

# EMPLOYMENT OUTLOOK IN PRINTING OCCUPATIONS



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. 1126



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A Reprint from the

1951 Occupational Outlook Handbook

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## LETTER OF TRANSMITTAL

UNITED STATES DEPARTMENT OF LABOR,  
BUREAU OF LABOR STATISTICS,  
*Washington, D. C., February 2, 1953.*

The SECRETARY OF LABOR:

I have the honor to transmit herewith a report on the employment outlook in printing occupations 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 the printing occupations to replace our Bulletin No. 902, issued in 1947, which described the outlook in this field.

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 the major 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.

HON. MARTIN P. DURKIN,  
*Secretary of Labor.*

EWAN CLAGUE, *Commissioner.*

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Cover Picture—Courtesy of Columbia Typographical Union, No. 101, Washington, D. C.

## PRINTING OCCUPATIONS

Printing is an art, a great industry, and one of our chief means of communication. Its contribution to the growth of democracy was so fundamental that freedom of the press was one of the basic rights incorporated in the first amendment to the United States Constitution.

Printing workers make up one of the largest occupational groups in American industry. In 1949, jobs in the printing, publishing, and allied industries numbered about 725,000, of which roughly half a million were production and related workers. Outside the industry itself, many thousands of printing workers were employed by governmental agencies, factories making items involving printing but which are not essentially graphic arts products, businesses doing their own commercial type printing, libraries, and other categories of employers.

### *Methods of Printing*

Printing is essentially a means of putting ink on paper, metal, or other types of materials. Present-day printing is done with the use of plates which are "run" on special printing presses.

There are three basic methods of reproduction—letterpress, gravure printing, and lithography. In letterpress (also known as relief) printing, the letters and designs to be reproduced are raised above the nonprinting areas of the type or the press plate. When the actual printing is done, ink is applied only to the letters and designs, usually by means of an inking roller.

In gravure (or intaglio) work, the relation between the printing and nonprinting areas of the plate is opposite to that in letterpress. The letters and designs to be printed are cut or etched into the plate and are below the nonprinting surface. Ink has to be applied to the entire plate, but the surface is then wiped or scraped, leaving ink only in the depressions. In printing, suction is created, which lifts the ink out onto the paper.

The plate used in lithography (offset printing) is smooth or nearly so, with both the image and nonimage areas on the same level, instead of on different levels, as in letterpress and gravure work. Lithography makes use of the principle that grease and water repel each other. The image areas of

the plate are coated with a greasy substance to which the greasy printing ink will stick. On the press, the plate is moistened with water before each inking, with the result that only the image areas take up the greasy ink from the inking roller.

In modern lithography the plates are processed photographically, and the method is often referred to as photolithography. There are a few types of work—preparing posters, for example—in which some of the plates are still made by hand.

Letterpress is the oldest and by far the most common printing process. Practically all newspapers, the bulk of books and magazines, and most other printed items are produced by this method. Work done by photoengraving shops (chiefly making plates for use in relief printing of illustrations and other copy that cannot be set up in type) and by stereotyping and electrotyping shops (mainly producing metal and plastic duplicates of type forms and photoengravings for use as press plates) is also part of letterpress printing operations.

Gravure printing, the process least employed (but most rapidly growing) is of two main types: Rotogravure (in which press plates are made from pictures by a method based on photography) and hand or machine engraving. The picture supplements of some Sunday newspapers are the best known rotogravure items. Rotogravure pictures appear in many magazines and are used in other forms as well. Some printing on metal foil is done by this means. Hand or machine engraving is used in making engraved stationery, greeting cards, paper money, bonds, and similar products.

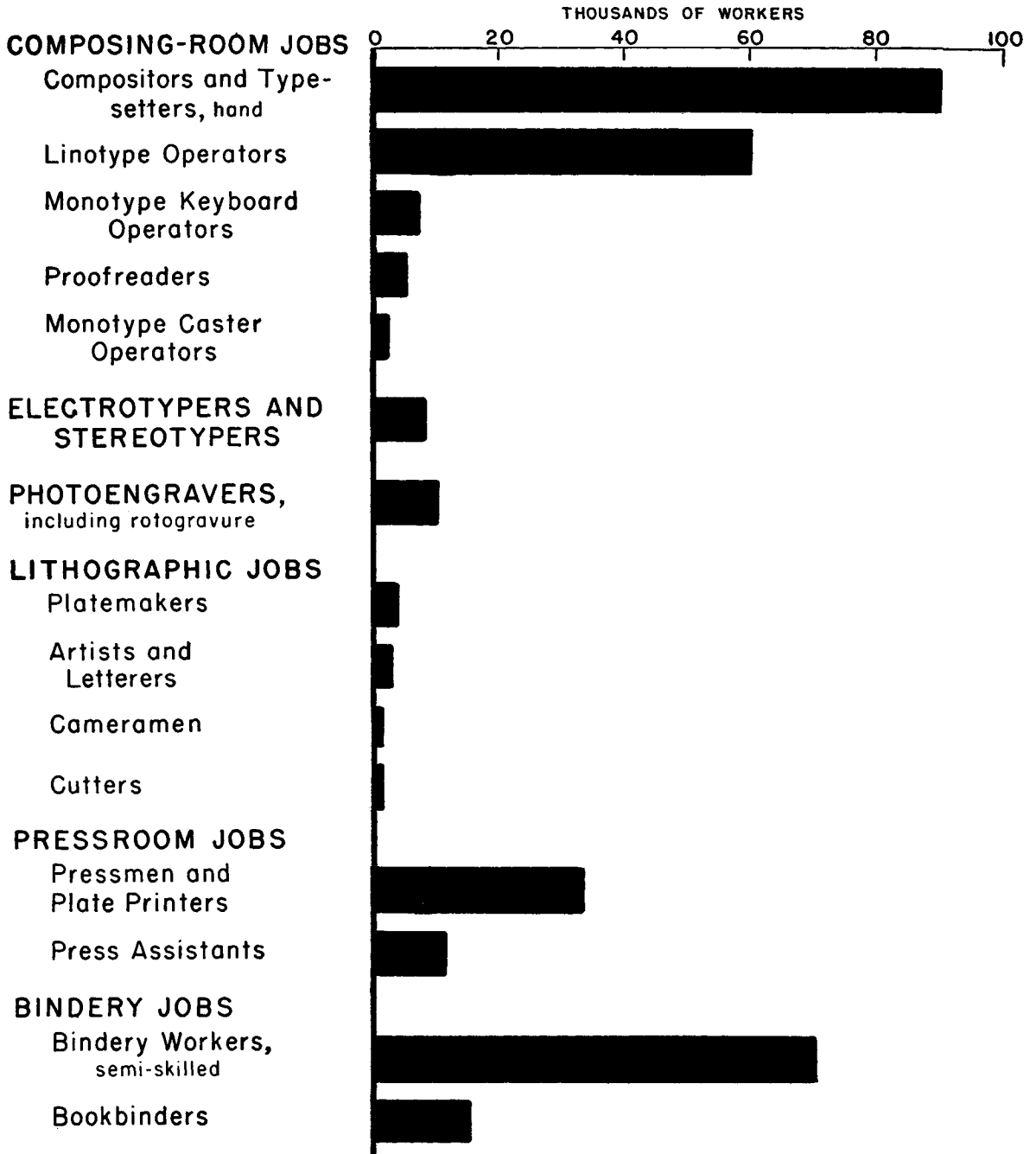
Lithography is in use to a much greater extent than the gravure method of reproduction, but considerably less than letterpress techniques. Practically all items printed by the relief process are also produced by lithography—including, for example, books, calendars, maps, posters, labels, office forms, sheet music, and even newspapers. Almost all printing on metal and much of the printing on rough paper is done by this method.

