuable if servicemen retire and wish to go into another career. A certain amount of pay for schooling after enlistment is completed also is available.

Servicemen may be stationed anywhere in the United States or abroad. The work is vigorous, both mentally and physically. Discipline is an important factor both as a team and as an individual. If persons are not willing to have strict discipline, they should not consider the military, whose background is discipline. Servicemen are responsible for the safety of their country, and as such, the restrictions are necessary, even if irksome. They live under a special law called "Uniform Code of Military Justice" which defines criminal acts and punishments; if they violate the code, they are tried by courtmartial.

Advancement is by schooling or training, performing a good job, and time in the service. Different promotions require different lengths of service. The pay is low at the onset but rises to a good salary for top officers. The pay scale is becoming higher, with basic pay, food, housing, uniforms, medical care, and additional pay for hazardous duty as benefits. Dependent allowances, transportation pay, re-enlistment bonuses and retirement are available to servicemen. An important benefit is the availability of hospitalization, and surgery where required, in military hospitals, not only for themselves but for their families. This valuable benefit continues after retirement from the service. Military personnel also have benefits of recreational facilities, home loans, schooling for dependents, personal advice, post exchange stores, insurance and service clubs. The services offer travel to all parts of the nation and the world as well. Vacation time ranges to thirty days a year.

SOURCES OF ADDITIONAL INFORMATION ABOUT  
MILITARY

Army Careers  
U.S. Army Recruiting Command  
Hampton, Va. 23369

Chief of Naval Personnel (PERS B61)  
U.S. Dept. of Navy  
Washington, D.C. 20370

Commandant (P.T.P.) U.S. Coast Guard Hdq.  
Washington, D.C. 20236

Commandant, U.S. Marine Corps, Code D.P.  
Washington, D.C. 20380

Headquarters, U.S. Air Force Recruiting Service  
Attn: Director of Advertising and Publicity  
Wright-Patterson Air Force Base, Ohio

Your local recruiting office: Army, Air Force, Coast Guard, Marine,  
Navy

## Public Service Occupations

### OTHER PUBLIC SERVICE OCCUPATIONS

Career fields in public service occupations, in addition to those already discussed, include the following:

Urban Planners develop comprehensive plans for the growth and overall revitalization of urban areas. They attempt to remedy urban problems such as deteriorating areas, traffic congestion, inadequate parks, and space for industrial development.

Civil Defense Officers coordinate the civil defense public information programs to prepare for effective action to limit damage, and to speed the recovery in event of a natural disaster or enemy attack.

Pumping Station Foremen supervise workers who operate equipment such as pumps, turbines, valves and electric motors in public water systems.

Water Treatment Plant Operators (See Pollution Control).

Sanitary Service Operators (See Pollution Control).

Electric Service Turbine Operators control steam or water powered turbines which drive the generators to produce electricity.

Electric Load Dispatchers control the flow of electricity throughout the area served by the utility company.

Electric Linemen construct and maintain all power lines which carry electricity from the power plant to consumers. They install, make equipment repairs, and do routine maintenance work.

Metermen install, test, maintain and repair meters on customers' premises for all utilities.

Postmasters supervise and coordinate the activities of workers in postal and related work in a post office. They resolve customer complaints and inform the public of postal laws and regulations. They submit detailed reports to supervisors.

Superintendents of Mails have general charge, under the Postmaster, of all mail handling operations. They supervise all mail services of the post office, including distribution and dispatch of outgoing mail, and distribution and delivery of incoming mail.

Mailhandlers are found in larger post offices only. They do not sort mail, but physically handle the mail, transferring it, loading and unloading to and from postal trucks.

Postal Clerical Workers sell stamps, savings certificates, money orders, and register and insure mail. They may also weigh packages, sort and examine mail.

## Public Service Occupations

Carriers sort mail for delivery and deliver mail on established routes. They may collect delivery charges and obtain signatures on receipts for delivery of certain types of mail.

Ambassadors are personal representatives of the President and are appointed by him. They speak and act on behalf of their country, government and policies. They are the highest ranking Americans in any foreign country.

Ministers rank below Ambassadors, and are sent to foreign countries to represent the U.S. government to act in the same capacity as Ambassadors.

Consuls are officers who are sent to a foreign country to look after business interests of their own country, and to protect and help fellow citizens traveling or living in that foreign country. They also issue visas to foreigners to come to the United States as immigrants, students, tourists or businessmen. They also renew passports of Americans abroad.

Chargé D'Affaires are officers who are temporarily in charge of a diplomatic post in the absence of the chief of the mission.

Attachés are consulate officers who perform a highly specialized function. Their jobs may be associated with agriculture, minerals, culture, the military, or education.

Peace Corpsmen are persons who are sent by the U.S. government on the request of a foreign country to help, instruct, advise or aid its people in matters pertaining to health, agriculture or construction. Term of service is two years.

