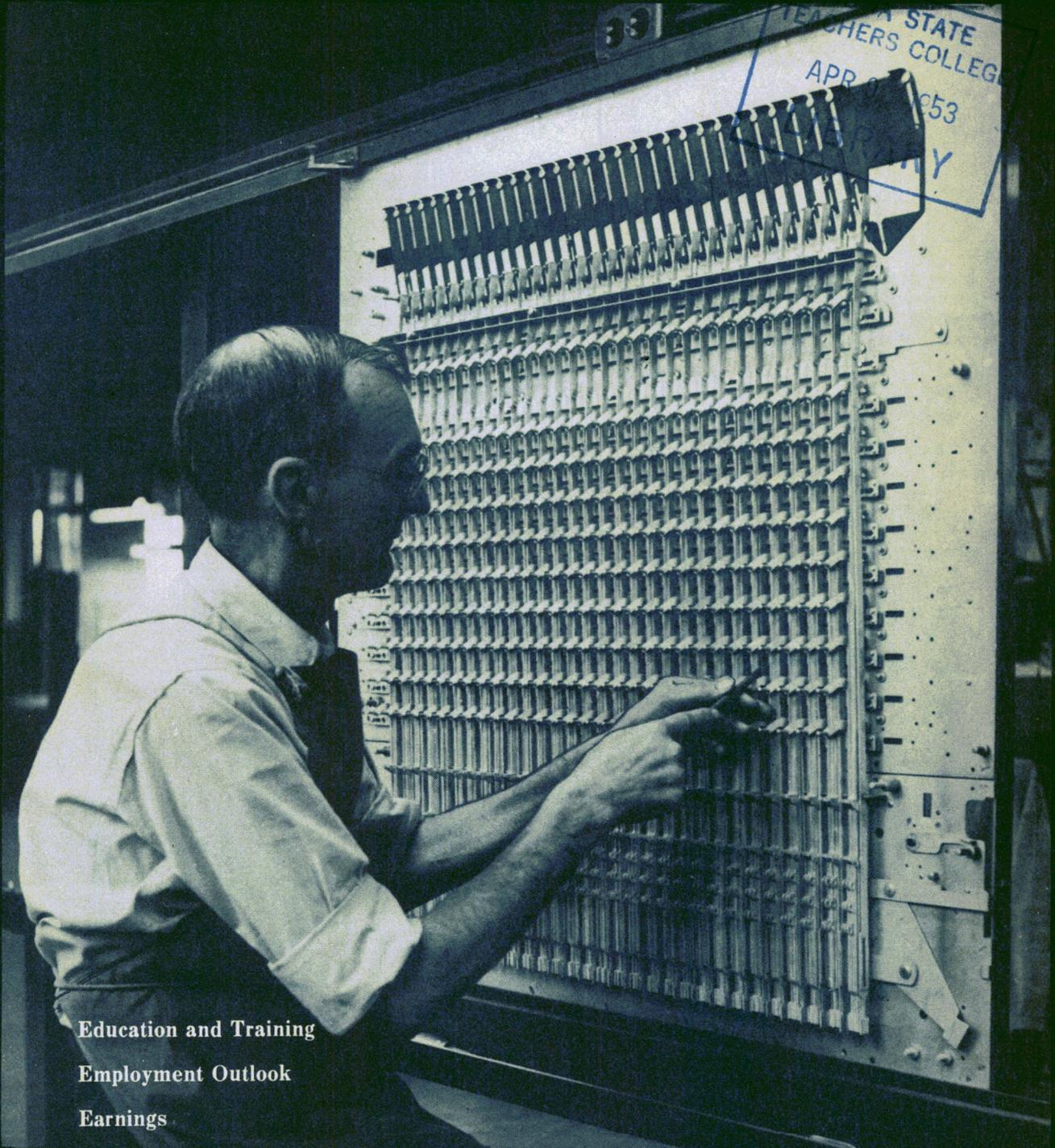


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Jan 2008
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Employment Outlook for

MECHANICS AND REPAIRMEN



Education and Training

Employment Outlook

Earnings

UNITED STATES DEPARTMENT OF LABOR

Martin P. Durkin, *Secretary*

BUREAU OF LABOR STATISTICS

Ewan Clague, *Commissioner*

In cooperation with VETERANS ADMINISTRATION

Reprint from 1951 Occupational Outlook Handbook

Bulletin No. 1129

Employment Outlook For Mechanics and Repairmen

A Reprint From The

1951 Occupational Outlook Handbook

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For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. - Price 20 cents

Letter of Transmittal

UNITED STATES DEPARTMENT OF LABOR,
BUREAU OF LABOR STATISTICS,
Washington, D. C., January 21, 1953.

THE SECRETARY OF LABOR:

I have the honor of transmitting herewith a report on the employment outlook for mechanics and repairmen taken from our 1951 edition of the Occupational Outlook Handbook. This reprint from the Handbook is being issued at this time to make available to the many counselors, teachers, students, and others who seek accurate occupational information, a separate report on employment opportunities in the large and growing field of repair occupations—a field of great interest to mechanically inclined young people. Veterans will be particularly interested in this field, since many of them have acquired related skills in the Armed Services. This report will serve to replace and bring up to date Bulletins 813 and 842 on diesel and auto mechanics issued in 1945 and Bulletin 892 on business machine servicemen issued in 1947. It also furnishes information on a number of other repair and mechanical jobs, including electrical and electronic technicians and repairmen of industrial machinery.

Librarians, counselors, and other users of the Occupational Outlook Handbook, as well as others with special interest in a single occupation or industry, have indicated the need for separate reports on some of the occupational and industrial fields covered in the Handbook.

The research for the Occupational Outlook Handbook was carried on with the financial support of the Veterans Administration, which needed information for use in its vocational rehabilitation and education activities.

EWAN CLAGUE, *Commissioner.*

HON. MARTIN P. DURKIN,
Secretary of Labor.

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MECHANICS AND REPAIRMEN

Automobile Mechanics

(See D. O. T. 5-81.010, .120, .420, and .510)

Outlook Summary

There will be many apprenticeship and other on-the-job training openings for beginners in this large trade during the early fifties. Turn-over, high in this trade, will continue to be the main source of job openings. Long-run employment trend slowly upward.

Nature of Work

Automobile mechanics do repair work on passenger cars, busses, and trucks. Typical repair jobs are tuning up the motor, replacing piston rings, re-aligning the wheels, and adjusting or re-lining the brakes. Mechanics may be either general mechanics or specialists such as auto electricians, carburetor experts, and paint and body repairmen. Body repairmen, as a rule, are skilled only in straightening, repairing or refinishing fenders and bodies. The other specialists are usually mechanics with all-round knowledge of automotive repair who have concentrated upon one kind of repair work.

Where Employed

Most of the estimated 500,000 mechanics work in service departments of car and truck dealers or in independent repair garages. There were about 150,000 such establishments in 1949, many of them owned and operated by mechanics. Mechanics are also employed in garages of transportation companies and other large firms which service their own fleets. Some work in gasoline service stations, where they usually do only light repair work.

There are auto mechanics in all parts of the country, including small rural communities. States with the greatest number of auto mechanics are those which have the largest number of motor vehicles. In 1948, these were California, New York, Pennsylvania, Ohio, Illinois, Texas, Michigan, and New Jersey.

How To Enter

Most mechanics learn the trade by working in a garage or repair shop as helper, greaser, or washer. It will be helpful to men who enter the trade in this way to take courses in related technical subjects which are given in most public vocational schools. These courses aid in understanding how automobile engines operate, and give knowledge of the parts used in different types and makes of cars.

The best way to learn the trade is to serve a 3- or 4-year apprenticeship, which assures the beginner of a definite schedule of training, covering the entire field in an orderly fashion. For example, in one agreement which calls for at least 8,000 hours (about 4 years) training, the apprentice must spend at least 2,000 hours working on motors. The contract also calls for 1,000 hours each on front axle and steering, rear wheel and axle assembly, and transmission and clutch work; 600 hours in learning how to adjust and repair brakes. Such formal apprenticeships have become increasingly common since the end of the war. In June 1949, it was estimated that about 29,000 were working as apprentices. In addition, an even larger number of men were learning this trade in late 1949 while working as helpers or in other beginning jobs.

It is desirable to have completed at least 2 years of high school before beginning on-the-job training or entering a vocational school. Many high schools offer some training in auto repair in their shop courses. Courses in English, general science, physics, and mathematics are also very helpful, especially for men who want to advance to supervisory jobs or open their own shops. Mechanics employed by automobile and truck dealers are sometimes sent to automobile factories or parts manufacturers for specialized training.

Those entering automotive work should have definite mechanical ability and an interest in working with tools. This knack for mechanical work

often makes the difference between an average mechanic and a really good one.

Outlook

The Nation had more than 45 million automobiles in 1950, half of which were manufactured before World War II. This means that the volume of repair work will stay at a high level during the early fifties, whether or not defense preparations make it necessary to curtail the production of new cars.

Employment of automobile mechanics probably will stay near the 1950 level of approximately 500,000. Nevertheless, many new trainees will be needed each year in this large occupation to replace men who die, retire, enter military service, or leave their jobs for other reasons. Training opportunities may not be as plentiful as during the 1945-48 period, however, when shops were hiring thousands of veterans to make up for wartime shortage of good trainees.

Some of the vacancies will arise as men die or retire. In 10 or 15 years, when a substantial proportion of the workers in the trade will be over 55 years of age, the number of drop-outs resulting from death and retirement probably will increase sharply.

There will be a strong demand for body repairmen in the early fifties. As a result of postwar

changes in auto body design, such as use of larger sheets of steel on the body and the omission of running boards, auto bodies are more easily damaged and require more complex and extensive repair work.

Mechanics with business ability, plus considerable experience, will still find favorable opportunities to open their own repair shops. However, the trend is toward greater numbers of mechanics working for large truck and car dealers, since the capital required to open a modern well-equipped shop is often beyond the means of many mechanics.

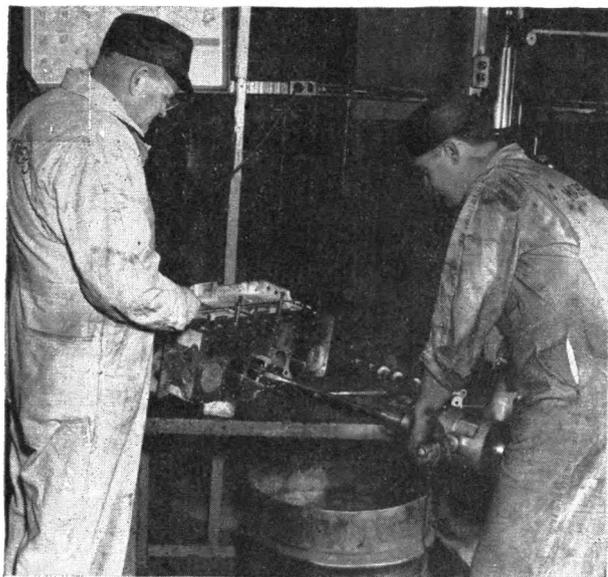
In the long run, motor travel will increase. Employment will probably continue to rise unless a simpler way of propelling cars is developed and widely adopted, such as might be possible with gas turbine engines. Although newer cars require fewer repairs, the expected growth in the number of motor vehicles will probably be great enough to assure an increase in the total amount of repair work, and consequently in employment.