### *Printing Occupations*

The all-round printer skilled in typesetting and also in operating a press was the typical printing worker up to the closing years of the nineteenth

# MAJOR PRINTING OCCUPATIONS

EMPLOYMENT, 1940



UNITED STATES DEPARTMENT OF LABOR  
BUREAU OF LABOR STATISTICS

BASED ON 1940 CENSUS OF POPULATION  
AND OTHER SOURCES



century. Some craftsmen who are adept in both kinds of work are still employed in small newspaper and job shops. In the printing industry as a whole, however, they are greatly outnumbered by specialized craftsmen and semiskilled employees.

The largest group of skilled and semiskilled workers are in the composing room, the department responsible for typesetting and composition. Other major groups are the printing pressmen and their assistants, photoengravers and rotogravure photoengravers, electrotypers and stereotypers, lithographic workers, and bookbinders and bindery workers. Chart 66 indicates the relative importance of the largest printing occupations.

Besides the occupations shown in chart 66, there are many other small groups of skilled or semiskilled printing workers. In some plants, especially in the newspaper industry, the composing-room work force includes Ludlow operators, who run a typesetting machine known as the Ludlow Typograph. Big composing rooms nearly always employ one or more "stonemen," who place the pages of type in the large type form in which they leave the department.

Another small group of workers, found in large plants, are mechanics who specialize in repairing and adjusting typesetting machines, printing presses, or bindery machines. Steel and copper-plate engravers, on the other hand, work mainly in small engraving shops. They cut or etch lettering and designs into plates by hand or machine.

Most of the occupations indicated in chart 66 and the preceding paragraphs are skilled jobs. The main exceptions are the press assistants and nonjourneymen bindery workers, whose jobs are semiskilled. Proofreaders in nonunion shops are sometimes classed as clerical employees.

In skilled occupations practically all the workers are men. However, many of the semiskilled workers, especially in binderies, are women. Small numbers of Negroes are employed in skilled jobs; a greater number in semiskilled occupations. In the several hundred shops which print newspapers or other items for the Negro community (magazines have experienced unusual growth in recent years) the great majority of workers in all types of jobs are Negroes.

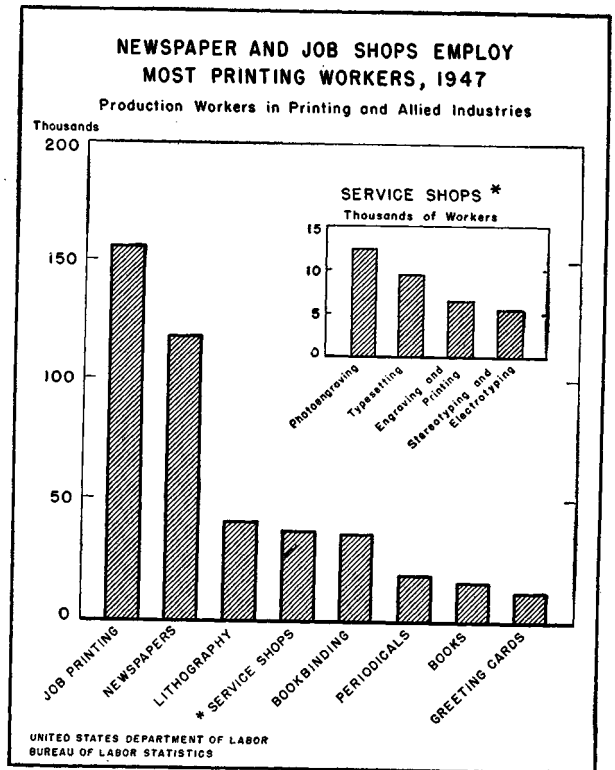
To complete the picture of the printing and publishing work force, the professional, administrative, clerical, and unskilled employees of printing plants should be mentioned. The chief professional workers are the reporting and editorial staffs of newspapers and other publishers. In addition, all sizable plants employ increasing numbers of executives, estimators, salesmen, stenographers, clerks, and laborers of various types; these employees usually have duties much like those of comparable personnel in other industries.

*Fields of Employment*

The establishments engaged primarily in job or commercial printing make up the largest printing industry, in terms of employment of production workers (see chart 67). In 1947, as for many years in the past, about a third of such workers were employed in job shops.

The Nation's commercial plants produce a greater variety of printed matter than the other types of shops. Letterheads, business forms, posters, displays, calendars, and folders are but a few of the many thousands of items made by job plants.

CHART 67



ABOUT HALF THE PRINTING JOBS ARE IN THE MIDDLE ATLANTIC AND GREAT LAKES REGIONS

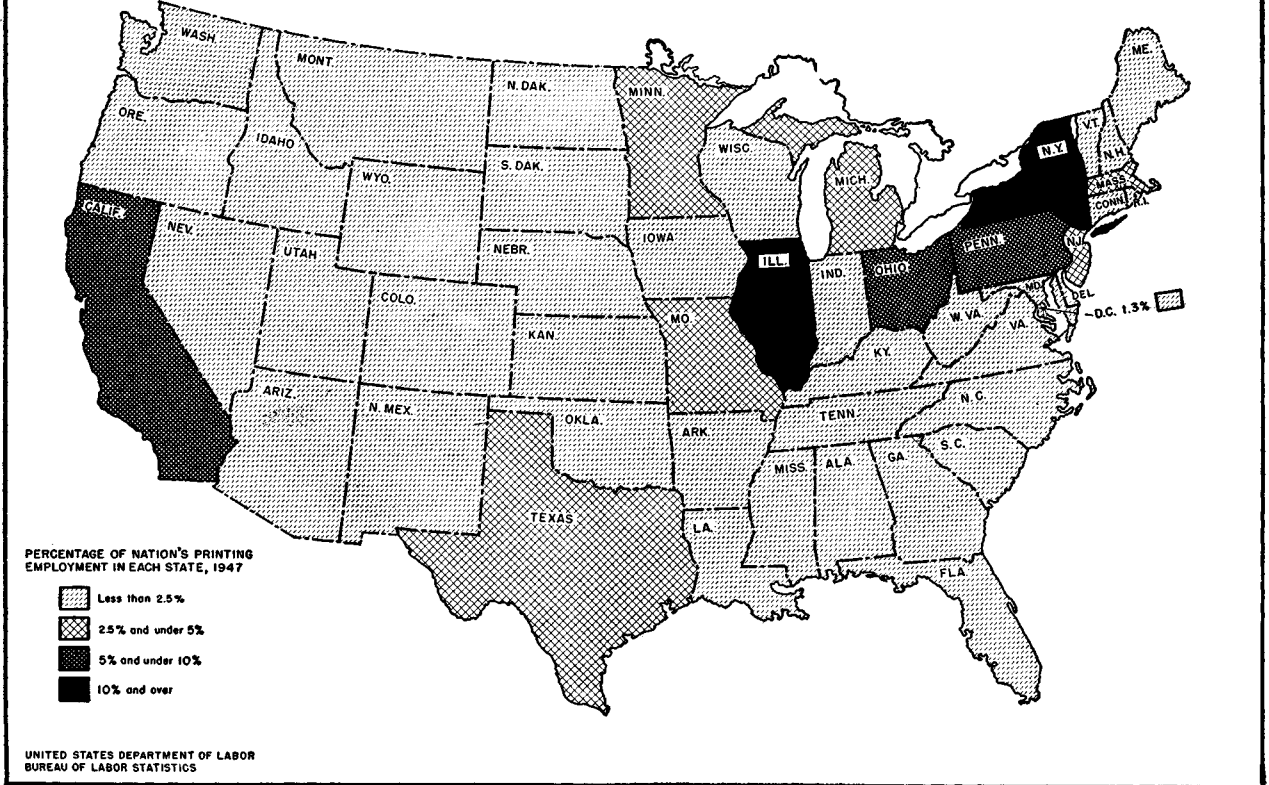


CHART 68

In addition, a large number of these commercial shops do a considerable amount of printing of newspapers, periodicals, books, pamphlets, or other items which are mainly produced in other branches of the printing industry.