Public Service Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
OTHER PUBLIC SERVICE OCCUPATIONS

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 18 Careers in U.S. Foreign Service  
No. 58 Government Career Employment  
No. 157 Careers in the U.S. Postal Service

U.S. Civil Service Commission  
Washington, D.C. 20415  
Futures in the Federal Government

U.S. Dept. of State  
Division of Employment, Washington, D.C. 20520  
A Career in the Foreign Service of the United States

U.S. Government Printing Office  
Washington, D.C. 20402  
No. 1300-45 Government Occupations, 15c

Books

Arnold, Walter, Career Opportunities, Community Service and Related  
Specialists  
J.G. Ferguson Publishing Co., Chicago, Ill.

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Your Career in Civil Service  
Your Career in Foreign Service

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Civil Service

Other Sources

American Institute of Planners  
917 15th Street, N.W., Washington, D.C. 20005

Federal Job Information Center  
1114 Commerce Street, Dallas, Texas 75202

Local Post Office, any city

# TRANSPORTATION



## Transportation Occupations

### GENERAL INFORMATION

Tremendous growth potential is the keynote in the transportation industry. Persons interested in the general field of transportation can look to the airlines, the railroads, the shipping and automotive industries for varied and challenging careers.

In the jet age of aircraft, thousands of people use air travel for business and pleasure trips each day. It is commonplace for business executives to fly half way across the nation on an early morning flight, conduct their business, and return to their homes in early evening. As the airline industry has continued to grow, an array of interesting and challenging careers have developed in addition to the "glamour" jobs of pilots and stewardesses. The trend in the airline industry is toward specialization, a factor which has created new positions and heavier personnel demands each year.

Discussions about the nation's railroads have focused on their problems in recent years. However, significant changes are occurring in the transportation field. Computers and other new tools are being employed to streamline railroad operations and new utilizations of railroads are being developed. Transportation experts now speak of railroads of the future as one part of the transportation complex which will connect with shipping, trucking and air freight for long distance and local movement of freight and passengers.

All transportation vehicles--from jet aircraft to family cars--require proper maintenance. The demand for fully trained mechanics continues to increase each year. Areas of specialization are developing, all of which demand training above the high school level.

Careers in transportation require many skills from different people. Some careers involve extensive traveling while others are confined to the same office or shop every day. Some careers require great manual dexterity while others rely less on dexterity than cool, calculating minds. Opportunities abound in most geographic locations in the United States and many jobs either offer overseas travel or can be performed in many foreign countries.

Labor unions and professional associations represent many transportation career areas. Wages generally are good to above average and fringe benefits are generous. Since transportation needs are never-ceasing, most careers involve some form of shift work and work on week-ends and holidays.

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### FLIGHT CREW

Airline flight crews are responsible for the safety, comfort and convenience of thousands of passengers who travel on commercial airlines each day. Flight crews are made up of pilots, co-pilots, stewardesses, and stewards. Their work is performed mainly while the plane is in flight. These careers are demanding but offer unusual rewards. Competition is keen for entry level jobs and top performance is required for advancement.

Pilots, or captains as they are known by the airlines, operate and control and perform other duties necessary for flying a plane. They must keep the aircraft on course and land it safely.

A great deal of planning must go on by pilots and co-pilots before their plane takes off. They must confer with the airline meteorologist about weather conditions, and, in cooperation with the airline dispatcher, prepare a flight plan. This flight plan must follow routes and altitudes which offer the best weather and wind conditions for a safe and smooth flight. The flight plan must be approved by air traffic control personnel of the Federal Aviation Administration (FAA).

Pilots are also responsible for checking engine operation, function of instruments, controls, and electronic and mechanical systems. During flights, the pilots are constantly conferring with ground control stations via radio about altitude, air speed and weather.

Airlines employ a few pilots to fly planes leased to private corporations. Aircraft pilots are also hired by the airlines as instructors to train both beginning and experienced pilots in the use of new equipment. Some pilots are assigned by airlines as "check pilots" to make at least two flights a year with each captain to observe proficiency and adherence to FAA flight regulations and company policies.

Pilots employed in general aviation usually fly planes much smaller than those used by the airlines. Although preflight and flight duties are similar to those of airline pilots, these pilots are seldom assisted by crew members. Trained pilots can advance to charter pilots or corporate pilots. Only the most qualified can expect to become pilots for major airlines.

Flight training should include the private, commercial, instrument, and certified flight instructor certificates. Graduation from flying schools approved by the FAA satisfies the flight experience requirements for licensing. Course work will include a study of navigation, aircraft performance and maintenance, aerodynamics and meteorology.

Although flying does not involve much physical effort, pilots are subjected to stress because of their great responsibilities. Pilots for major airlines should be prepared to stay away from home for

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extended periods of time. Local airlines offer shorter distance flying, which affords pilots more time at home, plus daily flights. These pilots, however, have the added strain of many more takeoffs and landings each day.

Aircraft pilots are among the highest paid employees in the country. Flying positions are available anywhere in the world, and pilots can expect to go where the jobs are. Experienced airline pilots can expect much time off, as well as a choice of flights. The public image of a pilot is one of prestige and respect because of the responsibilities associated with the position.

Stewards and stewardesses employed by the airlines render a variety of personal services to passengers in order to make public traveling as comfortable and enjoyable as possible. They are present on all passenger flights of commercial airlines for both national and international travel.