Earnings and Working Conditions

Class A mechanics had average straight-time earnings in July 1948 ranging from \$1.31 in Providence, R. I., to \$2.15 in Cleveland, Ohio, according to a survey of independent general repair shops in dealer's service departments in 30 large cities. In about a third of these cities, average earnings exceeded \$1.75 an hour, and were \$2 or more in San Francisco, St. Louis, Detroit, and Cleveland. For Class B mechanics, average straight-time earnings in the 18 cities for which data were available ranged from 89 cents an hour in Atlanta to \$1.72 in San Francisco. Automobile electricians earned more than Class A mechanics (from \$1.33 to \$2.25 an hour); body repairmen made still more (\$1.37 to \$2.36). As of the end of 1949, wages in most cities were slightly higher. In general, wage rates were substantially higher in the Pacific Coast and Great Lakes cities than in other regions. Within cities, pay varies widely, depending upon the individual's skill, the size and location of the shop, and, where there are incentive wage plans, on the volume of business done. Earnings in small rural areas tend to be considerably lower than in cities. Mechanics may be paid a straight salary, sometimes with an incentive bonus; but the flat rate system, whereby the mechanic receives a percentage of the labor cost

Automobile mechanics doing a major overhaul job on a cylinder block.

PHOTOGRAPH BY U. S. DEPARTMENT OF LABOR



charged the customer, is the most common, especially in the large cities.

About a third of the mechanics covered in the July 1948 survey had a 44-hour week. Most of the others worked longer, except in Cleveland, St. Louis, San Francisco, and Seattle, where the majority were on a 40-hour week. More than 90 percent of the shops surveyed gave their mechanics vacation with pay. Most shops pay for holidays, usually six in number. Work is fairly steady throughout the year.

Unionization is not very widespread among mechanics as a whole, but where it exists it is usually

found in the shops of large dealers and the repair shops of truck and bus fleets. They are highly organized on the West Coast, but there is some unionization in other parts of the country, particularly in large cities.

Where To Go for Further Information

U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce. Establishing and operating an Automobile-Repair Shop, Industrial (Small Business) Series No. 24. 1946. Out of print but available in many public libraries.

Accounting-Bookkeeping Machine Servicemen

(D.O.T. 5-83.121)

Outlook Summary

Opportunities will be good during the early fifties for a limited number of men to be trained in this work. Most of these openings will go to men already employed by the companies which make and service the machines, and who are experienced in repairing adding machines, calculators, or cash registers. For those successful in entering the field, prospects are for steady employment.

Nature of work

These servicemen inspect, adjust, and repair accounting-bookkeeping machines. There are a number of different types of these machines—some post entries, some do billing, while others are combination typewriters and computing devices. All types have keyboards, like typewriters and adding machines. These machines are used wherever a great deal of accounting and bookkeeping is done, such as in department stores, large retail and wholesale businesses, and banks. Since there are several different types of machines, each complicated, the servicing is highly skilled work. Servicing these machines is often combined with the servicing of other office machines.

Repair work involves determining the cause of trouble in the machines, replacing worn or broken parts, and cleaning and oiling machines. Servicemen use common hand tools such as wrenches, punches, pliers, screw drivers, and a few hand

tools which are specially designed for the particular type of machine being repaired. Adjustments and minor repairs are made in the offices where the machines are used. However, some major repair work is taken to the shop.

Where Employed

These servicemen are employed principally in large cities, since this is where the bulk of the machines are used. Most accounting-bookkeeping machine mechanics are employed in the local service branches of companies which manufacture this equipment. There is little transferring of servicemen among the five main companies in this field. Only a very few servicemen are in independent repair shops.

Training and Qualifications

Training programs for accounting-bookkeeping machine repairmen vary greatly among the companies employing these workers, partly because this work is frequently combined with the repair of other business machines. One large concern uses its mechanics primarily on the accounting-bookkeeping machines and does not combine this work with other repair work. Two other major companies train their mechanics to work on all of the office machines that they manufacture. One of these firms has a 4- to 5-year training program.

Usually a man must have had 1 or 2 years' experience as an adding machine, calculator, or cash



PHOTOGRAPH BY U. S. DEPARTMENT OF LABOR

Repairing accounting-bookkeeping machines is one of the most highly paid of business-machine servicing jobs

register repairman in order to be eligible for accounting-bookkeeping machine training—which consists of 2 or 3 years of on-the-job instruction and, in some cases, an additional 6 months of training at a company school. Some of the repair work on accounting-bookkeeping machines requires considerable experience and knowledge of the machines. Servicemen who have just completed their training need additional experience before they are qualified to perform all repair work.

The main aptitudes needed by a trainee are general mechanical ability and manual dexterity. Most manufacturers of these machines prefer to hire men in their early twenties as trainees. Since servicemen in this field make many contacts with customers, a presentable appearance and manner is important to the employers.

Outlook

During the early fifties, prospects will be good for a limited number of new men to enter this field. Additional workers will be trained in order to service the growing number of accounting-bookkeeping machines in use. However, most of the trainees will be drawn from the ranks of mechanics already employed in repairing other

business machines, for the companies which make and service accounting-bookkeeping machines. These companies manufacture other machines, such as adding machines, calculators, and cash registers, and the practice has developed of transferring some of the more skillful mechanics on these less complex machines to servicing the more intricate bookkeeping machines.

Although this field is small, comprising about 1,800 workers in 1949, it will probably expand gradually for several years to come. The trend is not only toward greater sales of these machines, but also toward greater complexity in newly developed equipment, which tends to increase the need for servicemen.

Long-run prospects are excellent for stable employment for those already in the trade or for those entering in the next few years, since this occupation is little affected by declines in general business activity. The tendency during poor business years is to keep old machines in repair rather than to buy new ones.

Earnings and Working Conditions

In 1949, experienced servicemen typically earned from \$60 to \$85 for a 40-hour week, with some working 8 hours longer and receiving overtime pay. It generally takes a trainee about 3 years to reach this level of earnings. Experienced servicemen may be promoted to supervisory jobs. Men showing sales aptitude are sometimes transferred to the sales departments.

Repairing these machines is comparatively free from the danger of accident and is cleaner than most other mechanical trades. Since most work is performed in the offices where the machines are located, servicemen generally dress like office workers.

Where To Find Additional Information

U. S. Department of Labor, Bureau of Labor Statistics, *Employment Outlook for Business Machine Servicemen*. Bulletin No. 892. 1947. Superintendent of Documents, Washington 25, D. C. Price 15 cents.

See also: Cash Register Servicemen, page 166; Calculating Machine Servicemen, page 165; and Adding Machine Servicemen, p. 164.

Accounting-Statistical Machine Servicemen

(D. O. T. 5-83.126, .128)

Outlook Summary

A small number of new workers will be hired for trainee jobs during the early fifties. The long-run outlook is for a gradual upward trend in the number of servicemen.

Nature of Work

These servicemen inspect, adjust, and repair punched-card accounting-statistical machines, such as card-punching, sorting, and tabulating machines, collators, multipliers and dividers, and verifiers. They also install machines in offices and sometimes train personnel to operate them. Accounting-statistical machines record and tabulate large masses of accounting and statistical data. The information is punched on cards alphabetically or according to a code, and the cards are put into machines which sort them and tabulate the results. These machines are used mainly in large organizations, such as government agencies, department stores, insurance companies, and large industrial establishments for payroll and other accounting records, inventory control, statistical surveys, and similar purposes.

Repair work involves determining the cause of trouble in the machines, replacing worn or broken parts, and cleaning and oiling machines. Servicemen use common hand tools such as screw drivers, wrenches, punches, and pliers, and a few hand tools which are specially made for these machines. Repairs and adjustments are usually made in the establishments where the machines are used.

Where Employed

Accounting-statistical machine servicemen are employed by two firms which manufacture and service all accounting-statistical machines. These men may be assigned by their companies to work anywhere in the United States, but usually their work is in large cities. They rarely transfer from one company to the other.

Training and Qualifications

Men seeking employment in this field should have general mechanical ability and enjoy working

with machinery. Both concerns employing these servicemen generally require that new trainees be in their early twenties and have at least 2 years' technical schooling in electrical or mechanical engineering or equivalent electrical or mechanical experience. One company is now hiring only graduate electrical engineers as trainees for servicemen jobs, because the electronic features of their machines are becoming increasingly important.

Men hired as trainees are first given a trial period of 1 or 2 months' on-the-job training. If the new trainees are satisfactory, they are sent to the company school for a period of from 3 to 6 months. After completion of the school course they are put to work under supervision until they are able to service and repair machines on their own. This last period of training usually lasts from about 12 to 18 months.

Outlook

For many years in the future there will be continued growth in the use of punched-card accounting-statistical machines. This growth, together with the need for replacing those who leave this work, means that prospects should be favorable for entering the occupation and remaining for many years. The number of men that will be hired in any one year will be limited, however, by the small size of the occupation—there were 4,000 employed at the beginning of 1950—and by the fact that increases in use of the machines will be gradual rather than sharp.

Employment in this field will be steady, because this work is little affected by changes in general business conditions and because the policy of the companies in this field is to keep their servicemen even when work is slack. In the past, there have been few lay-offs in time of depression.

Earnings and Working Conditions

The earnings of servicemen vary considerably. Typical weekly straight-time earnings for accounting-statistical machine servicemen with at least 3 years' experience ranged from about \$65 to \$85 at the end of 1949. However, some of the most

skilled servicemen earned up to \$100 a week. The company that employs the majority of servicemen pays its trainees \$250 a month to start. Periodic pay increases are given to servicemen according to skill and experience. Servicemen may be promoted to supervisory jobs, or may get into the sales departments.

Servicing and repairing these machines is cleaner and lighter work than most other mechanical trades. The occupation is comparatively free from the danger of accident. Servicemen generally dress like office workers, since the work is

clean and is usually performed in the offices where the machines are used.

Where To Get Additional Information

U. S. Department of Labor, Bureau of Labor Statistics, Employment Outlook for Business Machine Servicemen. Bulletin No. 892. 1947. Superintendent of Documents, Washington 25, D. C. Price 15 cents.