Newspapers make up the second largest employer of production workers in the printing and publishing fields. Newspaper plants concentrate mainly on turning out newspapers and do relatively little printing of other materials. On the average, newspaper shops are larger than commercial printing establishments.

As chart 67 shows, lithography was the printing industry's third largest employer of production and related workers in 1947, followed by book-binding establishments and periodical printers and publishers. In addition, a considerable

amount of lithographic reproduction was done in letterpress and other types of printing plants.

Among the smaller branches of the printing industries, according to the 1947 Census of Manufactures, are those made up of its book publishers and printers, greeting card manufacturers, and service shops. The last named do primarily type-setting, engraving (including photoengraving), or electrotyping and stereotyping; this is done as a service to regular printers and others doing their own reproduction work.

In addition to the workers in firms that are mainly engaged in printing, or in publishing and printing, many printing and bindery workers are employed by Government agencies and libraries, and also by manufacturers and other firms doing some printing in connection with their opera-

tions—for example, canned goods producers printing their own labels. The largest printing plant in the world is the United States Government Printing Office in Washington, D. C.

### *Where Printing Jobs Are Found*

As chart 68 shows, well over half of the printing jobs in the country are located in a few States, mainly in the Middle Atlantic and Great Lakes regions. The principal States and cities are New York (New York City), Illinois (Chicago), Pennsylvania (Philadelphia), and Ohio (Cleveland and Cincinnati). Well over half of the Nation's printing is done in these States. Other leading centers are Los Angeles, San Francisco, Detroit, St. Louis, and Minneapolis-St. Paul. Washington, D. C., takes on special importance as a printing center owing to the concentration there of the Government's printing and engraving activities.

Employment in job and periodical printing is concentrated to a considerable extent in these areas. In the newspaper industry, a much larger proportion of jobs is found outside the main centers because of the great number of small, local newspapers scattered elsewhere throughout the country. Almost every small town has a printing shop of some kind—frequently a small newspaper plant which also handles the community's job printing.

### *Earnings and Working Conditions*

Earnings have long tended to be higher in printing than in most other industries, owing to the large number of skilled workers employed, the strong influence of the printing unions, and other factors. In March 1950, production workers and nonsupervisory employees in newspaper plants averaged \$2.12 an hour, considerably higher than in all but a very few industries. In manufacturing, the next highest earnings for the same class of workers were in petroleum refining, with an average hourly figure of \$1.90, in March 1950.

The other printing industries also showed hourly earnings in March 1950 higher than those for most groups: \$1.84 for production workers in periodical printing and publishing; \$1.82 for those in lithographic plants; commercial and job shops, \$1.79; and book printing and publishing, \$1.64. The

average for all printing industries combined was \$1.86; for all manufacturing, \$1.43.

The comparisons and averages cited above refer to production workers and nonsupervisory employees only, but cover all classes of such personnel. They include premium pay for overtime hours worked, extra pay for night shifts, and other forms of compensation which add to base pay.

Earnings may vary considerably among individual printing workers. The differences may be a result of occupational variations in wage scales. The practices of different employers and unions in the same or in different cities may play a part. Many workers receive premium rates for long service, quality work, or for other reasons. Additional factors make for differences in pay between individual workers.

The best source of information on basic pay rates in printing occupations is the union wage scales for selected groups in the important printing centers reported annually to the Bureau of Labor Statistics. Averages obtained from these scales differ from those shown above not only in that the union rates cover only certain individual trades, principally in the skilled crafts, but also in that they are the minimum basic scales for the given occupational classifications and subclassifications.

Union wage scales are usually uniform for each occupation in a given locality, and are representative generally of wage rates in the highly organized skilled trades and, to a lesser extent, those in semiskilled printing jobs. A range indicated for a given occupation and city (as shown in the reports on individual printing occupations which follow) means that there are two or more effective rates falling under the same general occupational classification, based on variations in job content or requirements. For example, the standard photoengraver rate in an area may be \$2.58 an hour, while tint layers in the occupation may earn \$2.84; or there might be a rate of \$1.50 an hour for one-color pressmen in a given city, and \$1.75 an hour for two-color men in the same city, under the same contract. There are frequently differences in the union wage scale between English and foreign-language operations.

The Bureau of Labor Statistics' union wage scales do not include Government scales, although these may be arrived at through negotiation with

employee organizations, including the regular printing trades unions found in private industry. Scales of the Government Printing Office are indicated separately at appropriate points of this report.

Starting pay of an apprentice (see p. 304) is usually 30 or 40 percent of the wage rate for journeymen in the shop. This is increased once or twice a year, until, in the final year or half-year of training, he receives 80 or 90 percent of the journeymen rate. Men who have had some experience in the trade, civilian or military, can often obtain credit for this. They will then start at a wage above the beginning apprentice rate, and the length of time before they become journeymen will be reduced. Veterans who qualify under the GI Bill of Rights may also receive subsistence allowances from the Federal Government during part or all of the training period.

The Bureau of Labor Statistics obtains the separate union wage scales for day and night work. The rates referred to below and elsewhere throughout this report are for day work. More detailed information on union wage scales than appears in this report is available upon request.

In July 1949, union wage scales in the 77 printing centers covered taken together averaged about \$2.50 an hour in the newspaper industry; \$2.08 in book and job work. Three-fifths of the workers covered were employed at scales ranging from \$2 to \$2.60 an hour. In the half-year following July 1949, many wage scales increased. Most increases appeared to fall within a range of 5 to 15 cents an hour, or \$2 to \$6 a week.

In most printing plants, as in many other manufacturing establishments, workers are paid time-and-a-half not only for work in excess of a specified number of hours a week, but also for hours in excess of 8 a day. For such overtime purposes, the standard workweek in mid-1949 was usually 37½ hours in the mechanical departments of newspaper plants where collective bargaining agreements were in effect. Shorter schedules apparently prevailed under contracts in shops outside the newspaper industry. There is considerable variation, however. In newspaper work, for example, according to the American Newspaper Publishers Association, a young man going into a small plant would most likely work a 40-hour week. In a metropolitan plant, he might be on a schedule even shorter than 35 hours.

Work on Sundays and holidays is customarily paid for at time-and-a-half or double-time rates in most branches of printing. In newspaper plants, an individual employee's regular workweek often must include Sundays and holidays; time-and-a-half or double-time is paid for these days only when they are not part of the employee's regular shift. In early 1950, night-shift workers in union shops generally received about \$5 or more extra for the regular workweek.

Yearly earnings of workers depend not only on rates of pay and related provisions, but also on how regularly they are employed. Printing workers are fortunate in having steadier employment and earnings than workers in many other industries. This is true especially in the newspaper field.

Paid vacations are called for by most union contracts. The most common provision is 2 weeks' vacation with pay after 1 year of employment. In addition, the printing unions are noted for welfare provisions for their members. For example, pensions, sanitarium facilities, and educational programs are frequently provided. The principal labor organizations are listed on page 307, and are referred to elsewhere in this report.