These flight attendants perform many pre-flight and flight services. Prior to takeoff, they must attend briefing sessions of the flight crew, carefully check flight supplies, emergency life jackets, oxygen masks and other passenger safety equipment. They must see that the passenger cabins are neat and in readiness for the upcoming flight. Stewardesses welcome passengers and check tickets as they board the flight and direct them to seats, and store carry-on luggage and parcels. Before take-off, stewardesses welcome passengers, then make explanations concerning certain aspects of the flight. During flight, stewardesses check seat belts, distribute reading materials, and comfort those who may be nervous. On some flights, meals are served by the stewardesses. Light refreshments are prepared and served on shorter flights.

Because stewardesses play a major role in airline public relations, they must be attractive, intelligent, courteous, poised, have a pleasant speaking voice, and be able to work in a team effort. Tactfulness with the public is also important to their work. Requirements include excellent physical health with no visual or hearing impairments. They are usually required to be between 5 feet 2 inches and 5 feet 9 inches in height and weigh in proportion with their height, not exceeding 140 pounds. They must also have the ability to think clearly and logically, especially in emergency situations.

Stewardesses must have a high school education. Often those applicants who have additional training in post-secondary schooling or nurses' training are given preference in employment. Business training and experience are also considered assets. Stewardesses employed by international airlines may be required to speak foreign languages.

Most airlines maintain their own training schools for stewards and stewardesses. These schools last from four to six weeks. Course work at training schools includes study of company operations and schedules, first aid, grooming, emergency operations, and flight regulations and

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duties. Related instruction in public relations, baby care and air-flight terminology is also included. Trainees are allowed flight experience on practice flights. Following completion of the training, new stewardesses are closely watched during a "probation period" so that the airline can be certain they perform in the correct manner.

Airline stewardesses are usually assigned to a home base in a large metropolitan area. Some airlines assign them on a rotation system to home bases, or they may give preference to requests of stewardesses with rank and seniority on bids for certain home bases.

Stewardesses must be able to accept a flexible work schedule since commercial airlines maintain operations 24 hours a day. They may be scheduled to work nights, weekends, and holidays. They may find some of their allotted time off occurs away from home base, between flight assignments. Stewardesses usually have about 15 days off each month.

There are numerous opportunities open to stewardesses and stewards for advancement. They may advance from stewardess, or flight purser, to supervisory positions over other persons. They may then become instructors in training schools or recruitment representatives. They may also have the opportunity to move up to chief stewardess of a particular division.

Many who no longer qualify for flight duty move into other airline jobs such as ticket agent, clerk, secretary, or stenographer. They may also work in public relations, air transportation, dispatch or communications. Trained stewardesses often take jobs with luxury cruise ship lines.

The pay scale ranges from fair to good, depending upon the particular airline. Those with more experience receive better pay. Salaries are also dependent upon number of flight hours, type of flights (domestic or foreign), and seniority. Usually all bills incurred on the job, such as hotel and meal expenses, are paid by the airline. With all fringe benefits, including reduced air rates and special vacation time, pay goes a long way.

Transportation Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
FLIGHT CREW

Pamphlets

General Aviation Manufacturers Ass'n  
Suite 1215, 1025 Connecticut Ave. N.W., Washington, D.C. 20036  
Aviation Career Guides

The Institute For Research  
610 South Federal Street, Chicago, Ill. 60605  
No. 39 Aviation Careers  
No. 137 Careers for Women with Air Lines

National Aerospace Education Council  
Suite 616, Shoreham Bldg., 806 15th Street N.W., Washington, D.C. 20005  
Careers in Aviation

U.S. Government Printing Office  
Washington, D.C.  
No. 1300-5 Air Transportation Occupations, 15¢

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Skyblazers: Your Career in Aviation

Scribner, Kimball, Your Future As a Pilot  
Arco Publishing Co., 219 Park Ave. S., New York, N.Y. 10003

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Airline Careers

Other Sources

Air Line Employees Ass'n  
5600 South Central Ave., Chicago, Ill. 60638

Air Line Pilots Ass'n, International  
1329 E. Street N.W., Washington, D.C. 20004

Air Line Stewards and Stewardesses Ass'n Division  
Air Line Pilots Ass'n, International  
1329 E. Street N.W., Washington, D.C. 20004

Braniff International, Dallas, Texas

Federal Aviation Administration, Personnel Offices  
Box 1689, Fort Worth, Texas 76101

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### GROUND CREW

Many people work in many areas to support the work of airlines flight crews, and their work is essential to the safety and comfort of the traveling public. Members of ground crews include aviation mechanics, air traffic controllers, dispatchers, radio operators, and ticket or reservation agents.

Federally licensed persons who maintain aircraft are known as aviation mechanics. They may work on small or large aircraft, fixed or rotary wing craft, and both reciprocating and jet powerplant aircraft. Work includes woodworking, fabrication, electrical systems, painting and sheetmetal, hydraulics, pneumatics, rigging, fuel systems, and engine systems.