See also Adding Machine Servicemen, page 164; Calculating Machine Servicemen, page 165; and Cash Register Servicemen, page 166.

Adding Machine Servicemen

(D.O.T. 5-83.122)

Outlook Summary

A small number of new workers will be able to find jobs in this field during the first half of the fifties. The long-run outlook is for steady employment.

Nature of Work

Servicemen inspect, adjust, and repair adding machines. Adjustments and minor repairs are usually made in the offices where the machines are used. Major repair work is taken to the shop. Repair work involves determining the cause of trouble, replacing worn or broken parts, and cleaning and oiling machines. Servicemen use common hand tools such as screw drivers, wrenches, pliers, punches, and special tools designed for the particular type of machine being repaired. In some cases servicing of both adding machines and calculators is combined in a single job. In independent repair shops, adding-machines are often serviced by mechanics who also repair typewriters.

Where Employed

Servicemen are employed principally in large cities, where the bulk of the adding machines are used. Adding machine servicemen are employed both in manufacturer's service branches, which are operated in connection with the sales offices of the firms, and in independently owned local repair shops. Other sources of employment are in the Federal, State, and local governments and in a few large banks and other firms which use large numbers of adding machines.

Training and Qualifications

The training period for adding machine mechanics ranges from 6 months to a year or more of on-the-job instruction. Servicemen employed in manufacturers' service branches generally receive a few weeks supplemental training in the manufacturers' own school, usually located at the plant. Manufacturers train men to work only on their own line of machines.

In independent shops new men may learn to repair adding machines by working as helpers. Some pick up the skill while working as typewriter mechanics.

The main aptitudes needed by a trainee are general mechanical ability and manual dexterity. Most manufacturers of adding machines prefer new trainees to be in their early twenties.

Outlook

During the first half of the fifties, there will be jobs for a small number of trainees in adding machine repair. Most manufacturers of the equipment are conducting expanded training programs. Since this is a small occupation, however—in 1949 there were about 2,000 adding machine servicemen in the country—the number of openings for new workers will be limited.

Longer run prospects are for an upward trend in the employment of servicemen. The number of adding machines in use in business and in government is tending to increase. Moreover, the repair of adding machines is little affected by

changes in general economic conditions. In time of depression there are few lay-offs, since during these years the tendency is to keep old machines in repair, rather than to buy new machines.

Earnings and Working Conditions

During 1949, typical earnings for a 40-hour week ranged from \$50 to \$75. In addition, commissions are sometimes paid to servicemen and supervisors on sales of supplies and contracts to do servicing for a particular firm. Men servicing calculators, as well as adding machines, generally earn more than men servicing only adding machines.

Service mechanics may be promoted to positions as service supervisors. The weekly earnings of service supervisors range up to \$100 and over. In

manufacturers' branches, mechanics are sometimes transferred to the sales department.

Repairing adding machines is comparatively free from the danger of accident and is cleaner than most other mechanical trades. Servicemen generally dress like white-collar workers, since most service work is performed in the offices or stores where the machines are located.

Where To Find Additional Information

U. S. Department of Labor, Bureau of Labor Statistics; *Employment Outlook for Business Machine Servicemen*. Bulletin No. 892. 1947. Superintendent of Documents, Washington 25, D. C. Price 15 cents.

See also: *Calculating Machine Servicemen*, page 165; and *Typewriter Servicemen*, page 168.

Calculating Machine Servicemen

(D.O.T. 5-83.123)

Outlook Summary

There will be opportunities for a limited number of new men to enter this field during the first half of the fifties. Long-run prospects are for steady employment.

Nature of Work

These servicemen inspect, adjust, and repair calculating machines. Calculating machines, which add, subtract, divide, multiply, and also perform combinations of these operations, are used mostly in offices where a great many computations are necessary. These machines, most of which are electrically operated, have elaborate mechanisms, and, therefore, skilled men are required to repair them. Minor repairs and adjustments are made in the offices where the machines are used. Major repair work may be taken to the shop. Repairing the machine involves determining the cause of trouble in the machines, repairing or replacing broken or worn parts, and cleaning and oiling the machines. The mechanic uses common hand tools designed for the particular type of machine on which he is working. Servicemen are sometimes required to explain to new operators how to operate the machines. In some cases, servicing of calculators is combined with the servicing of other business machines, particu-

larly adding machines, and also accounting-book-keeping machines.

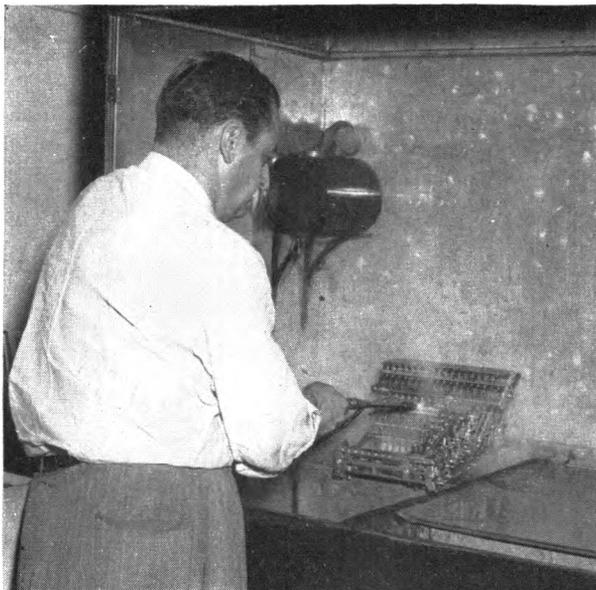
Where Employed

Most servicemen are employed in large cities, since this is where the bulk of the calculators are used. Mechanics servicing calculators are usually employed in manufacturers' local service branches which are operated in connection with the sales offices of these firms. However, a few work in independently owned local repair shops. Most of these independent shops are small and employ only a few workers. Another source of employment is the Federal Government.

Training and Qualifications

Trainees employed by manufacturers of calculating machines generally receive from 1 to 3 years of on-the-job training, often combined with a 3- or 4-month course at a company school. Servicemen employed by the manufacturers are trained to service only the company's products.

Servicemen working in independent shops must be able to repair all makes of calculators, and need a longer training period. Most calculator servicemen in independent shops receive no formal training, but learn through experience gained while helping experienced mechanics.



PHOTOGRAPH BY U. S. DEPARTMENT OF LABOR,

Cleaning a calculator with a fine spray of cleaning fluid—an important step in keeping the complicated mechanism in good running condition.

The main aptitudes needed by trainees are general mechanical ability and manual dexterity. The calculating machine manufacturers generally prefer to hire men in their early twenties.

Outlook

Opportunities for new workers to enter this field will be fairly good in the early fifties. The manufacturers of calculators have expanded their training programs during the past several years to provide servicing for the increased number of calculators in use. However, the number of new workers entering the occupation will be limited, since in 1949 only about 2,400 men were engaged primarily in repairing calculators.

Looking further into the future, prospects are for an upward trend in the employment of servicemen, lasting for many years. There will be a growing demand for calculators in business and

government. At the same time, there is a trend toward more complicated calculators, as they are improved and adapted to new uses. There will be relatively few openings to replace men leaving the occupation during the next 10 or 15 years. Turn-over of servicemen is low, and there is only a small proportion of older men in the trade who will be dying or retiring during this period.

Servicing of calculators is little affected by changes in general economic conditions. There are few lay-offs during depressions as the tendency during poor years is to keep the old machines in repair rather than to buy new ones.

Earnings and Working Conditions

In 1949, typical earnings for a 40-hour week ranged from \$50 to \$85. Including commissions and overtime, earnings were often considerably higher. Commissions are sometimes paid to service mechanics on sales of contracts to do servicing for a particular firm.

Servicemen may be promoted to supervisory jobs. The weekly earnings of a service manager range up to \$120 and over—depending largely on the size of the shop. In manufacturers' service branches, mechanics are sometimes transferred to the sales departments.

Repairing calculators is usually light work and cleaner than most other mechanical trades. The occupation is relatively free from serious accidents. Generally, servicemen dress like office workers, since most service work is performed in the offices where the machines are located.

Where To Find Additional Information

U. S. Department of Labor, Bureau of Labor Statistics; Employment Outlook for Business Machine Servicemen. Bulletin No. 892. 1947. Superintendent of Documents, Washington 25, D. C. Price 15 cents.

See also Adding Machine Servicemen, page 164.

Cash Register Servicemen

(D.O.T. 5-83.124)

Outlook Summary

During the first half of the fifties, a limited number of new workers will be able to enter this field. The long-run outlook is for steady employment.

Nature of Work

Cash-register servicemen inspect, adjust, and repair cash registers. Next to typewriters, cash registers are the most widely used business machines. They are found mainly in retail stores

and service establishments. Cash registers vary greatly in the number of things they can do. The simple models merely record each transaction, total the day's receipts, and provide a change drawer. The more complicated cash registers tabulate several different kinds of information on one transaction simultaneously, such as identification of clerk, department, and type of merchandise, as well as provide printed receipts with such information for the customer. The more elaborate cash registers actually perform many functions of accounting machines.

In some cases servicemen work on other types of business machines, such as adding machines or accounting machines. Most repairs and adjustments are made in the establishments where the machines are used. Usually only major repair jobs are taken to the shop. Repairing cash registers involves determining the cause of trouble in the machines, replacing worn or broken parts, and cleaning and oiling machines. Servicemen use common hand tools, such as screw drivers, pliers, and punches, and special hand tools designed for cash registers.

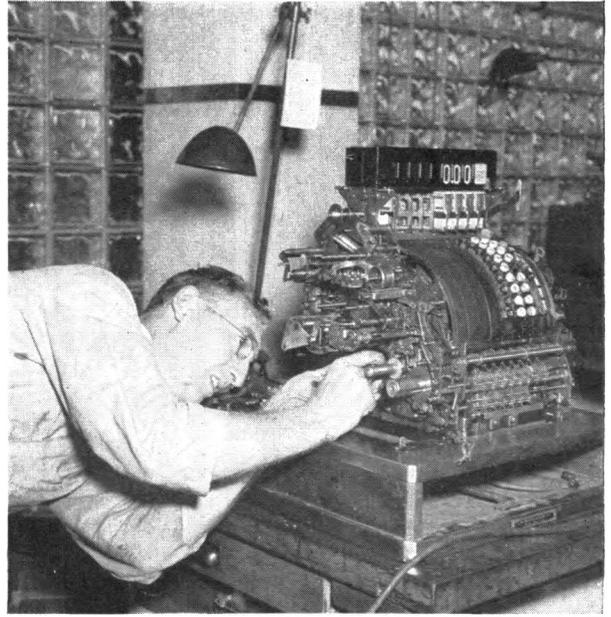
Where Employed

Cash register servicemen are employed principally in large cities. However, most cities of 50,000 population and over have shops repairing cash registers. The great majority of servicemen primarily engaged in repairing cash registers are employed in the local service branches of the few manufacturing firms in this field. There is little transferring of servicemen among firms. Some of the repair work, especially in smaller towns, is done in independently owned local shops, with only a few employees, which repair other types of business machines, such as typewriters and adding machines.