### *How To Enter the Field*

Apprenticeship is the accepted way of entering skilled printing occupations. With very rare exceptions, it is the only means by which one may qualify as a journeyman in a union shop, where the ratio of apprentices to journeyman is established by agreement between the employer and unions.

Printing apprenticeships usually require from 4 to 6 years, depending on the occupation and whether the shop is union or nonunion. The training program covers all phases of the particular trade and almost always includes classes in related technical subjects, as well as training on the job.

To be eligible for apprenticeship, applicants are generally required to be 18 (sometimes only 17) years of age and not over 30. A physical examination is usually given to find out whether the applicant is free from communicable diseases, has eyesight adequate for the particular occupation, and is in good enough physical condition to do the work which will be involved in his job.

Exceptional physical strength is rarely required. Printing is, on the whole, a relatively good field of employment for handicapped people. A considerable number of workers, particularly linotypists and compositors, have speech or hearing defects; some are even totally deaf. Men who have lost one or both legs or do not have the use of all 10 fingers have proved satisfactory in some composing-room occupations. Success in a job generally depends on the individual's ability to do the work and to adjust himself to specific working conditions. Handicapped people should not consider themselves automatically disqualified for employment in the industry, but should seek competent professional advice.

Education is another factor which employers consider in selecting apprentices. A high school education is usually required and always preferred. A thorough knowledge of spelling, punctuation, and grammar is essential for most trades. Technical training in printing in a vocational school is desirable. Printing courses in a high school, often given as part of a general industrial arts program, are also good preparation. In addition, courses in art, such as drawing, design, color, and lettering, are helpful for many kinds of printing work. Such courses are offered by the Carnegie Institute of Technology (in Pittsburgh, Pa.), Rochester (N. Y.) Institute of Technology, and New York (City) Printing School and are considered to be unusually good.

In late 1949, an estimated 20,000 veterans were receiving some training or education in connection with printing and publishing vocations under the GI Bill of Rights. Nonveterans in similar training programs also numbered in the thousands.

### *Employment Prospects*

During the early fifties, employment in printing occupations as a whole will remain about the same as in 1949. There will be some job openings each year, largely to replace men leaving the printing trades because of death and retirement. The defense production program begun during 1950 is not likely to increase the volume of printing substantially over the high postwar levels. The bulk of printing production is connected with advertising, or is used for education, information or recreation, and is not directly affected by defense requirements. There may be some slight increase in

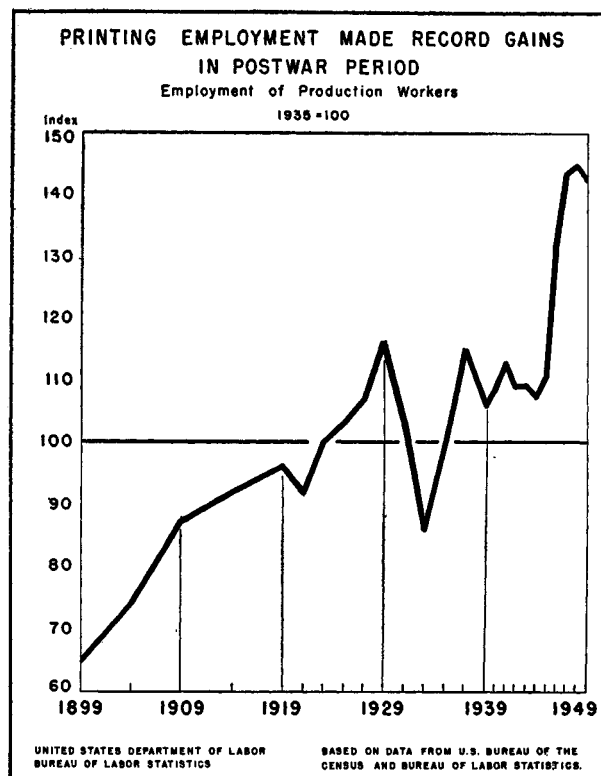


CHART 69

the total output of printed materials to meet the expanded needs of the Armed Forces, and the accompanying higher levels of business activity. Many of the printing plants will be able to handle any increases in their business by lengthening the workweek of their employees. If, as seems likely under the mobilization plans set up in 1950, a large proportion of the Nation's youth is taken into the Armed Forces, at least temporarily, there will be less competition for apprenticeship openings. On the other hand, it is probable that the printing industries will offer fewer apprenticeships. The widely discussed recent technological developments in printing are not likely to affect employment appreciably during this period.

Over the longer run, printing employment is likely to show a gradual increase. The history of employment in the printing industry has been one of steady growth, except for periods of severe business depression (chart 69). In 1899, there were about 200,000 jobs in production and related work in the printing, publishing, and allied industries. By 1929, the number had risen almost 80 percent to more than 350,000. During this same

period the actual output of printed matter increased much more rapidly.

Printing activity was hit fairly hard by the depression of the early 1930's, although printing employment did not decline as much as that in other industries. Newspaper and magazine publishing held up particularly well. Total employment of production workers in printing and publishing dropped to about 260,000 in 1933, but recovered to about 350,000 by 1937, according to census reports.

Probably the sharpest year-to-year gain in printing employment ever recorded was that which occurred between 1945 and 1946. During World War II, the number of wage earners was not much above the 1939 level of 325,000. Instead, hours of work were increased to meet the heavier demands for printing. The great postwar boom in general business and reductions in the length of the work-week expanded printing employment to 438,000 in 1947. Following this upsurge in employment, the number of production jobs leveled off in 1948 and 1949.

In the future as in the past, population growth and the general tendency toward greater use of printing material for information, advertising, entertainment, and various industrial and commercial purposes should cause further gains in printing output over the long run. But past experience in this field also indicates that possible gains in employment arising from increased consumption of printed matter will be limited by technical improvements in the printing process. In the past few years there have been a number of developments which may have considerable effect on printing methods and the number and kinds of printing workers employed.

Now in commercial use or in the laboratory stage are a wide variety of new devices and techniques, ranging from such comparatively simple items as electronic counters to highly complex systems of radio transmission of copy and proof. Some of the new methods affect primarily a single printing operation, while the influence of others may be spread across the entire printing field.

One of the developments, relating to composing-room work, involves the use of special typewriters which "justify" copy (even it up at the right-hand margin) by varying the space between words. The copy is "pasted-up," photographed, and plates made by means of photoengraving. These are then used to produce stereotypes or offset plates from

which the printing is done. When used, this process eliminates the usual typesetting process.

Implying a still greater technical revolution is the Fotosetter, a photocomposition machine already in commercial use. This equipment is said to be as effective in composition as is the present-day method of setting type. It is claimed also that it is easier to operate than typesetting machines now in use and that it does the job faster. One of its outstanding features is a special automatic camera which photographs letter characters one at a time and records them on a new type of photographic film in lines assembled in galley form. This film can then be used to make offset plates or photoengravings.

A new type of machine can be used in engraving in place of the conventional chemical process. In this new method a heated steel stylus is guided by means of photo-electric cells.

Electronic printing, another new development, may replace some of the conventional printing presses. In this process, ink is drawn off the printing surface onto the paper by an electric force; no physical contact occurs between the printing surface and the paper. It is claimed that printed matter can be turned out by this method at many times the speed of regular presses. At the same time, improvements are being made on old style presses which increase their speed of operation, and these should have a definite influence on press-room labor requirements.