Jobs within the aviation mechanics industry fall into four areas: overhaul shops, airlines, general aviation, and manufacturing. In each area, trained persons are qualified to perform repairs on specific parts of the aircraft or the entire airplane.

Aviation mechanics must have good manual dexterity. They should be able to be exacting in work performance and above all, must be able to accept a high degree of responsibility.

There are two basic ways to train for a career in aviation mechanics. The first is through actual work experience--18 months for a single license such as powerplant, and additional time for airframe--or a total of 30 months' experience for both. Work experience must be documented and cover all phases of aviation maintenance.

The second method of entry into the field is attendance at FAA approved schools. Course length varies from 14 months to two years and includes advanced course work in mathematics, general sciences, and shop work, such as machine shop, welding and electricity.

Good jobs may be found in the United States and most foreign countries. Working conditions are usually good and the maintenance of aircraft is a relatively clean field. Work may be either inside or out-of-doors.

Opportunities for aviation mechanics are directly related to the individual. A person who is quick and eager to learn and who performs well may expect to find a rewarding future in this industry. Pay scales are generally high; however, salaries vary by geographic areas. In many locations, the pay scale for an aviation mechanic includes a fixed increase over a period of time up to a certain maximum salary.

Air traffic control personnel consist of the air traffic coordinator, air traffic control station specialist and air traffic control tower specialist. These persons work to maintain safe air travel

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conditions for both commercial and private aircraft. They strive to minimize delays and avoid air collisions as planes fly near or into airports. All are employees of the Federal Aviation Agency (FAA).

Such persons may be employed in control towers where they issue orders for take-offs and landings, altitudes, and other patterns of flight, or they may work in air traffic control centers which coordinate via radar and electronic equipment the movement of aircraft out of range of control towers.

Because persons working in air traffic control must be responsible for a number of aircraft at the same time, it is necessary that they have sharp memories and concern for details. They must be able to perform their job in a calm manner under difficult and stressful situations. The ability to make good, sound decisions quickly is extremely important. Emotional stability is a necessary quality.

Air traffic control operators are required to have a degree from a recognized college or university, or have three years of experience in professional, investigative or technical areas. They must pass a written test administered by the FAA. After nine weeks' training at FAA-approved schools, qualified graduates receive a certificate enabling them to enter the field. Then they receive an additional six months training under actual working conditions.

Working facilities in air traffic control are clean, modern and well-lighted. Traffic control operators usually work forty hours each week, with some overtime. Since air traffic control stations and towers are constantly manned, personnel are expected to work on some nights and weekends. Jobs in air traffic control can be found in any part of the country.

Advancement is through pay raises, and employees are rated according to Civil Service listings. Traffic controllers may also advance to the position of chief controller or receive a promotion to a more complex area.

The pay for air traffic control employees is very good. In recent years, competition for the job has grown much stiffer with many more applicants than available jobs.

There is a feeling of accomplishment associated with these jobs because of their importance and degree of responsibility which contribute to safer air transportation.

Transportation Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
GROUND CREW

Pamphlets

General Aviation Manufacturers Ass'n  
Suit 1215, 1020 Connecticut Ave. N.W., Washington, D.C. 20036  
Aviation Career Guides

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605

No. 39 Aviation Careers  
No. 77 Ground Careers in Aviation  
No. 122 Aviation Mechanic  
No. 139 Careers for Women with Air Lines  
No. 278 Jet Engine Technician and Mechanic

National Aerospace Education Council  
Suite 616 Shoreham Bldg. 806 15th Street N.W., Washington, D.C. 20005  
Careers in Aviation

U.S. Government Printing Office  
Washington, D.C.  
No. 1300-5 Air Transportation Occupations, 15c

Books

Messner Career Books  
Julian Messner Co. 1 West 39th Street, New York, N.Y. 10018  
Skyblazers: Your Career in Aviation

Universal Publishing and Distributing Co.  
235 E. 45th Street, New York, N.Y. 10017  
Vocational Guidance Manual, Airline Careers

Other Sources

Air Line Employees Ass'n  
5600 South Central Ave., Chicago, Ill. 60638

Braniff International  
Dallas, Texas

Federal Aviation Administration, Personnel Officer  
Box 1689, Ft. Worth, Texas 76101

RAILWAY OPERATIONS

Railroad occupations include persons who operate trains, perform communications, station and office work; who build and maintain locomotives, cars and other equipment; who build and maintain tracks and railway structures; who handle luggage, prepare and serve food, and provide numerous other personal services for passengers.

Locomotive engineers are responsible for running trains safely and efficiently and for the supervision of firemen. Yard engineers operate switch-engines to assemble passenger or freight trains.

Engineers must have good eyesight and hearing. They must be in good physical condition, and alert for emergencies. Engineers are usually firemen who have been promoted. No special education is required for this, but years of on-the-job training is necessary to enter the occupation. Engineers may advance to supervisory positions, but most advancement is by way of pay increases.