Training and Qualifications

The training period for cash register mechanics employed in the manufacturers' service branches generally consists of 12 to 18 months of on-the-job training in the branch that hires him, followed by about 6 months at the company school. Cash register servicemen working in manufacturers' shops are trained to repair only the company's own line of machines.

Servicemen working in independent repair



PHOTOGRAPH BY U. S. DEPARTMENT OF LABOR

Cash-register repair is exacting work

shops generally have not had formal training, unless they are former employees of manufacturers' service branches. Most of the men in the independent shops pick up the trade while working as helpers in the shops. In independent shops, servicemen are required to repair several different makes of cash registers, and several years of this informal training is required.

New men entering the field should have general mechanical ability and enjoy working with machines. Since servicemen in this field make many contacts with customers, a presentable appearance and manner are important, and servicemen must be able to carry on some business transactions. Manufacturers generally prefer to hire as trainees high school graduates in their early twenties.

Outlook

During the early fifties, a limited number of new workers will be able to enter the field as trainees. Cash-register manufacturers have expanded their training programs, but are not planning to take on as many trainees in the next several years as they did during 1948 and 1949. The number of men who can enter in any one year, however, is also limited by the small size of the occupation. In 1949 there were probably not more than 2,700 cash-register repairmen in the United States.

Longer-run prospects are for an upward trend in the employment of servicemen. Gradually increasing sales of new machines and the trend toward more complicated machines, which can do a wider variety of operations will make it necessary for the manufacturers to build up larger service organizations.

This work is not greatly affected by changes in general economic conditions. In time of depression there are few lay-offs. Cash registers are great timesavers and they serve so many essential commercial purposes that they are a necessity in most businesses. Depressions affect the sales of new machines, but the repair and service work continues.

Earnings and Working Conditions

In 1949, experienced cash-register servicemen typically earned from \$60 to \$80 a week, plus over-

time for work beyond 40 hours. It generally takes a trainee 3 years to reach this level of earnings. Earnings may be increased through promotions to service supervisory jobs. Men showing sales talents are sometimes transferred to the sales department.

Repairing cash registers is comparatively free from the danger of accident and is cleaner than most other mechanical trades. Since most service work is performed in the offices or stores where the machines are located, servicemen generally dress like white-collar workers.

Where To Get Additional Information

U. S. Department of Labor, Bureau of Labor Statistics, Employment Outlook for Business Machine Servicemen. Bulletin No. 892. 1947. Superintendent of Documents, Washington 25, D. C. Price 15 cents.

Typewriter Servicemen

(D.O.T. 5-83.127)

Outlook Summary

There will be a number of job openings for new workers during the first half of the fifties. The long-run outlook is for steady employment.

Nature of Work

Typewriter servicemen inspect, adjust, and repair typewriters. Repair work may involve replacing worn or broken parts, alining the type to print evenly, fixing the escapement (spacer), and adjusting the shift mechanism and ribbon movement. Servicemen also clean and oil the machines. Most servicing and repair work is taken to the shop. However, minor servicing jobs may be done in the offices where the machines are used. The mechanics use common hand tools such as screwdrivers, pliers, and punches.

The operating mechanism of electric typewriters differs from that used in the ordinary mechanical typewriters, and men who have not had some training on the electric machines cannot service them. One company which makes and services only electric typewriters employs servicemen who work full-time on the electric machines. In the

other companies which make both types of machines, servicing of electric machines is still a small part of the repair business. In some cases, repair shops have a few men who have been trained to handle the electric machines, and they spend all their time on them. In other shops, the men who know the electric typewriters also work on the regular mechanical machines.

In some small shops, typewriter servicing may be combined with the servicing of other business equipment, particularly adding machines.

Most servicemen are bench men; that is, their work is done in the repair shop. "Outside" men make contacts with customers as well as frequently doing some work in the shop. They inspect the customer's machines and determine whether or not they should be brought back to the shop for repair. Outside men, particularly those employed by small independent shops, may also sell typewriter ribbons and supplies; occasionally, they sell typewriters.

Where Employed

Typewriter repair men are employed both in the local service branches of typewriter manufacturers

and in independently owned local repair shops (which frequently sell typewriters as well as repair them). Many servicemen have their own shops.

Geographically, typewriter servicemen are widely distributed. Every city and large town has men employed in the occupation. However, the greatest concentration of servicemen is in large cities, where most clerical work is done.

Training and Qualifications

The length and kind of training for typewriter servicemen varies. Most of it, however, is received on the job. Training periods range from 1 to 3 years. Servicemen employed in independently owned shops require more training and experience, as they must be able to repair all makes of typewriters and, sometimes, adding machines and calculators; servicemen employed in the service branches of manufacturing companies generally repair only one make of typewriter.

In many independent shops, new workers become servicemen by working as helpers, gradually picking up the necessary skills. In some independent shops and in the manufacturers' service branches, however, training schedules are set up and experienced servicemen and supervisors teach the new men systematically.

In addition, trainees in the service branches are frequently sent to a company school at the factory for a few weeks or months of intensive training. Some typewriter servicemen are trained in 2- or 3-year formal apprenticeships which include work on several makes and types of business machines.

To be able to service electric typewriters it is necessary to have special training. The companies which make and repair both types of machines are sending experienced mechanics to company schools for 2 or 3 weeks' instruction on the electric machines. New trainees hired by these companies will learn to repair electric machines as part of their training program.

There are at least two privately owned schools, not connected with any manufacturer, training typewriter servicemen. These schools are equipped to give additional training on servicing adding machines and calculators.

Outlook

Opportunities to enter the trade during the early fifties will be better than in most prewar

years. However, the number of new trainees taken on will be smaller than in 1947 and 1948. Skilled men are still in strong demand and will have little difficulty in getting jobs. The number of new workers who will find job openings in this field will be greater than in other kinds of business-machine servicing. There were more than 10,000 typewriter mechanics in 1949 making this by far the largest business-machine servicing occupation.

Those who enter the occupation during the next few years, will have excellent chances for continued employment over the longer run. Employment in this field will tend to rise gradually as the number of typewriters in use increases. Moreover, typewriter repair work is not greatly affected by changes in general economic conditions. In poor business years, sales of new machines fall, but the amount of repair work remains fairly steady, as old machines are kept in use instead of being replaced.

Earnings and Working Conditions

The typical pay of experienced typewriter servicemen for a 40-hour week in 1949 ranged from about \$45 to \$75 in the larger cities, although some highly skilled men made more. Servicemen in independent repair shops usually earn more than men in the manufacturers' service branches, largely because men in the independent shops must be able to repair various makes of typewriters.

Many typewriter repair shops pay servicemen commissions on sales of typewriters, supplies, and contracts to do servicing for particular firms. Servicemen may increase their earnings through promotion to service supervisors or shop managers. In many cases they have opportunities to open their own shops. Typewriter servicing is light work, comparatively free from accidents, and cleaner than most other mechanical trades.

Where To Get Additional Information

U. S. Department of Labor, Bureau of Labor Statistics, *Employment Outlook for Business Machine Servicemen*. Bulletin No. 892. 1947. Superintendent of Documents, Washington 25, D. C. Price 15 cents.

See Also Adding Machine Servicemen, page 164.

Diesel Mechanics

(D. O. T. 5-83.931)

Outlook Summary

In the early fifties a limited number of men will be taken on as helpers and apprentices in shops which handle Diesel repair work. Prospects for experienced engine mechanics who specialize in Diesel work are highly favorable. Volume of Diesel repair work will increase over long run.

Nature of Work

Diesel-engine mechanics maintain and repair Diesel engines. Their duties include diagnosing engine trouble, disassembling the engine, replacing or repairing defective parts, reassembling the engine, and adjusting the fuel and air valves. The Diesel engine is similar to the gasoline (or carburetor) engine in many respects. From the point of view of the mechanic, the essential difference between the carburetor engine and the Diesel engine lies in their different methods of ignition. The Diesel engine has no electric ignition system or carburetor such as is found in the gasoline engine, but has an oil-injector system and fuel pumps, with which the mechanic must be familiar. However, the basic stationary and working parts are similar in both engines. As a result, Diesel-engine maintenance is usually carried on by workers who are employed as engine mechanics rather than as specialized Diesel mechanics. For example, Diesel-powered busses, trucks, tractors, and construction machinery are usually maintained by automobile or tractor mechanics. Railroad electricians and machinists generally repair Diesel locomotives.

Training and Qualifications

Most mechanics who repair Diesel engines have had training and experience on other engines. Qualifications for Diesel maintenance jobs vary among industries. Mechanics employed in servicing and repairing Diesel locomotives are drawn from among railroad shop craftsmen who are required to serve a 4-year apprenticeship. Marine engineers, who are in charge of the operation and maintenance of Diesel engines on ships, must be licensed by the United States Bureau of Marine Inspection and Navigation. Experience in the

engine department of ships and a written examination are among the chief requirements for a marine license. Mechanics who service Diesel engines in the vehicular field, including trucks, busses, tractors, and construction machinery, generally are gasoline-engine mechanics who have learned how to repair Diesel engines. There are a number of schools which provide instruction in Diesel engine repair and maintenance. Such training is most valuable when it supplements experience in gasoline-engine maintenance. Those without actual experience who take courses in Diesel theory and practice will find it difficult to qualify directly for Diesel maintenance and repair work.

Where Employed

Diesel maintenance jobs are found in a wide variety of fields. Among the more important sources of employment are bus lines, trucking companies, railroads, ships, electric power plants, large farms, logging camps, marine-engine repair establishments, and garages and firms that service Diesel tractors and construction machinery.

Outlook

The use of Diesel power probably will continue to expand for many years. Almost all of the new locomotives ordered by the railroads are Diesels; more Diesel trucks and busses are on the highways; and thousands of Diesel tractors are sold to farmers annually. This points to a continued increase for a number of years at least, in the number of Diesel maintenance jobs, which will go to mechanics who already have experience in repairing other types of engines. For example, a company changing over to use of Diesel engines will usually assign experienced mechanics already on its payroll to service the Diesel equipment, and give them the slight retraining necessary. Other companies who are filling expansion needs with Diesel engines will hire experienced engine mechanics wherever possible. Also, in many shops, union-management agreements specify that men in the shop be given first chance at vacancies. In these shops most new men will be taken on as apprentices or helpers, regardless of whether they

have had previous training in Diesel engines. Men who have had school training but no practical experience in Diesels, will find few opportunities to start as full-fledged mechanics.