The introduction of these and other methods is likely to be gradual. They will have a tendency to reduce printing employment or to limit gains which would result from increased demands for printed materials. To the extent that they do increase efficiency of printing operations and hold down printing costs, they may actually encourage greater use of printing. This has been the case with the important innovations in the past, such as the linotype machine. Despite the labor-saving effects of these inventions, printing employment continued to grow rapidly.

Another important factor which will tend to limit any possible decrease in employment resulting from technological changes is the likelihood of a continued reduction in the length of the work-week in printing plants. Over a period of years, weekly work schedules have been steadily cut from the 9-hour day and 6-day week which prevailed in commercial printing at the beginning of the cen-

tury, to workweeks of 35 and 37½ hours which are now prevalent in newspaper plants and job shops. The limiting of the number of weekly hours (at straight-time pay) is a policy of the printing unions which is expected to continue in future years.

The over-all result of the increased demands for printing, technological changes, and the trend toward a shorter workweek should be a slight and gradual long run increase in employment. However, there will be more job openings each year to replace older workers who die or retire than will be caused by the small increases in employment.

*Where To Get More Information*

Additional information on the printing industries, on methods of printing, and on typesetting and many other printing occupations is given in:

Employment Outlook in Printing Occupations. Bulletin No. 902. U. S. Department of Labor, Bureau of Labor Statistics, 1947. 36 pp., illus. Superintendent of Documents, Washington, D. C. Price 20 cents.

Information on opportunities for apprenticeship or other types of printing employment in a particular locality may be obtained from several different sources. Applicants may go to the nearest office of their State employment service affiliated with the United States Employment Service, or to any printing plants in the neighborhood (addresses can be obtained from the classified section of the local telephone directory). Local unions and employer associations can also be of great assistance. If none is listed in the telephone directory, an applicant may write to the following national headquarters of such organizations and ask them to refer the letters to their nearest branches.

*Labor Organizations*

Amalgamated Lithographers of America (CIO),  
143 W. 51st St.,  
New York 19, N. Y.

International Allied Printing Trades Association (AFL),  
302 AFL Bldg.,  
Washington 1, D. C.

International Brotherhood of Bookbinders (AFL),  
901 Massachusetts Ave., NW.,  
Washington 1, D. C.

International Photo-Engravers' Union of North America (AFL),  
292 Madison Ave.,  
New York 17, N. Y.

International Printing Pressmen's and Assistants' Union of North America (AFL),  
Pressmen's Home, Tenn.

International Stereotypers' and Electrotypers' Union (AFL),  
752 Old South Building,  
Boston 8, Mass.

International Typographical Union (AFL),  
2820 N. Meridian St.,  
Indianapolis 6, Ind.

*Trade Associations and Others*

American Photoengravers Association,  
166 W. Van Buren St.,  
Chicago 4, Ill.

Book Manufacturers Institute, Inc.,  
25 W. 43d St.,  
New York 18, N. Y.

Employing Printers Association of America,  
53 W. Jackson Blvd.,  
Chicago 4, Ill.

International Association of Electrotypers and Stereotypers, Inc.,  
% Executive Secretary: Mr. A. P. Schloegel,  
701 Leader Bldg.,  
Cleveland 14, Ohio

International Association of Printing House Craftsmen,  
18 E. Fourth St.,  
Cincinnati, Ohio.

Library Binding Institute,  
501 Fifth Ave.,  
New York, N. Y.

Lithographers National Association, Inc.,  
420 Lexington Ave.,  
New York 17, N. Y.

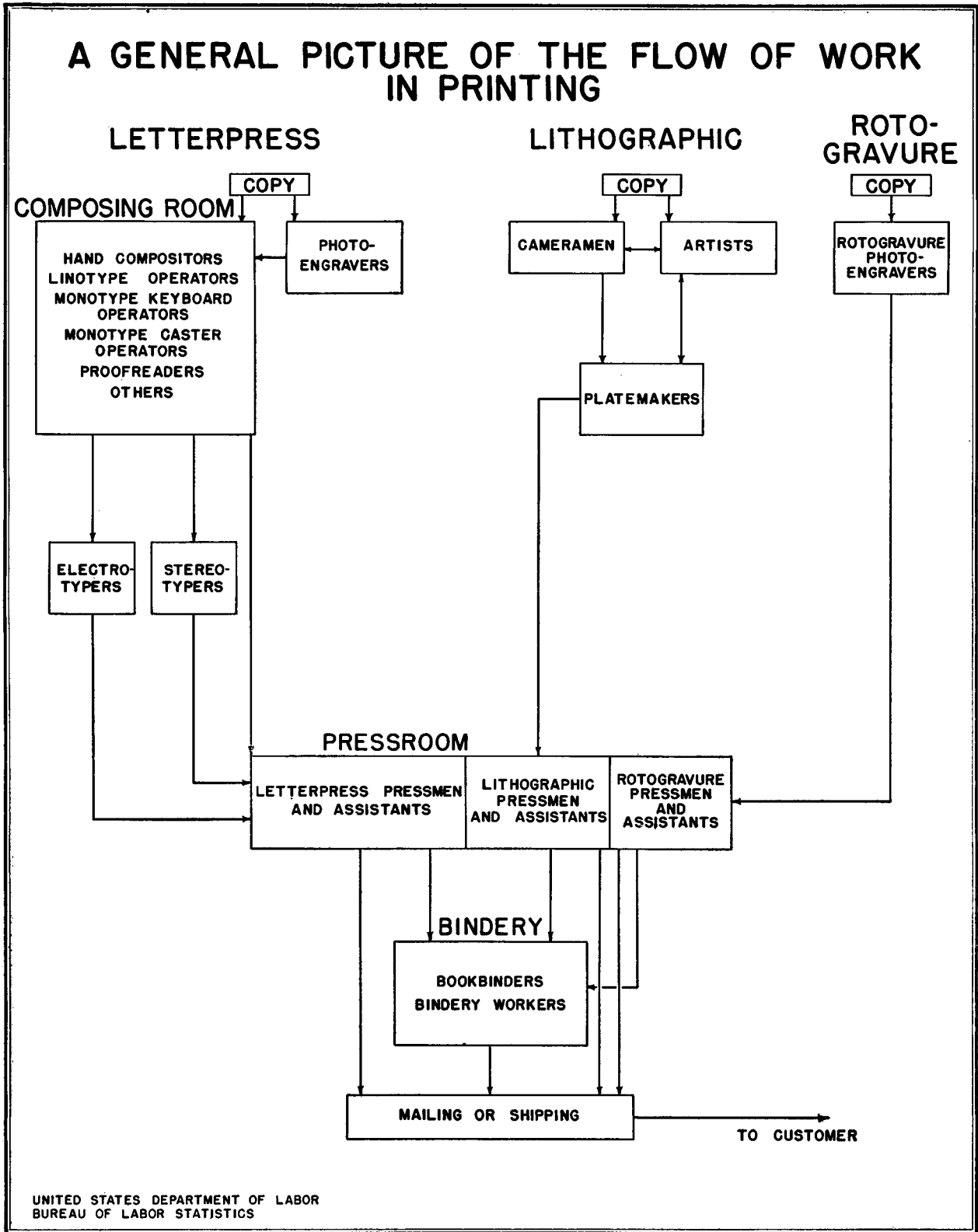
Lithographical Technical Foundation, Inc.,  
131 E. 39th St.,  
New York 16, N. Y.

National Association of Magazine Publishers,  
232 Madison Ave.,  
New York 16, N. Y.

National Association of Photo-Lithographers,  
317 W. 45th St.,  
New York 19, N. Y.