Pay for locomotive engineers is very good. Hours on the job and days of work vary. For the person who will enjoy sitting and operating the throttle of a diesel locomotive for long periods of time, the job of locomotive engineer is satisfying and rewarding. Benefits include vacation time, insurance, and excellent retirement programs. Many railroad employees strive for this position, but it can be frustrating to wait for enough seniority and experience to qualify.

The term fireman is no longer descriptive of this job because diesel locomotives are now used by railroads. Firemen help engineers in making minor adjustments, manipulating levers and valves, and observing signals along the track. Firemen must be completely familiar with engineers' work in order to be of assistance at all times. A high school diploma is not required for a fireman but is desirable. On-the-job training is necessary and may require many years.

Conductors receive train orders from the dispatcher, supervise all persons employed in the train, check the cars, and are generally responsible for the safety and comfort of passengers. They keep a record of contents and destination of all box cars on freight trains. They collect tickets or cash fares on passenger trains.

Conductors' jobs are also filled on a seniority basis. Conductors must have years of railroad experience and pass tests on signals, braking, and rules to be observed by the railroad. Since passenger train conductors have direct contact with the passengers, they should have pleasing personalities and dignified manners.

Railway brakemen work with conductors to see that proper flags, warning lights and other signals are displayed. They check air brake equipment, make frequent visual inspections while on a run, throw switches, couple and uncouple cars. Brakemen often advance to the

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position of conductors when they have gained seniority. Pay is lower for brakemen, but other conditions are similar to those for engineers, firemen, and conductors.

Baggagemen assist brakemen in their duties. They also have charge of all baggage and freight, and must see to it that each is in the proper car. Baggagemen can advance to conductors with enough experience.

Dispatchers and telegraphers control the movement of trains and pass train orders on to their crews. They must know Morse code and railroad operating procedures and rules. They must be able to pass the same practical tests as the conductor. These persons must be dependable, trustworthy and be mentally alert in their work. A high school diploma is advantageous for the jobs of dispatchers and telegraphers. A training period is required and trainees must pass examinations administered by the railroad before being eligible for jobs. They may advance to the position of station agent, but most advancement is in pay raises.

The work of the dispatchers and telegraphers is on a 40 hour week basis, with some shift work. These are not strenuous jobs and this work is usually indoors. Pay is good and fringe benefits of vacation time, insurance and retirement apply to these positions.

Station agents are official representatives of the railroad who serve the public in the passenger and freight stations. They sell tickets, check in baggage, calculate express and freight charges. In a large station agents may work in a supervisory capacity. As in most railroad jobs, station agents are selected by seniority rankings. They may advance from smaller to larger stations as well.

Signal workers construct, install and repair signaling systems which control movement of the train. Knowledge of electricity and mechanical skill are assets to those seeking this job. As in other railway occupations, a high school diploma is advantageous. On-the-job training is required. Pay for signal workers ranges from fair to good.

Persons who perform repair and maintenance tasks necessary to keeping the freight or passenger cars in good condition are known as carmen. This group consists of electrical workers, machinists, boilermakers, blacksmiths and sheet metal workers.

Trackmen, bridge builders and building mechanics are employed by railroads to construct, maintain and repair tracks and roadbed. Their work also includes building and maintenance of tunnels and other structures along the right of way. Work benefits for this group are generally the same as for other railway employees; however, the training period is shorter and the pay is lower.

Various unions represent the many different job positions associated with railroads.

SOURCES OF ADDITIONAL INFORMATION ABOUT  
RAILWAY OPERATIONS

Pamphlets

The Institute For Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 192 Engineers, Conductors, Trainmen  
No. 238 Careers in Railroading

U.S. Government Printing Office  
Washington, D.C.  
No. 1300-84 Railroad Occupations, 20c

Books

Richards Rosen Press, Inc.  
New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Railroad, Transportation Occupations

Other Sources

Association of American Railroads  
American Railroad Bldg. 1920 L Street N.W., Washington, D.C. 20036

Texas Railroad Ass'n  
Box 1767, Austin, Texas 78767

## Transportation Occupations

### BUS LINE OPERATIONS

Busing operations employ numerous persons who carry out the responsibilities associated with this particular transportation field. General positions include maintenance, dispatching, reservations, advertising and clerical work. About half of the employees are bus drivers.

Those drivers who travel between cities are known as intercity bus drivers. Those drivers who make frequent stops on a certain route or schedule are called local transit drivers. Both types of drivers are responsible for transporting passengers from one place to another according to definite time schedules and specific routes.

Intercity bus drivers are selected on the basis of skill behind the wheel, driving record, emotional stability and courtesy. These drivers' jobs begin when they report to the bus terminal for assignment. They carefully check the bus, making certain it is carrying all required safety equipment. Drivers then pick up tickets and make a list of package express and mail to be delivered. During trips, drivers collect fares, announce destinations, routes, and times of arrival. They may also supervise loading baggage and mail. Upon arriving at the final destination, intercity drivers supervise unloading and prepare reports on mileage, time, fares, and a time log.

Intercity drivers must be in good physical condition with good hearing and eyesight, with or without corrective lenses. They should have an even temperament and steady nerves. A high school diploma is desired by many companies. Applicants must be able to pass physical and written tests which check coordination, reflexes, and temperament. A training program must also be completed, as well as another written examination on company rules and safety regulations. Drivers are placed on a trial period for three months.