Eventually, as Diesels come into greater use, on-the-job training opportunities for inexperienced applicants may become more common. Diesel engines are likely, however, to continue to be but a very small proportion of all engines in use. Unless unexpected developments occur, they

will not be used to any appreciable extent in passenger automobiles.

Where To Get Additional Information

Employment Opportunities for Diesel-Engine Mechanics. Bulletin No. 813. U. S. Department of Labor, Bureau of Labor Statistics, 1945. 10 pp. Superintendent of Documents, Washington 25, D. C. Price 5 cents.

Electrical-Household-Appliance Servicemen

(D. O. T. 5-83.04)

Outlook Summary

Sizable expansion of employment over long run. A few thousand openings for beginners each year, in the early fifties.

Nature of Work

Repairmen are employed mainly by service departments of stores, wholesalers of electrical household appliances, shops specializing in the repair of appliances, and appliance manufacturers and electric companies. There are many owner-operated retail repair shops.

Main duties of servicemen are to install, repair, and rebuild large appliances such as ranges, refrigerators, and washing machines, and to repair smaller ones such as irons and toasters. Sometimes servicemen repair both appliances and radios. Servicemen in small repair shops frequently repair almost every type and make of electric appliance. Those working in shops specializing in the repair of small appliances usually learn to repair all types handled by their shop. Shops which handle both large and small appliances have some servicemen who repair only small appliances and others who specialize in one or more types of major appliances. Some men, for example, repair the major appliances of a particular manufacturer, others handle only refrigerators; still others, automatic washing machines.

Training

Almost all the workers in this occupation begin as helpers and learn their skills through work experience. Occasionally, workers are sent to

schools operated by manufacturers of appliances for short periods of training or are given instruction by factory representatives at their places of work. Repair of simple appliances can be learned in a few months, but to become an all-round serviceman or to learn how to repair complicated appliances requires as much as 3 years of on-the-job training. School courses in the fundamentals of electricity are helpful in understanding the work, but to be considered fully qualified, a worker must have had several years of practical experience.

Outlook

Employment in this occupation will increase for many years as the number of appliances continues to grow. Many appliances which in early 1950 were found in relatively few homes, for example, electric dishwashers, will eventually be purchased by millions of families. Moreover, continued growth in the number of families will mean a greater use of electric appliances. Besides the appliances now on the market, the industry will continue to introduce new ones.

As the number of appliances grows, demand for service will increase. The amount of work for servicemen will also be increased as more and more automatically operated appliances are used. Automatic appliances have more parts which can break down and are harder to repair than non-automatic appliances. This factor making for more employment may be somewhat offset by improvements in the durability and reliability of appliances which will tend to reduce the amount of servicing. In the balance, however, it is likely that many more servicemen will be employed in

the future than the 60,000 now estimated to be in this occupation.

Despite the expected growth in employment of appliance servicemen, the prospects of establishing successful retail and repair shops generally will not be favorable in the next few years. A great many such shops were started in the postwar period, and competition for business is likely to be keen for some time.

Earnings

The only Nation-wide earnings data for electric appliance servicemen available is that for servicemen employed by electric utility companies.

In the spring of 1948, electric company servicemen had average hourly wage rates of \$1.45. Those in the Pacific Coast region had the highest

average, \$1.66 an hour, and servicemen in the region including Delaware, District of Columbia, Kentucky, Maryland, Virginia, and West Virginia, had the lowest average, \$1.34 an hour.

Where To Go for Additional Information

Servicemen interested in going into business for themselves will find valuable information in:

U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce. Establishing and Operating an Electrical Appliance and Radio Shop. Industrial (Small Business) Series No. 28. 1946. Superintendent of Documents, Washington 25, D. C. Price 45 cents.

See also Radio and Television Technicians, page 173, and Refrigeration and Air-Conditioning Mechanics, page 177.

Radar Technicians

(D. O. T. 5-83.449)

Outlook Summary

Small but rapidly expanding field with openings for qualified men.

Nature of Work

This group is made up of men engaged mainly in supervising installation of radar (radio detection and ranging) equipment and in servicing and repairing such equipment; some do actual installation work. Radar work calls for advanced knowledge of electronic principles and a high degree of technical skill. Radar technicians must be able to make reports on difficulties encountered and recommend improvements in construction and design. They often service other types of electronic equipment as well as radar.

Where Employed

Most radar technicians work for the very small number of concerns manufacturing and selling radar equipment and holding contracts to service military radar. Many technicians who service military equipment work outside continental United States. Those servicing commercial radar are located mostly in the big port cities in this country.

Training and Other Qualifications

Only men with good experience or training in radar or radio are hired. Many are former radio repairmen. Some are college graduates; at least one company considers a college degree, preferably in electrical engineering, essential. Even college-trained engineers must, however, have basic mechanical skills to be considered fully qualified as technicians. A number of schools, colleges, and radio institutes offer courses in electronics; some have well-rounded programs, including laboratory work and practice in the types of mechanical tasks met with in technician jobs. Although thousands of men were trained to operate and maintain radar equipment in the armed services, this military experience alone rarely, if ever, qualifies a man for civilian work.

New employees almost always receive on-the-job training. For entrants with especially good experience, the training period may last only a few weeks; for others, it may last a year or more.

Outlook

During the early fifties there probably will be a shortage of radar technicians, mainly because

of rapid expansion in the use of military radar equipment. Only a limited number of men have sufficient skill, experience, and theoretical knowledge to handle radar servicing, and it will take time to train additional men to meet the rapidly expanding needs. Moreover, only men capable of learning theoretical electronics and with unusual aptitude for this type of work can become qualified radar technicians. Some of the men who do not meet all the requirements for radar technician jobs will find opportunities in television servicing and other types of electronics work.

Earnings

In 1949, fully qualified men with good radar experience made about \$4,000 for the first year or so with a company. Typical annual earnings in the occupation in 1950, were between this figure and \$5,000. Men working away from their headquarters cities have their expenses paid by the company or receive extra pay. Special bonuses may be given for overseas work. The basic workweek is usually 40 hours, with time-and-a-half for overtime.

See also Radio and Television Technicians, page 173; Electrical Engineers, page 86.

Radio and Television Technicians

(D. O. T. 5-83.411 and 6-98.210)

Outlook Summary

Good opportunities for men thoroughly trained in electronics during early part of the 1950-60 decade. Long-run employment trend upward in TV installation and repair—probably down in radio repair.

Nature of Work

Radio and television technicians mainly install and repair home and automobile sets. Technicians with FCC licenses work on two-way aircraft, police, boat, and taxicab radios and a small number install and service other types of electronic equipment such as public address and interoffice communications systems. A few thousand are employed in research laboratories or work as testers and trouble-shooters in radio and television manufacturing plants. In small towns, radio repairmen frequently service electrical appliances. Altogether there probably were about 100,000 radio and television technicians in late 1949.

A majority of the technicians who repair radio sets are self-employed; some repair radios only during their spare time. Other radio men are employed by large repair shops, radio stores, garages, wholesale distributors, manufacturers of electronic equipment, and other types of concerns. Increasingly, television repair is also being handled by independent servicemen but many television technicians work for manufacturers, companies contracting with manufacturers to in-

stall and repair their sets, distributors, and large repair shops.

How To Enter

Most radio repairmen get their initial training in vocational and technical schools, in the Armed Forces, as helpers or apprentices, in radio manufacturing plants, through amateur radio, or from correspondence schools. The quality of initial training and the ability of the men vary greatly, so that there is a very wide range in degree of skill among new entrants. Many months of work experience are needed to learn the trade thoroughly. Radio technicians who test aviation, police, marine, or taxicab transmitters are required to have an FCC second-class radio operator's license.

Television repairmen need much more basic training and knowledge of electronic theory than radio repairmen. The latter may learn television work through on-the-job training with television servicing companies. Independent servicemen who wish to learn television repair sometimes get training materials and technical help from TV manufacturing companies. These companies also train their own employees to test and repair TV sets. Men with no previous training can enter the trade by studying for about a year in one of the better technical or vocational schools; a few schools provide excellent placement service. TV technicians who work in the homes of customers are required to have a neat appearance and pleasant personalities.

Men going into the radio repair business for themselves must have at least \$500 worth of tools and equipment. The additional equipment needed to service television sets costs from \$700 to \$1,000.

Outlook

During the early fifties there will be a strong demand for skilled electronic technicians. They will be needed to service home radio and television sets and in manufacturing and servicing military, industrial, and other types of electronics equipment. Repair work on home radio and television sets, which employ the bulk of these technicians, will continue to expand, even though military requirements are likely to cut down the production of new sets. Production and servicing of military electronic equipment will grow rapidly. Although skilled men will easily find jobs in the early fifties, there will at the same time be many men with inadequate training in electronics or with no aptitude for this type of work, who will be qualified only for helpers' or assistants' positions. Many who might have enough knowledge and skill for radio repair will not be able to handle the much more difficult television work.

In addition to openings arising from expanding employment in this occupation, there will be a

fairly large number of openings created by turnover. Many technicians who repair home radio and television sets are young men subject to draft for military service. Moreover, some technicians now engaged in repairing home sets will shift to jobs with companies manufacturing or servicing military electronic equipment.

Over the long run, increasing use of television sets will call for a growing number of technicians, because TV sets are much more complicated than the radio sets they tend to replace. Although the total number of technicians employed will increase, many men who now have their own radio repair shops will be forced out of business unless they can successfully enter the TV repair field.

Earnings and Working Conditions

Radio servicemen working for others generally have lower wage rates than most other groups of skilled workers. Only a small proportion of radio repairmen are union members. Some big cities have associations of independent radio servicemen.

Apprentices or helpers in television work had weekly earnings ranging from about \$30 to \$60 in 1949. Supervisors and foremen had earnings ranging from about \$60 to \$120 a week. Many TV technicians are members of the International Brotherhood of Electrical Workers; some belong to other unions.

Radio repairing is inside work. Television technicians frequently have to work outside while putting up and adjusting aerials; sometimes this means climbing to dangerous positions on roofs and working in bad weather.