Printing Industry of America, Inc.,  
719 Fifteenth St., NW.,  
Washington 5, D. C.

CHART 70





## Hand Compositors and Typesetters

(D. O. T. 4-44.010)

### *Outlook Summary*

Job prospects fair for qualified journeymen in most parts of country in early fifties, but diminishing number of apprenticeship openings. Employment will probably soon resume its long-range downtrend.

### *Nature of Work*

Copy to be printed by the letterpress process starts its trip through a printing plant in the composing room as shown in chart 70. There the type is set and assembled in type forms, ready for the pressroom—or for electrotyping or stereotyping, if printing is to be done from press plates instead of directly from type forms.

The oldest and largest composing-room occupation (with probably no less than 100,000 now employed) is that of hand compositor and typesetter. Their job involves setting each line of type in a "composing stick"—letter by letter and line by line and, when the stick is full, sliding the completed lines onto a shallow metal tray or "galley." Even in shops where all "straight matter" (such as you are now reading) is set by machine—and there are many—hand compositors may still be needed to set some of the type required for headlines, titles, and other special work, and to assemble the machine- and hand-set type. Taking proofs of type that has been set (i. e., printing a few copies on a proof press), checking the proofs against the original copy, correcting errors in typesetting, page make-up (arranging type and any needed engravings into pages), and locking the completed pages into forms are among the other tasks sometimes performed by compositors, particularly in small shops. In large plants, page make-up is usually done by special "make-up men," chosen from among the compositors; type forms are generally locked up by "stonemen."

All the major branches of letterpress printing—newspaper, job, book, and periodical—employ large numbers of hand compositors. Smaller numbers work in other kinds of printing shops or in service shops doing typesetting on contract for

printing and other establishments. A good many men in the occupation have their own small job or service shop.

### *Training and Qualifications*

A 6-year apprenticeship is usually required for employment as a journeyman compositor or typesetter. In union shops, apprenticeship of this length is always needed except for some veterans with military experience related to printing, and apprentices for whom shop foremen recommend shorter training periods in recognition of outstanding ability.

The apprenticeship commonly found in this trade includes a considerable amount of classroom and correspondence study. Printed manuals of instruction have been prepared by the International Typographical Union (AFL) and the Printing Industry of America, Inc. (employer association). These manuals are used not only in apprenticeship programs but also in vocational schools.

Besides having the educational qualifications needed for all skilled printing occupations, a compositor should be good in arithmetic, so that he can calculate spacing of type on pages. A knowledge of English is especially important, since the worker should be able to catch errors in copy before setting type. Imagination and artistic ability in planning page lay-outs are assets which may help him to advance to lay-out work or make a success in business for himself.

It is necessary for the worker to be in good enough physical condition to be on his feet 8 hours a day. He should also be able to use his hands, arms, and eyes constantly.

### *Outlook*

Employment prospects for journeymen compositors are expected to be fair in most parts of the country during the next few years. For a year or two following VJ-day, there were many more openings for inexperienced men than usual. In these immediate postwar years, employers, in order

to make up for the wartime deficit in trainees, generally took on as many apprentices as were permitted by the ratios of apprentices to journeymen established by union agreements, or that it was feasible to take on, but training opportunities have since become much fewer. Apprentice members of the International Typographical Union in all printing trades in which the union provides for such affiliation numbered about 6,500 in mid-1949, considerably more than in 1945. Similarly, gains were registered in other categories of hand compositor trainees. During the early fifties, apprenticeship openings will be fewer, but probably there will also be a smaller number of applicants.

Employment in this occupation, as before World War II, will no doubt tend to decrease, in the long run—owing to continued advances in machine typesetting and to other factors. The decline will be slow and will probably not involve many layoffs. Men in the occupation should have a good chance of holding their jobs indefinitely, especially if they have machine (linotype or monotype) as well as hand skills.

For years there have been so many small general printing shops that competition for business has been keen in most parts of the country, and earnings of shop owners have often been very inadequate. Nevertheless, some men may be able to go into business for themselves during the next few years. Those with varied experience in the industry will have the best chance of success, especially if they locate in growing suburban and other areas where they will not be in direct competition with well-established "downtown" firms.

Men with composing-room skills plus supervisory and managerial abilities will also find some immediate openings in salaried positions with large organizations, and, in general, good opportunity for advancement to such positions.

### *Earnings and Unionization*

Hand compositors are among the better paid printing trades workers. Union wage scales in effect in a large number of cities on July 1, 1950, averaged nearly \$2.42 an hour in book and job printing and about 8 cents more in newspaper plants (day work).

The lowest scale among the cities covered was in book and job work in Manchester, N. H. and

Savannah, Ga. (see table below). At the extreme upper end of the scale was a rate of \$2.74 an hour, in Detroit, for some newspaper craftsmen. On July 1, 1950, more than half the workers were on pay scales ranging from \$2.40 to \$2.60 an hour.

The minimum union wage rates for hand compositors and typesetters as of July 1, 1950, for most of the important printing centers are shown in the following tabulation:

City	Newspapers	Book and job shops
Atlanta, Ga.	\$2. 45	\$2. 33
Baltimore, Md.	2. 40	2. 00
Birmingham, Ala.	2. 38	2. 33
Boston, Mass.	2. 52	2. 13
Buffalo, N. Y.	2. 46	2. 31
Butte, Mont.	2. 40	2. 37
Charlotte, N. C.	2. 10	2. 05
Chattanooga, Tenn.	2. 32	2. 13
Chicago, Ill.	2. 63	2. 59
Cincinnati, Ohio	2. 53	2. 34
Cleveland, Ohio	2. 53	2. 35
Columbus, Ohio	2. 48	2. 35
Dallas, Tex.	2. 53	2. 35
Davenport, Iowa	2. 14	1. 85
Dayton, Ohio	2. 37	2. 37-2. 40
Denver, Colo.	2. 52	2. 19
Des Moines, Iowa	2. 40	2. 19
Detroit, Mich.	1. 50-2. 74	2. 58-2. 69
Duluth, Minn.	2. 19	1. 75
El Paso, Tex.	2. 35	2. 35
Erie, Pa.	2. 19	2. 00
Grand Rapids, Mich.	2. 34	2. 15-2. 34
Houston, Tex.	2. 57	2. 51
Indianapolis, Ind.	2. 51	2. 27
Jacksonville, Fla.	2. 39	1. 88
Kansas City, Mo.	2. 44	2. 37
Knoxville, Tenn.	2. 32	2. 25
Little Rock, Ark.	2. 18	1. 98
Los Angeles, Calif.	2. 48	2. 47
Louisville, Ky.	2. 44	2. 06
Manchester, N. H.	2. 08	1. 70
Memphis, Tenn.	2. 40	2. 05
Milwaukee, Wis.	2. 48	2. 35
Minneapolis, Minn.	2. 68	2. 43
Mobile, Ala.	2. 28	2. 20
Moline, Ill.	2. 14	1. 85
Newark, N. J.	2. 56	2. 48
New Haven, Conn.	2. 27	1. 93
New Orleans, La.	2. 18	2. 10
New York, N. Y.	1. 88-2. 73	2. 48
Norfolk, Va.	2. 35	2. 00
Oakland, Calif.	2. 64	2. 63
Oklahoma City, Okla.	2. 33	2. 00
Omaha, Nebr.	2. 25	2. 18
Peoria, Ill.	2. 28	2. 08
Philadelphia, Pa.	2. 40	2. 20