Advancement for drivers usually means pay increases or better assignments. Some may be promoted to the position of dispatcher, supervisor, and in some cases terminal manager.

Drivers perform their jobs without direct supervision and on personal initiative. They have the opportunity to travel, seeing new places and new things, and to meet the public. The job includes week-end and holiday work. Intercity drivers are away from home much of the time, and often must report to work on short notice. The pay is good, however, and insurance and retirement plans add to benefits.

Local transit bus drivers perform jobs similar to that of intercity drivers. They too collect fares or transfers, and issue other transfers. They must answer the questions of passengers and enforce safety rules of the company and city. At the end of the work day, local drivers must make a complete report of fares, trips and any accidents.

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Local bus drivers work in one city about 40 hours each week, many times on rotating schedules.

Advancement in this job is in terms of pay raises. The pay is fair, and varies according to locality and overtime. These drivers also have a great deal of independence in performing a job without direct supervision. Local drivers have benefits which include vacation time, insurance and retirement.

Some intercity and local transit drivers are represented by unions.

Transportation Occupations

SOURCE OF ADDITIONAL INFORMATION ABOUT  
BUS LINE OPERATIONS

Books

Messner Career Books

Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018

Your Career in Transportation

Other Sources

American Transit Ass'n

815 Conn. Ave. N.W., Washington, D.C. 20006

Bus Transportation Company, your city

Greyhound Bus Lines

140 South Dearborn St., Chicago, Ill. 60603

The National Trailways Bus System

1200 I. Street N.W. Washington, D.C. 20005

Texas Motor Transportation Ass'n

Box 1669, Austin, Texas 78767

TRUCK OPERATIONS

Trucking companies provide employment for people with specialized training and experience ranging from truck drivers and mechanics to computer operators and claims specialists. Other jobs include clerks, typists, secretaries, dispatchers and loaders.

Local truck drivers may operate dump trucks, oil or freight trucks, etc. They must be skilled drivers who can maneuver through crowded streets, park in tight places, negotiate narrow alleys, and back up to loading platforms. Over-the-road drivers operate gasoline or diesel powered tractor-trailers. They frequently drive at night, and spend long hours on the highway.

Truck drivers should have good physical health, good eyesight and good depth perception. They must have some mechanical ability. They must be able to stay alert under monotonous conditions while driving. Night driving may be especially fatiguing and drivers should expect to be away from home for days at a time. Drivers must be able to tolerate noise and vibrations. Specific age requirements for truck drivers vary from state to state. They must have good vision with or without corrective lenses, good driving records and extensive driving experience. Truck drivers must have a commercial drivers' license. They must pass extensive tests given by each trucking company. A high school diploma or its equivalent is desired.

Truck drivers may find employment anywhere in the country. They work day and night driving under all weather conditions. Local drivers usually work 40 hours each week, while over-the-road drivers often work 50 to 60 hours a week, usually only 10 hours at a time.

Usual advancement in truck driving is through pay raises; however, some may move into positions of dispatchers or supervisors. Some drivers also go into business for themselves.

Pay for drivers is good to very good, varying in the particular area in which they are employed.

Many truck drivers are represented by unions.

Transportation Occupations

SOURCES OF ADDITIONAL INFORMATION ABOUT  
TRUCK OPERATIONS

Pamphlets

American Trucking Association  
1616 P Street, N.W., Washington, D.C. 20036  
Trucking Industry Careers

The Institute for Research  
610 South Federal Street, 7th Floor, Chicago, Ill. 60605  
No. 256 Careers in Truck Transportation

Books

Messner Career Books  
Julian Messner Co., 1 West 39th Street, New York, N.Y. 10018  
Your Career in Transportation

Richards Rosen Press  
New York, N.Y. 10010  
Aim High Vocational Guidance Series  
Trucking Industry  
Railroad, Transportation Occupations

Other Sources

Texas Motor Transportation Ass'n  
Box 1669, Austin, Texas 78767

TRANSPORTATION MAINTENANCE AND REPAIR

The success of the various forms of transportation depends upon the operating condition of the various types of vehicles. As motorized transportation continues to expand, the need for trained automotive and truck mechanics is increasing rapidly. Skilled body repairmen are in great demand throughout the nation. However, this growing need is for skilled persons. No longer will "shade tree" skills guarantee employment. Prospective employers in all phases of transportation maintenance are searching for properly trained persons who have participated in formal training past the high school level. There is every indication that this trend will continue.

The automobile service industry is one of the largest and fastest growing employment fields today. Labor surveys show a projected net increase in this industry of 24 per cent by 1980. This, combined with the fact that the national average age of an auto mechanic is 56, points to the fact that there is, and will be in the future, a shortage of trained persons in automotive mechanics.

Automobile mechanics perform preventive maintenance, diagnose breakdowns, and make repairs to keep automobiles in good operating condition. Most automobile mechanics perform a variety of repairs while others specialize in such areas as automatic transmissions, tune-up, brakes and front-end alignment. Other specialists include automobile radiator mechanics and automobile glass mechanics.