Where To Go for More Information

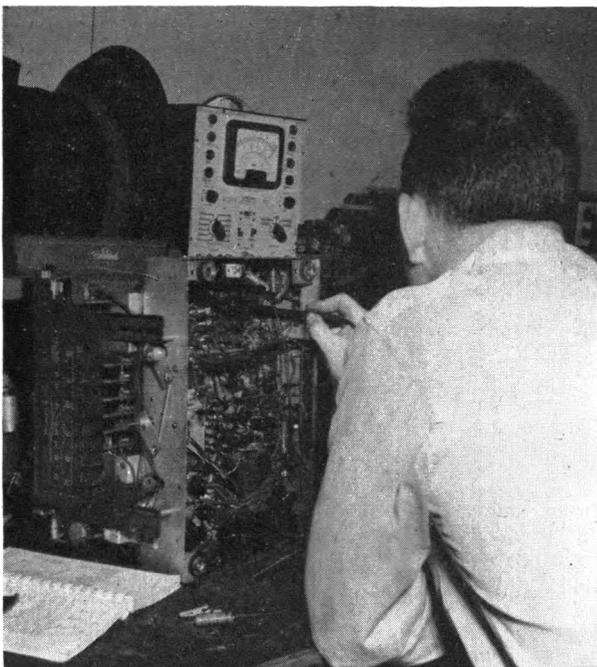
Some communities have radio servicemen's organizations that can provide information on employment opportunities, wages, and working conditions. Servicemen interested in going into business for themselves will find valuable information in:

U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce. Establishing and Operating an Electrical Appliance and Radio Shop. Industrial (Small Business) Series No. 28. Superintendent of Documents, Washington 25, D. C., 1946. Price 35 cents.

See also Radar Technicians, p. 172; and Broadcasting Engineers and Technicians, p. 103.

Radio repairman locating "trouble" in a home receiver.

PHOTOGRAPH BY U. S. DEPARTMENT OF LABOR



Telephone Installation and Maintenance Craftsmen

(D. O. T. 5-53.030, .250, and .410)

Outlook Summary

Employment likely to remain at about the 1950 level for several years, with several thousand openings each year resulting from turn-over. Stable employment over long run.

Nature of Work

Group includes station installers and repairmen, who install and maintain telephone equipment in private homes, offices, and pay telephone booths; PBX installers and repairmen, who work on private switchboard equipment; central-office repairmen, who do maintenance work on the telephone companies' central-office equipment; linemen, who string and repair wire and place cable; and cable splicers, who splice and maintain aerial and underground cable. Most workers in these occupations are employed by the associated companies of the Bell System, but some work for independent telephone companies, which have about a sixth of the total telephones in the United States.

Qualifications

High-school graduates are given preference for jobs in these occupations, and a knowledge of basic principles of electricity is an asset. New entrants are usually hired for general telephone work and are given all-round classroom and on-the-job training. Then they are placed in the particular occupation where workers are needed. They usually progress within a single craft, though men are often shifted from one type of work to another as the need arises. It usually takes about 8 years to advance to the top of the wage-progression schedule in the Bell System companies. Some of the small companies also have progression schedules covering varied periods of time, but others promote workers on the basis of their individual competence. Veterans are usually granted some credit for training and experience received in the service.

Outlook

Employment of telephone installation and maintenance craftsmen probably will remain at about the present level over the next few years. The number of men in these occupations was about 135,000 in October 1949, about twice the figure reported in late 1945. The work force was expanded to install and maintain an average of more than 3,000,000 additional telephones each year. When the enormous backlog created by the depression of the Thirties and World War II will have been taken care of, installations will be made at a more moderate rate. In late 1949, however, the associated Bell Companies alone still had about 800,000 unfilled orders for telephones.

The volume of repair and maintenance work will continue to rise as new phones are added and should serve to maintain present employment levels even though there will be a decrease in the number of installations. Although employment will remain fairly level in the early fifties, turn-over rates may rise as men enter the armed services and as a tighter labor market makes it easier to shift from one job to another.

Employment probably will tend to increase slowly over the long run. Many of the Nation's families—in both urban and rural areas—are waiting for telephones; the construction of facilities to provide this service is going ahead actively. Moreover, the growing population will create additional demand for telephone service. Special types of telephone service, such as automobile installations, will continue to expand, although this will be a very small factor for many years.

Gains in employment which will result from the rising number of telephones in use will be partly limited by improvements in telephone equipment which will enable each maintenance man to service a larger number of phones. However, the mechanization program, including dial equipment, intertoll dialing, etc., and developments such as coaxial cable, radio relay, etc., are resulting in a large increase in the central office forces which

will tend to offset any reduction in outside forces such as cable splicers and other craftsmen who handle lines and cables.

Earnings and Working Conditions

Starting rates with Bell companies ranged from about \$30 to \$38 a week in late 1949, depending on the community. The highest salaries provided for by the progression schedules varied from about \$72 to \$90 (somewhat less for linemen). The standard workweek is 40 hours, but overtime is

frequently necessary. Linemen have to work out-of-doors in all kinds of weather.

Where To Go for Additional Information

People interested in employment with a telephone company should go to their nearest central office where they will be directed to the proper person.

See also Central Office Equipment Installers, Telephone, page 176; and Linemen and Troublemakers, page 468.

Telephone, Central Office Equipment Installers

(D. O. T. 5-53.010)

Outlook Summary

Employment likely to decline in next several years. A limited number of men will be hired to meet replacement needs in early fifties.

Nature of Work

This group is engaged mainly in installing manual and dial switchboards and other equipment in the central offices of telephone companies. In general, the duties involve placing the equipment in locations designated in floor plans, connecting the various units with cables, and adjusting the devices for maximum efficiency. The principal employer is Western Electric Co., a subsidiary of the American Telephone and Telegraph Co. The next largest is the Automatic Electric Co., which produces a good deal of equipment for foreign companies as well as for independent telephone companies in this country. The associated companies of the Bell System also employ a small number of installers in large cities, to make relatively simple installations.

Qualifications

Applicants must have at least a high-school education or its equivalent. Courses in electricity are an asset. Men with college education have an advantage in competing for advancement within the company, especially if they have engineering training. It is absolutely necessary that the applicant be willing to travel.

The Western Electric Co. gives new employees on-the-job training, supplemented as required by classroom training. It takes about 6 years to work

up to the top of the progression schedule. Some of the small companies also have progression schedules covering various period of time, while others promote workers on the basis of their individual competence.

Outlook

Employment will decline gradually from the high level of late 1949 through the early fifties. The number of installers working for the Western Electric Co. grew rapidly in the early postwar period. At the end of World War II, there were 3,700 installers as compared with 16,700 in early 1949. During this period, the Bell System alone installed 10,000,000 telephones, an expansion which would have been impossible without a tremendous enlargement of central office facilities. During the next several years, a great deal of equipment will be installed to convert manual systems to dial and to expand central offices, but probably less equipment will be installed each year than during the years between 1946 and 1949. Because of decline in employment the number of job openings will be small, although there will be some as a result of turn-over in the occupation.

After the next few years, when the postwar expansion and modernization program is completed, openings will arise much less frequently than at any time since the end of World War II. Most of the hiring will be to replace installers who die, retire, are promoted, or leave their jobs for other reasons. Employment probably will tend to be relatively stable, since there is likely to be a continuation of the long-run growth in the use of telephones.

Earnings and Hours of Work

For most installers, wages started at 90 to 97 cents an hour in early 1949, with increase up to a maximum of \$1.56 to \$1.69 an hour after 6 years' experience. The standard workweek is 40 hours, but it is often necessary to work overtime.

Where To Go for Additional Information

People interested in employment as a central-office installer should go to the nearest telephone company office, where they will be directed to the proper person for information.

See also Telephone Installation and Maintenance Craftsmen, page 175.

Refrigeration and Air-Conditioning Mechanics

(D. O. T. 5-83.941)

Outlook Summary

Limited numbers of apprentices will be hired during the early fifties. Employment trend upward over long run.

Nature of Work

Refrigeration mechanics install and service large self-contained refrigeration and air-conditioning units of the types used in such places as food stores and restaurants. They must know refrigerants and how to repair compressors, condensers, pumps, and other equipment. Central systems, such as those used in theaters, factories, office buildings, and cold storage warehouses use a good deal of piping, electrical, and sheet metal duct work. This type of installation requires the services of craftsmen such as sheet metal workers, pipefitters, and electricians in addition to the refrigeration specialists. The stationary engineers who maintain the big central systems and men who repair only household refrigerators are not covered by this report.

Mechanics usually work for heating, refrigeration, or air-conditioning contractors and for companies that sell and service large self-contained refrigeration and air-conditioning units. Many are in business for themselves as contractors. Some mechanics are employed by manufacturers of refrigeration and air-conditioning equipment.

How To Enter

The usual way of becoming a mechanic is to serve a 5-year formal apprenticeship in programs jointly supervised by unions and employers. In areas where the trade is not organized, shop helpers and assistants frequently learn the trade by

working on the equipment over a period of years. Sometimes men who repair household refrigerators are given an opportunity to learn how to install and repair the larger equipment. Young men are usually preferred for apprenticeships and other beginning jobs, but age requirements are frequently waived for veterans.

In some cities mechanics are required to have licenses. Many cities require that refrigeration contractors be licensed.

Outlook

The total number of men employed as refrigeration and air-conditioning mechanics will increase

Mechanic repairing an air conditioner.

PHOTOGRAPH BY U. S. DEPARTMENT OF LABOR



over the long run, owing to expanding use of commercial and industrial refrigeration and air-conditioning equipment. An increasing number of mechanics will be needed to install and repair air-conditioning equipment—mostly for commercial users, such as stores, restaurants, and office buildings. Air-conditioning systems for private homes are still too costly for all except the comparatively small number of high-income families. Industrial process air-conditioning and refrigeration will also employ more and more men. Employment on commercial refrigeration, ranging in size from walk-in boxes to cold storage warehouses, will have an upward trend for many years to come. The long-run upward trend in employment in this occupation may be interrupted during the early fifties, however, if defense preparations make it necessary to cut back production of civilian refrigeration and air-conditioning equipment.

In any event, it probably will be difficult for beginners to enter the trade. Commercial and industrial refrigeration and air-conditioning work is concentrated in cities where the trade is organized and men become journeymen mechanics by serving apprenticeships. Even in good times there are usually many more applicants for apprenticeship than can be taken on.

Earnings and Working Conditions

Separate earnings information for air-conditioning and refrigeration mechanics is not available. However, minimum union wage rates for pipefitters in major cities on July 1, 1949, ranged from \$1.90 to \$3 an hour; from \$1.50 to \$3 for

electricians; and from \$1.75 to \$2.75 for sheet metal workers. Apprentices generally start at less than half the journeyman's rate. They get increases after each 6 months and after completing their apprenticeships get the journeyman's rate.

Many mechanics, especially in large cities, are represented by the United Association of Journeymen and Apprentices of the Plumbing and Pipe-Fitting Industry. This union, the International Brotherhood of Electrical Workers, and the Sheet Metal Workers' International Association represent most of the workers who install and repair air-conditioning and refrigeration systems.