PRINTING OCCUPATIONS

City	Newspapers	Book and job shops
Phoenix, Ariz.....	\$2. 35	\$2. 35
Pittsburgh, Pa.....	2. 53	2. 40
Portland, Maine.....	2. 11	1. 80
Portland, Oreg.....	2. 57	2. 51
Providence, R. I.....	2. 42	2. 10
Reading, Pa.....	2. 16	2. 04
Richmond, Va.....	2. 21	1. 75
Rochester, N. Y.....	2. 32	2. 25-2. 29
Rock Island, Ill.....	2. 22	1. 95
St. Louis, Mo.....	2. 59	2. 32
St. Paul, Minn.....	2. 65	2. 43-2. 50
Salt Lake City, Utah.....	2. 40	1. 88
San Antonio, Tex.....	2. 29	2. 18
San Francisco, Calif.....	2. 64	2. 63
Savannah, Ga.....	2. 13	1. 70
Scranton, Pa.....	2. 37	2. 28
Seattle Wash.....	2. 71	2. 71

City	Newspapers	Book and job shops
South Bend, Ind.....	\$2. 29	\$2. 18
Spokane, Wash.....	2. 49	2. 32
Springfield, Mass.....	2. 00	2. 00
Syracuse, N. Y.....	2. 37	2. 35
Toledo, Ohio.....	2. 55	2. 06-2. 19
Washington, D. C.....	2. 64	2. 40
Wichita, Kans.....	2. 19	2. 19
Worcester, Mass.....	2. 29	1. 83
York, Pa.....	2. 00	2. 00
Youngstown, Ohio.....	2. 33	2. 07

A large proportion, if not the great majority, of compositors are represented by the International Typographical Union (AFL), one of the six major unions of printing workers.

## Linotype Operators

(D. O. T. 4-44.110)

### Outlook Summary

Fairly good employment prospects for skilled men during early fifties, in country as a whole, but diminishing number of training opportunities. Long-run uptrend in employment expected to continue for some time. Eventually, however, decline in number of jobs is possible, even under favorable economic conditions.

### Nature of Work

In the late 1880's, a new machine, which was to revolutionize the composing room and the printing industries generally, came into use. This machine, the now famous linotype, sets type very much more rapidly than is possible by hand (as does the intertype, a similar machine invented some years later). Reading from copy clipped to the machine's copyboard, the linotype or intertype operator selects the letters and other characters to be printed by operating a keyboard which has about 90 keys. After he completes each line, he works a lever, and the machine then casts the lines of type automatically in solid strips known as slugs.

Other duties performed by the operator include removing type from the machine, putting new

"pigs" (blocks) of type metal into the melting pot, and making adjustments. In shops having a considerable number of linotype machines, however, a machinist is usually employed who makes all but the minor adjustments directly connected with machine operation.

As linotype and intertype machines came into wider use, the number of operators needed increased. They have made up the second largest group of composing-room workers for many years, exceeded in number only by hand compositors.

In 1940, an estimated 60,000 persons were employed as linotypists and the number is now considerably greater. The largest groups of such workers are in newspaper and job shops, but they are also employed in book and periodical houses and in service shops doing machine typesetting for printing firms. Some linotype operators have their own service shops.

### Training and Qualifications

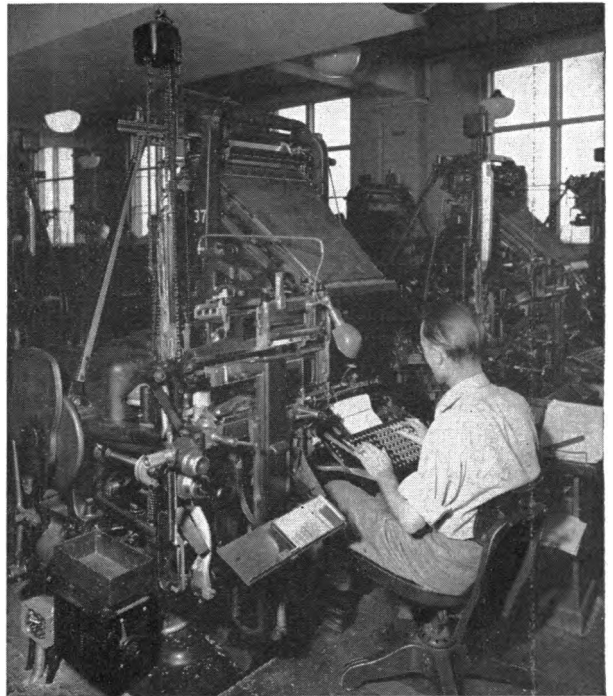
Like hand compositors and typesetters, linotype operators are skilled journeymen. The apprenticeship requirements are usually the same as for hand compositors, except that in the last 6 months of training the linotypist apprentice receives specialized training in machine work.

Qualifications needed by apprentices are much the same for machine as for hand typesetting. For machine work, however, artistic ability is less important than it is for hand work. Machine work, on the other hand, calls for much more mechanical skill than does hand work, as the duties of the different classes of workers involved suggest.

### *Outlook*

The employment outlook for experienced linotype (and intertype) operators during the early fifties is fairly good in the country as a whole. There will also be some training opportunities, although not as many as during the first year or two after World War II when several thousand newcomers were taken on for training (total of hand and machine programs). Because of the large number of young men who will be going into the Armed Forces, the number of job seekers will be somewhat smaller. Top-skilled men, with experience in hand as well as machine composition, and with supervisory and managerial abilities, will find some immediate openings in salaried positions or will have good chances for advancement to such jobs. Some ex-servicemen and others wishing to go into business for themselves may find favorable opportunities to do so; those with good all-round civilian experience will have the best chances of success.

The long-range outlook, too, is reasonably favorable—more so than for hand compositors, for example. Employment has tended to rise over the years and should continue to do so for some time. Eventually, however, technological and other fac-



COURTESY OF U. S. GOVERNMENT PRINTING OFFICE

Linotype operator at the keyboard of a linotype machine.

tors may lead to a stable or even a declining trend in employment. On the other hand, printing is less affected by declines in general business activity than many other manufacturing industries.

### *Earnings and Unionization*

Linotype operators tend to have much the same rates of pay as hand compositors. (See p. 311.)

A large proportion, if not the great majority, of linotypists are represented by the International Typographical Union (AFL).

## Monotype Keyboard Operators

(D. O. T. 4-44.120)

### *Outlook Summary*

Enough jobs likely for all qualified journeymen in this small occupation during the early fifties; also a limited number of openings for apprentices. Long-range trend of employment upward.

### *Nature of Work*

An important step forward in typesetting was the invention of the monotype keyboard and mon-

otype casting machines. In contrast to the solid lines cast in linotyping, these later machines make possible the automatic casting of individual letters and other type characters, and also the automatic assembling of type into the long shallow trays, known as galleys (see p. 309). Monotyping thus retains some of the flexibility of hand composition, while offering advantages of machine operation.

The monotype keyboard is similar to a typewriter keyboard, but has some 200 keys. Unlike the linotype, which does the whole typesetting job, the monotype keyboard machine only perforates a narrow roll of paper for use later in a separate casting machine.

The workers who operate the keyboard and make the many different adjustments needed are called monotype keyboard operators (sometimes simply monotype operators.) They are a small occupational group with only about 6,000 employed in 1940. The number in mid-1950 was probably no more than half again as great. Most monotypists work for book or periodical houses; some few, for job and service shops.

In general, qualifications for employment are the same as for linotype operators.

### *Outlook*

In few, if any, parts of the country where monotype operators are employed will qualified journeymen have any difficulty finding jobs within the 1950 decade—especially if general business conditions remain favorable. In addition, employers will have an increasing number of openings for apprentices as the number of craftsmen

grows. The actual number of training opportunities will not be large, however, because total employment in the occupation will remain small.