The ability to make an accurate diagnosis in a minimum of time is one of the mechanic's most valuable skills. It requires analytical ability as well as a thorough knowledge of a car's operations. Many skilled mechanics consider diagnosing as one of their most challenging yet satisfying duties.

Training in basic mechanics is a necessity for persons who wish to enter this field today. Due to the high cost of operating a business many firms cannot afford to train mechanics in the basic fundamentals of the trade. Most training at the post-secondary level is on a two-year basis. Auto mechanics students should have a good high school background in mathematics and science. Many young persons begin in automobile mechanics as helpers, lubrication men and service station attendants. Although this type of training will serve to introduce a beginner to the field, formal training is a requirement for those who wish to become skilled mechanics. Training programs include both on-the-job training and related classroom studies in nearly all phases of automobile repair work.

Jobs can be found in shops which range from several hundred mechanics to independent operations employing one or two mechanics. Most auto mechanics shops today are organized into specialty areas enabling mechanics to increase their speed and earnings due to repetition of the work.

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Automotive repair work requires that mechanics work on dirty mechanisms but the success of most jobs is the degree of cleanliness and care they put into the repairs. Physical labor together with a basic understanding and application of theory are necessary to be a top performer in the repair field. Employers regard the ability to get along well with others, trustworthiness and pride in workmanship as important to the success of auto mechanics as their mechanical abilities.

Opportunities were never greater for advancement in the field, nor the pay higher. The locale and economic climate largely dictate particular pay scales for automotive mechanics. Many jobs pay on a commission percentage of the total labor performed by the mechanic. Other companies pay by the hour or straight salaries. Benefits are usually good for automotive mechanics.

Heavy truck mechanics maintain and repair all portions of heavy trucks used for mining, construction, and intercity travel plus small trucks used in hauling operations. Mechanics employed by organizations which maintain their own fleet of vehicles may spend much time doing preventive maintenance to assure safe vehicle operation, prevent wear and damage to parts, and reduce costly breakdowns.

Heavy truck mechanics perform repairs on both gasoline and diesel engines. Some mechanics specialize in major engine or transmission repair, while others specialize in diesel engines. Mechanics who have worked on gasoline engines need special training to qualify as diesel mechanics.

Common handtools used by heavy truck mechanics range from screwdrivers and pliers to power and machine tools. When performing heavy work such as engine removal, two mechanics may work together. Skilled mechanics are often assisted by apprentices or helpers. All mechanics generally work under the supervision of shop foremen or service managers.

Young people considering careers as heavy truck mechanics should have strength and manual dexterity to handle tools and equipment. Good vision and patience are also important as much of the work of mechanics is tedious. A helpful prerequisite to the study of heavy truck mechanics is one to two years experience in general automotive mechanics. Training in this field can be obtained from technical and trade schools or special courses of study offered by industry. The training will vary from one to four years in length.

Heavy truck mechanics may work either in or out-of-doors. Out-door mechanics, called field men, do most of their repair work from the field truck. For mechanics who work inside a facility, the working conditions are relatively good. Work areas are generally well-lighted, heated and ventilated. Heavy truck mechanics may work the day shift, or they can pick night work. Because many trucking operations provide service around the clock, mechanics may also work on weekends, for

which they receive a higher pay.

Heavy truck mechanics jobs are greasy because they handle so many dirty, greasy parts. They are subjected to cuts and bruises, and may stand or lie in awkward or cramped positions for extended periods of time when repairing vehicles.

Opportunities for employment as heavy truck mechanics are very good. Mechanics are in demand across the United States and in many foreign countries. As mechanics become experienced, they may advance to shop foremen or service managers. Truck mechanics who have sales ability sometimes become truck salesmen. Some mechanics open their own independent repair shops.

A large number of employers who hire heavy truck mechanics provide holiday and vacation pay; many pay for employee health and life insurance programs. Some employers furnish laundered uniforms.

Auto body repairmen are skilled craftsmen who repair damaged vehicles by repairing or replacing fenders or body panels, straightening bent frames, and welding badly damaged parts. Most of these persons work on cars and small trucks. Auto body repairmen who have had special training may work on large trucks, buses and truck trailers.

Major tasks in this occupation are body alignment, panel replacement, frame alignment, metal finishing, glass replacement, and appearance finishing. Auto body repair usually involves the removal of body hardware, windows and trim before the actual repairs are begun. Repairmen use as standard tools in their work the pneumatic hammer, dolly, jacks, files, grinders and welding equipment. For reshaping purposes, they will use a hydraulic jack for pushing out large dents. Automobiles must be sanded in preparation for painting. It is also up to repairmen to mask and prime the car's surface before it is painted and restored to its original condition.

Successful auto body repairmen should be in good physical condition. They must have above average eye-to-hand coordination, as well as patience and general mechanical aptitude.

Many young people enter auto body repair work through on-the-job training. In this case, they begin as helpers or assistants to craftsmen and gradually pick up the skills of the trade. The completion of formal post high school training is recommended by most authorities. Such programs include both first hand experience and related classroom instruction. Trade and technical schools offer programs as short as one year in duration.