Except in the southernmost regions of the United States the demand for repair services and new installations is seasonal. During peak summer months overtime work is common.

Where To Go for Additional Information

Further information on the nature of the work, apprenticeship and other training opportunities, earnings, etc., may be obtained from:

Local unions of the United Association of Journeymen and Apprentices of the Plumbing and Pipe-Fitting Industry (AFL), the International Brotherhood of Electrical Workers (AFL), the Sheet Metal Workers' International Association (AFL), and local air-conditioning and refrigeration contractors associations.

See also Electricians, page 393; Electrical-Household - Appliance - Servicemen, page 171; Pipefitters, page 389; Sheet Metal Workers, page 395.

Gunsmiths

(D. O. T. 5-83.542)

Outlook Summary

Openings for new workers will be extremely scarce in the early fifties. This is a very small occupation and turn-over is very low. A slight increase in employment likely in the long run.

Nature of Work

The gunsmith rebuilds, repairs, and alters small firearms such as rifles or pistols. His duties include the replacement of broken and worn-out

parts and the making of new parts, frequently involving the use of such machine tools as the lathe and grinding machine, as well as many types of hand and woodworking tools. In addition, the more skilled gunsmiths spend a great deal of time designing and making new guns. In designing new guns they may have to lay out the plan on paper, select the proper materials, and do precision machining and wood shaping.

Most gunsmiths are proprietors of their own small shops. There are two main types of shops,

each employing different types of workers: (1) Combination locksmith and gun-repair shops operated by mechanics who do general repair work on mechanical equipment and guns. The gun repair work in this type of shop is primarily seasonal. (2) Shops operated by expert craftsmen who work on guns throughout the year and who specialize in intricate jobs, very often working on unusual and expensive arms. Since the war, a growing number of such expert craftsmen are also being employed by general sporting goods shops.

The American Rifle Association estimated that there were about 5,000 men doing some gunsmith's work in 1949, but only about 500 of these were engaged in gunsmithing on a full-time basis. There are gunsmiths' shops throughout the country, but the greatest number are located in areas where hunting is an important sport. The following 10 States issued the most hunting licenses in the 1948-49 hunting season, ending June 30, 1949: Michigan, Pennsylvania, New York, Ohio, Minnesota, California, Illinois, Wisconsin, Indiana, and Washington. Some of the gunsmiths' shops in the small towns do a large volume of mail order business derived from their advertising in national sports magazines. Most locksmith and gun repair shops are located in cities and the larger towns.

How To Enter

The most common way of learning this trade is through practical experience. Those working in lock and gun repair shops usually start in as helpers and learn on the job. Most expert gunsmiths started out by tinkering with their own guns as a hobby and then became interested enough to study and acquire some machine-shop experience. After doing this for a few years, some men may undertake small repairs for their friends, doing the work after hours in their garage or basement shop. By starting out on just such a small scale and gradually acquiring a good reputation, a few men have been able to establish themselves in business on a full-time basis.

An apprenticeship is about the best way to learn this trade, but there are very few gunsmiths shops large enough to spare the time of an expert craftsman to supervise the training. However, there are several vocational schools, mostly located in the West, which give good training courses in gunsmithing. Even graduates of these schools must

get several years of working experience before they can be considered as experts.

The main personal qualification for a man who wants to become a gunsmith is a love of guns. He must also have a high degree of mechanical ability. At least a year of machine-shop training, either in school or through working in a machine shop, is also essential. Men who did some gunsmithing in military ordnance departments during the war usually must get several years more of civilian experience before they are considered fully qualified.

Outlook

So few men do gunsmithing as a full-time job (only 500 in 1949) that the number of replacements each year needed for those who die, retire, or transfer to other work, will be extremely small in the early fifties. More than enough skilled experienced people will be available to fill any such openings, since so many men already do this on a part-time basis. Therefore, opportunities will be very limited for newcomers who want to do this work full time. There may be occasional opportunities, however, for a really skilled young man with a good record of experience as an amateur gunsmith, to do gunsmithing on a part-time basis.

The amount of work available for gunsmiths depends largely on the amount of hunting being done. Since World War II, hunting has become more popular than ever (over 12½ million hunting licenses were issued for the 1948-49 season, one and one-half times as many as before the war.) Many men became interested in this sport as a result of their military experiences. Game conservation programs have increased the amount of wildlife available for hunting in many areas.

In the long run there is likely to be only a slight increase in full-time employment of gunsmiths, and the occupation will continue to be very small. There will also be a moderate number of openings in locksmith and general repair shops.

Where To Go for More Information

Information on the name and location of training schools, as well as job requirements and employment opportunities, may be obtained from:

National Rifle Association of America,
1600 Rhode Island Ave., NW.,
Washington 25, D. C.

The publication of this organization, *The American Rifleman*, frequently carries technical articles,

help wanted columns, and other information of value to anyone interested in entering this field.

Industrial Machinery Repairmen

(D. O. T. 5-83.641)

Outlook Summary

Increasing employment is in prospect in this occupation.

Nature of Work

Industrial machinery repairmen, often called maintenance mechanics, maintain and repair machinery and other mechanical equipment in all types of industrial plants. Their duties include examining the machinery to determine cause of trouble, dismantling, repairing, or replacing defective parts, reassembling the machinery, and making necessary adjustments for efficient operation. Often some of the duties of the millwright in the moving and assembling of machinery and equipment are included. Maintenance mechanics usually specialize in the type of machinery or equipment used in the industry in which they are employed, and generally are required to have a knowledge of the operation of the machines which they repair.

Where Employed

These workers are employed in almost every type of industrial plant which uses any great amount of machinery or equipment. Many industrial machinery repairmen are employed in metalworking establishments including plants making automobiles, electrical equipment, iron and steel products, and machinery. Automobile plants employ well over 4,000. Other groups work in nonmetal industries such as textile mills, petroleum refineries, chemical plants, and paper and pulp mills; several thousand are employed in coal and metal mining.

Because industrial machinery repairmen do maintenance work in such a wide variety of industries, some are employed in every section of the country. These workers are concentrated, however, in the principal industrial States including

New York, Pennsylvania, Ohio, Illinois, Michigan, New Jersey, California, and Massachusetts.

Training and Qualifications

The amount of skill and training required for industrial machinery repairmen varies widely with the type of machinery and equipment in the plant. Training is usually obtained on the job, particularly since workers often specialize on one type of equipment. In many plants, machinists or machine operators are transferred to the maintenance department to do this job; in other plants inexperienced workers are hired as helpers and learn the job while working. A 3- or 4-year apprenticeship may be required by some firms.

Outlook

The expected rise in industrial activity due to expanding defense requirements will increase the number of maintenance mechanics during the 1950-60 decade. Many openings will result from the need to replace workers who switch to other jobs, retire, die, or are called up for military service. Over the long run, the growing mechanization of industry is expected to increase the need for maintenance mechanics to keep production equipment in working order.

Earnings

Industrial machinery repairmen are generally among the better-paid maintenance workers. Their earnings vary considerably among industries.

Recent data on earnings of industrial machinery repairmen are not available for most industries. However, in passenger automobile manufacturing plants in February 1950, these workers averaged \$1.89 an hour, and in the airframe industry in May-June 1949, they averaged \$1.62 an hour.

See also Millwrights, page 223.

Jewelers and Jewelry Repairmen

(D. O. T. 4-71.010, .020, and .025)

Outlook Summary

Limited number of openings for those who wish to learn these trades in the early fifties. Little increase in employment likely in the next 10 or 15 years.

Nature of Work and Where Employed

Jewelers make or repair rings, pins, earrings, bracelets, necklaces, chains, fraternal emblems, religious jewelry, and other ornaments. They may also design jewelry, do hand engraving, or set stones. They work with metals such as gold, silver, platinum, or palladium, and precious, semiprecious, and synthetic stones. The manufacture of a piece of jewelry is done mostly by hand and involves such skilled operations as making molds according to design, casting metals, shaping and filing down the rough piece, soldering and polishing. Repair work, usually less complicated, consists of such jobs as making rings larger or smaller, soldering broken parts, or resetting stones.

Jewelers are employed in retail stores, trade shops, and manufacturing establishments. Trade shops are small establishments which repair jewelry or make jewelry on a custom order basis for the retail stores in a particular locality. Retail stores and trade shops usually employ only a few jewelers—in many retail stores there is only one skilled man.

Precious jewelry is manufactured in a large number of small shops and in a few large establishments. In the small shops, most of the work is made to order, so that a large proportion of the employees are highly skilled all-round jewelers. In the larger establishments, there is considerable specialization among the skilled workers. Some of them set diamonds, others design jewelry, do hand engraving, assemble parts, or polish the finished pieces. Also, the bigger manufacturing plants employ a much larger proportion of semi-skilled and unskilled workers than do the small shops.

About 1,350 establishments manufacturing precious jewelry employed an average of 20,600 production workers in 1947. The New York City area

(including northern New Jersey) is the largest center of precious jewelry manufacturing. The Providence, R. I.-Attleboro, Mass., area ranks next in importance in precious jewelry manufacturing.

How To Enter

It takes 2 to 3 years of on-the-job training and experience in the trade to become qualified to handle the simpler jobs, and several years more to become a highly skilled all-round jeweler. The beginner may start out as a charger (setting up the work for soldering) or do simple soldering or rough polishing; as he gains experience he may



PHOTOGRAPH BY U. S. DEPARTMENT OF LABOR

This skilled jewelry worker is setting a diamond—a job that takes several years of practice to do well.

get a chance to undertake more difficult work. The best way to learn the trade is through an apprenticeship training program which takes from 2 to 4 years. However, since only a few of the larger shops are able to undertake such formal training programs, apprenticeships are not widespread in this industry.

There are trade schools which teach jewelry work, but even with school training, it is necessary for the newcomer to get several years of practical

experience before he is considered a skilled worker. Many employers send their apprentices and other trainees to day or evening classes in these trade schools, and consider the time spent as part of their working hours; in some instances the employer pays the tuition.

To become an all-round jeweler, it is necessary to have artistic talent and mechanical ability. Because this is light sedentary work, it has been found suitable for people with physical handicaps of certain types. Many disabled veterans have been employed successfully in this field. Skilled jewelers sometimes set up their own small manufacturing shops or acquire retail stores or trade shops.

Outlook

Young people who want to become jewelers will have difficulty finding openings where they can learn the trade in the early fifties. Little expansion from 1949 employment levels is expected in either jewelry manufacturing or retail trade. Almost all openings will rise through turn-over. Beginners will have a better chance of getting started in the manufacturing shops, because that is where most skilled jewelers are employed and because retail jewelry stores prefer to hire skilled workers. However, in manufacturing shops the number of apprentices is limited by union agreement. Despite a scarcity of openings, some applicants with a high degree of artistic talent and mechanical ability will be able to find jobs, since this is a field where employers are always searching for fresh and original talent. Moreover, there will continue to be a demand in manufacturing shops for certain highly specialized craftsmen such as hand stone setters, model makers, and sample makers.