Auto body repairmen can expect to work indoors under the supervision of a supervisor who does job estimating and parts ordering. The quality of facilities has greatly improved in recent years. Jobs are available

## Transportation Occupations

in automobile body shops, service departments of automobile dealers and with organizations maintaining their own fleets of motor vehicles. A small number of repairmen are employed by motor vehicle manufacturers.

Accomplished auto body repairmen with supervisory ability may advance to shop foremen. As trainees gain experience, they may be assisted by helpers.

Persons considering auto body repair as an occupation can expect variety, challenge, and steady employment with good pay scales. Most employers now have profit sharing and retirement programs, in addition to insurance. The growth of the auto body industry virtually guarantees total employment for all skilled well-trained body repairmen in the future.

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Pamphlets

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1616 P Street N.W., Washington, D.C. 20036

Automotive Service Industry Ass'n  
230 N. Michigan Ave., Chicago, Ill. 60601

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

Independent Garagemen's Ass'n  
Box 9926, Austin, Texas 78766

National Automobile Dealers Ass'n  
2000 K Street N.W., Washington, D.C. 20006

Texas Automobile Ass'n Inc.  
6220 Gaston, Suite 607, Dallas, Texas 75214

Texas Automobile Dealers Ass'n  
Box 2175, Austin, Texas 78767

## Transportation Occupations

### OTHER TRANSPORTATION OCCUPATIONS

Career fields in the transportation industry, in addition to those already discussed, include the following:

#### Air Transportation:

Air Freight or Cargo Agents accept and weigh freight, compute and collect charges. They also see that freight gets safely aboard the proper plane.

Load Control Agents compute weight of cargo aboard the aircraft and supervise cargo placement so that safe limits are observed.

Traffic Rate Clerks compute charges for different types of freight.

#### Pipeline Transportation:

Coal Pipeline Operators mix coal with water prior to transportation of the solution by pipeline.

Pipeline Coating Inspectors observe the wrapping of the outside of pipelines in order to meet contract specifications.

Line Walkers patrol pipelines on foot, horseback or vehicle to detect possible leaks.

Dispatching Personnel are responsible for scheduling and timing of pipeline use.

Pipeline Crew Members are responsible for laying the pipeline.

Pipeline Maintenance Workers inspect and make repairs to pipelines.

#### Water Transportation:

Ship Captains are in charge of the operation, administration and navigation of ships, barges or tugs. They comply with safety and company regulations, as well as scheduling for safe delivery of cargo and/or passengers.

Ship or Tugboat Mates also known as deck officers, are responsible for the operation of the navigation area or cargo booms.

Deck Engineers operate the powerplant and various pieces of machinery found aboard the ship.

Radio Officers operate the communications equipment including ship-to-ship and ship-to-shore systems aboard the vessel.

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Pilots steer the ship in and out of ports. They usually stay at one port or inland navigable waterway to guide ships in that particular area.

Checkers keep records of amount, kind and conditions of cargo which is loaded or unloaded from the ship.

Wharf Personnel assess the proper charges to ships for the use of pier areas and facilities. They also enforce docking and safety regulations.

### Merchant Marine:

Masters or Captains are in charge of the navigation, discipline and safety of the ship. They are representatives of the ship's owner.

Chief Mates are in charge of cargo planning and deck work.

Second Mates are in charge of mails and the care and maintenance of all navigation equipment and charts.

Third Mates are responsible for lifeboats, firefighting equipment and all signal equipment. The mates usually stand watch.

Radio Officers operate, maintain and repair radio and other electronic equipment and communications devices aboard the ship. They also maintain depth recording instruments as well as electronic navigational aids. They receive and record time signals, weather reports and position reports.

Pursers maintain payroll data, keep ship accounts, and prepare official documents for foreign port authorities. They may be responsible for first-aid treatment and injury reports.

Bosuns are in charge of deck crew, and work to carry out orders for details, direct maintenance and handle lifeboats.

Able-bodied Seamen ready gear for cargo loading or unloading. Work includes rigging of cargo booms. They may also stand watch, act as helmsmen and lifeboatmen.

Chief Engineers are in charge of all propulsion machinery and power generating equipment.

First Assistant Engineers are responsible for maintenance of lubricating systems, electrical equipment and engineroom auxiliaries.

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Second Assistant Engineers are responsible for fuel and water, the ships boilers, pumps and condensers.

Electricians repair and maintain all electrical motors and circuits.

Wipers, Oilers, Water Tenders and Firemen work in the engine room under the supervision of engineers.

Chief Stewards supervise the operation and maintainance of services for living quarters, food preparation and messrooms. They also prepare requisitions for purchase of necessary supplies for a voyage.

Chief Cooks prepare all meals and assist in planning menus for the entire ship crew.

Second Cooks bake all bread and pies, salads and night meals. They are also responsible for keeping storerooms neat.

Messmen set tables, serve meals and wash dishes. They also clean stairways, passageways, make berths in the officer and crew quarters, and clean officers' and radio rooms.

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