Employment of jewelers depends to a great degree on general business conditions, since this is a luxury trade. However, even with good business conditions, little increase in employment is likely in the next 10 years.

Earnings and Working Conditions

According to a survey made by an employers' association, average earnings for skilled workers in precious jewelry manufacturing shops in the

New York City area were about \$2.10 an hour in late 1949, or about \$70 to \$75 for the customary 35-hour week. Many are paid on a piece-work basis, but their earnings were about the same. Apprentices started at 70 cents an hour and received increases every 3 months until they reached the journeyman's rate. Fall is usually the busiest season in jewelry manufacturing. Many skilled workers belong to the International Jewelry Workers Union, AFL, some to the Playthings, Jewelry, and Novelty Workers International Union, CIO.

The general range of earnings of men employed in retail stores and trade shops in late 1949 was about \$60 to \$160 a week. Earnings vary considerably at different seasons of the year, following closely the fluctuations in retail jewelry sales. Top earnings usually come before and immediately after Christmas. Self-employed repairmen may work considerable overtime during that period. Summer is usually the slowest season.

Where To Go for More Information

Additional information on job opportunities, training, earnings, and related matters may be obtained from the following organizations:

International Jewelry Workers Union, **AFL**,
Suite 825, 551 Fifth Ave.,
New York 17, N. Y.

Jewelry Crafts Association, **Inc.**,
20 West 47th St.,
New York 19, N. Y.

National Association of Credit Jewelers,
545 Fifth Ave.,
New York 17, N. Y.

Playthings, Jewelry & Novelty Workers International
Union, **CIO**,
225 Lafayette St., Rm. 606,
New York 12, N. Y.

The following pamphlet contains information helpful to those interested in going into business for themselves.

U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce. Establishing and Operating a Jewelry Store. Industrial (Small Business) Series No. 55. 1947. Out of print but available in many public libraries.

See also Costume Jewelry Workers, page 227.

Shoe Repairmen

(D. O. T. 4-60.100)

Outlook Summary

Declining occupation. Limited number of opportunities for trained men to take over businesses of older repairmen or to open new shops. Men learn trade by working with experienced shoe repairmen.

Nature of Work

The shoe repairman (often called a shoemaker) resoles and reheels shoes and performs various other repair jobs. To resole a shoe, he first rips off the old sole with a pair of nippers and levels and sands the welt (narrow strip of leather between the shoe upper and the sole). Next, the new sole is set in place over the welt and permanently attached either by cementing, nailing, or machine stitching. Then the edges of the new sole are held against a revolving trimmer until the sole is trimmed to the shape of the shoe. Finally, the bottom of the sole is buffed, and the edges and bottom are waxed and stained to give a finished appearance. In reheeling, the old heel must be snapped off, and a new one shaped and fastened into place. The new heel is buffed and finished in the same manner as new soles. Numerous other shoe repair services, such as cleaning, dyeing, stretching, stitching ripped seams, patching holes, attaching heel and toe plates, and replacing buttons and buckles, are a part of the everyday work of the shoe repairman.

There were roughly 50,000 shoe repair shops in 1939, most of which were small one-man businesses. Altogether, there were about 60,000 shoe repairmen. In large cities, shoe repair facilities are often combined with other types of personal services, such as dry cleaning, laundry, hat blocking, and tailoring. Shoe repairmen sometimes own the concessions in these valet shops.

How To Get Into the Trade

The most common method of entering this trade is by serving an apprenticeship of about 2 years under an experienced shoe repairman. However,

many repairmen pick up the trade by getting a minor job in one of the large shops and advancing from the least difficult to the most difficult operations. Less emphasis is placed upon apprenticeship in large shops, where beginners are often hired and trained in a few months to do one particular operation. Vocational schools teach this trade, but most employers prefer people trained on the job. Those who have had school training usually are not considered fully qualified until they have had some practical experience.

The majority of repairmen eventually go into business for themselves. Several years' experience working for someone else is valuable, not only to develop skill, but to learn how to operate a shoe repair business.

Outlook

In general, prospects for opening successful new shops will not be good. Nevertheless, men who have learned the trade by working for some one else as a helper or apprentice will occasionally find favorable opportunities to take over shoe repair businesses or concessions, or to open new shops. Some beginners will be hired as helpers to replace these workers and to replace helpers and apprentices who leave the occupation to take other jobs. However, because the number of shops is not expected to increase, there will be only a limited number of helper openings.

The number of shoe repairmen has decreased over the past 30 years. Introduction of labor-saving machinery has been the chief factor making it possible for fewer repairmen to serve a greater number of people. The trend of employment probably will be downward in the future, also, partly because leather soles and heels are being replaced by new type composition soles and heels which outwear leather by a considerable margin. Moreover, advances in labor-saving repair equipment and the tendency for larger, more efficient shops to get a greater share of the work will make it possible for fewer repairmen to handle a given amount of work. Population growth, on the other

hand, will partly offset the factors making for decreased employment.

Earnings

No recent information is available on the earnings of owner-operators, who comprise the great majority of shoe repairmen. Wages for skilled employees in the big cities in late 1949 ranged between \$55 and \$80 a week; for semiskilled workers, \$35 to \$45. Hours of work are often long. Employment in shoe repairing is fairly steady throughout the year, with the busiest season occurring in early spring and fall. There is some

unionization among shoe repairmen, especially in the larger cities.

Where To Go for More Information

The following publication contains valuable information for persons interested in going into the business for themselves:

U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce. *Establishing and Operating a Shoe Repair Business*. Industrial (Small Business) Series No. 17. 1945. Superintendent of Documents, Washington 25, D. C. Price 45 cents.

Watch Repairmen

(D. O. T. 4-71.510)

Outlook Summary

Limited number of openings for jobs in the early fifties. Graduates of first-rate training schools have best chances of finding beginning jobs. Slight increase in employment likely over the long run.

Nature of Work

Watch repairmen (who are frequently referred to as "watchmakers") repair and adjust timepieces. This involves a variety of duties such as inserting new springs, refitting pivots, truing balance wheels, and grinding old parts or making new parts. These workers also clean and oil the parts, refinish dials, and repair or replace wristbands. In small shops, watch repairmen may perform some of the simpler types of jewelry repair and sometimes sell jewelry and watches. It is customary to specialize in either watch or clock repair work. The latter generally requires less skill than the former.

Where Employed

Most watchmakers work in retail jewelry stores or separate watch repair shops, either as owners or employees. Some of the separate watch repair shops service the public directly, while others, known as trade shops, repair watches for retail

stores. Many watch repairmen are also employed in department stores and mail order houses. In some instances, watchmakers operate a watch repair concession in a retail store. A small number of watch repairmen are also found in jewelled-watch factories and in firms that import watch movements and parts and assemble them into complete watches.

There were about 35,000 to 40,000 watchmakers employed in early 1949, including a small number of women. They work in all parts of the country, but the greatest proportion are concentrated in large cities.

How To Enter

Watch repairing is extremely intricate and precise work which requires much patience as well as a high degree of mechanical skill. Since this is light sedentary work it is suitable for many handicapped people.

Anyone wishing to enter the trade will find it difficult to do so without a year and a half to 2 years of training in one of the better watchmaking schools. There were about 125 schools of watchmaking in operation in late 1949, but some of these schools did not give training that was of a quality acceptable to most employers.

The best watchmakers' schools provide thorough training in all phases of the trade, but even their graduates need many months of experience and

practice on the job to reach a high rate of output. Men trained at lower-rated schools may need 3 to 5 years of work experience to become highly skilled. Some employers employ men with less than a year's training in a school or with no school background at all and attempt to train them on the job, but watchmakers are usually too busy now to give beginners adequate attention. Only a small number of the larger shops have formal apprenticeship programs. Small shops, particularly in large cities, generally hire only skilled men.

Certificates, which are widely recognized by employers throughout the country, are issued by the Horological Institute of America to those who are able to pass the Institute's examinations and thus demonstrate a certain quality of workmanship. Certified watchmaker certificates are granted to those able to pass a relatively simple examination, usually men who have completed watchmaking school or the equivalent in on-the-job training. Master watchmaker certificates are awarded to men who pass the more difficult examination, usually men who have had about 5 or more years' experience. Certificates of proficiency are also issued by the Testing and Certification Laboratory of the United Horological Association of America. However, the States which require licenses—namely, Wisconsin, Indiana, Iowa, Minnesota, Oregon, Louisiana, and Oklahoma—will not accept the certificates of either organization in lieu of their own examinations. The State of Ohio requires no license, but has regulations specifying the minimum number of hours of training a watchmaker must have in order to practice his trade.

Outlook

In 1950 there was an ample supply of men trained in watchmaking. There was such a great influx of newly trained watchmakers in the late forties, composed mainly of veterans, that by early 1949, employment had risen to nearly double the prewar figure. Although the number of openings for newcomers will be fewer in the early fifties, watchmaking schools probably will turn out more than 1,000 graduates each year.

Almost all of the openings which arise in the

next several years will result from turn-over in retail shops, although a limited number of additional watchmakers will be needed by factories producing military equipment. Graduates of first-rate watchmaking schools will have a strong advantage in getting jobs.

In the long run there is likely to be a slow increase over present levels of employment. The number of watches in use will probably continue to increase. Not only will many persons who do not now have watches buy them, but there is a growing tendency for people to own more than one watch, to wear watches as costume jewelry, and to buy more and more children's watches. Moreover, the continuing popularity of small watches will also help to keep up a large volume of repair work, because they break down more frequently and are much harder to fix.

Earnings and Working Conditions

In late 1949, a beginner trained in a first-rate watchmaking school could expect wages of \$40 to \$60 a week. Typical earnings of experienced men working for other shops were between \$70 and \$85 a week. Earnings of self-employed watchmakers vary considerably, depending largely on the volume of repair work and in case of retail jewelry stores, also upon the volume of sales. Work and earnings are fairly steady throughout the year.

Only a small proportion of watchmakers belong to unions; The International Jewelry Workers Union, AFL, has organized some of the watchmakers employed in retail stores in a few of the larger cities.

Where To Go for Additional Information

For data on job opportunities, schools giving training courses acceptable to the trade, and similar matters write to:

Horological Institute of America,
P. O. Box 4355,
Washington 12, D. C.

United Horological Association of America,
1549 Lawrence St.,
Denver 2, Colo.

See also *Watch and Clock Factory Workers*, page 235.