The long-range trend in employment in the field is upward. Men already in the trade and those who enter it in the near future should have a good chance of holding their jobs indefinitely. Those who are adept in hand composition and in linotyping as well as in monotype keyboard operation are likely to have the greatest job security.

Big printing centers will generally offer the most job openings, but also the keenest competition for employment. In the long run, more and more jobs are likely to be found in smaller cities, to which book and job plants have been moving gradually over the years.

### *Earnings and Unionization*

Wage rates for monotype keyboard operators are generally the same as for linotype operators and hand compositors in book and job shops. (See table p. 310).

A large proportion, if not the great majority, of monotype keyboard operators are represented by the International Typographical Union (AFL).

## Monotype Caster Operators

(D. O. T. 6-49.310)

### *Outlook Summary*

Limited number of openings for new workers in this small occupation during early fifties. Long-range employment trend upward.

### *Nature of Work*

Workers in this occupation operate the monotype casting machines, referred to in the statement on Monotype Keyboard Operators, p. 312. These machines cast and assemble type automatically, guided by the perforations in the rolls of paper prepared by the monotype keyboard operators. Caster operators not only adjust and tend the machines but usually are required to know the mechanism in order to make repairs. In shops having several casting machines, the operator may supervise unskilled workers who tend the machines.

Taking the printing industry as a whole, only

one caster operator has been employed to every two or three keyboard operators, as of early 1950. The occupation is, therefore, very small, employing only about 2,000 workers in 1940 and probably not more than three or four thousand in 1949. The types of plants using caster operators are the same as for keyboard operators—chiefly book and periodical houses and, to some extent, job and service shops.

### *Qualifications for Employment*

Most newcomers to this occupation learn to operate the machine at a monotype school. Training is then completed on the job. This experience is especially needed for the more skilled and better paying jobs in the occupation, which require an understanding of the mechanism of the caster and the ability to make adjustments and repairs. Persons entering the occupation should be physically strong and in good health.

*Outlook*

There will be more openings for newcomers during the early fifties than there were in the late thirties—but only a limited number at best, since the occupation will remain small. As the number of monotype keyboard machines in use increases, job prospects for trainee monotype caster operators will become more favorable.

Total employment is likely to increase steadily, although only slightly, over the long run. The rise will be, however, at a faster rate than in monotype keyboard operation. Under fairly normal general business conditions, experienced workers should have little difficulty in obtaining jobs, with good chances for continued employment for many years.

*Earnings and Unionization*

Most monotype-caster operators have about the same wage rates as linotypists, monotype-keyboard operators, and composing room craftsmen outside the newspaper industry. (See table, p. 310.) However, caster operators without responsibility for adjustments or repairs earn less.



PHOTOGRAPH BY U. S. DEPARTMENT OF LABOR

Monotype caster operator adjusting position of newly cast type as it comes out of the machine.

A large proportion, if not the great majority, of operators are represented by the International Typographical Union (AFL).

## Proofreaders

(D. O. T. 1-10.07)

*Outlook Summary*

Number of jobs in the early fifties will remain about the same as in 1949. Slight increase in employment over the longer run. Most proofreading jobs go to persons already employed in printing industries.

*Nature of Work*

These workers guard against error in the final printed product. For this purpose, it is customary to make proofs of type set-ups and read these carefully against the original copy. In small shops, journeymen typesetters and advanced apprentices may do the proofreading. In most large plants, however, particularly in the newspaper, book, and periodical industries, there are special proofreaders.

The work is done in one of two ways. Either the proofreader puts the proof and the copy side

by side and reads one against the other, a line at a time, or he has the material read to him by a copy holder while he follows the proof. Where there are errors, he notes the corrections needed, using standard proofreaders' marks.

*Qualifications for Employment*

Workers usually enter the occupation from another composing-room job or a front-office job with the same company. Skilled compositors and composing-machine operators who are no longer able to do typesetting at the speeds required may take positions as proofreaders. Those who do so, keep their journeyman status, at least in union shops.

A knowledge of grammar, spelling, and punctuation is very important to help the proofreader find and correct errors. The work requires good eyesight and good hearing.

*Outlook*

Employment of proofreaders in the early fifties will remain at about the 1949 level. Altogether, about 5,000 proofreaders were employed in 1940, including a good many women. The number employed in mid-1950 is estimated to have been about 20 or 25 percent greater. Most of the job openings arising from turnover will be filled by workers already employed in the printing industries. There will also be a few openings for men and women with some outside experience related to proofreading. Persons completely new to the field will usually have little, if any, chance for jobs.

The long-range trend in employment will probably continue to be upward. Those already in the occupation in early 1950 and those who enter it soon thereafter should have a good chance of holding their positions indefinitely.

*Earnings and Unionization*

Wage rates for proofreaders in union shops are generally the same as for hand compositors (see p. 310). Nonunion shops are likely to pay less, particularly to women. Some union contracts provide lower scales for proofreaders who have never qualified as hand compositors.

## Electrotypers and Stereotypers

(D. O. T. 4-45.010 and .210)

*Outlook Summary*

A limited number of openings for apprentices in the early fifties. Long-range trend slowly upward.

*Nature of Work*

From the composing room, type forms often go to the electrotyping or stereotyping department (or to an independent service shop doing such work for printing firms). Electrotyping and stereotyping are two different processes, having the same purpose—making duplicate press plates from the type forms. One reason why it may be necessary to use such plates, instead of printing directly from the forms, is that a number of plates made exactly the same may be needed (any number can be turned out by either electrotyping or stereotyping).

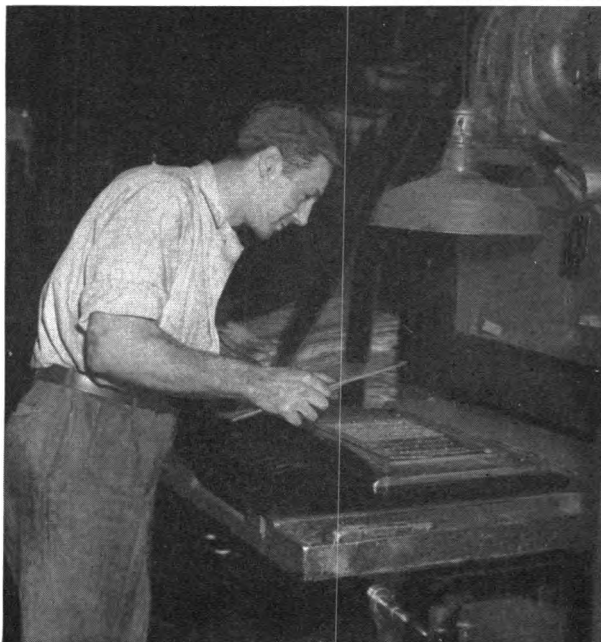
When a large edition of a book or magazine is printed, several plates must be used one after the other to prevent the printing surfaces from becoming too worn to make clear impressions. By means of duplicate plates, printers can also use several presses on the same job, at the same time, and thus finish a big run quickly. This is especially important in publishing daily newspapers, since a plant may have to rush many thousands of papers onto the streets with news that is no more than an hour or two old. Furthermore, the rotary presses used in many big plants require curved

plates (which can be made by either process), and type forms are always flat.

The usual first step in both processes is the making of a mold of the type form. In electrotyping, wax and plastic molds are the most common, although lead or some other metal is also used. To make a wax or plastic mold, the electrotyper lays the type form on the bed of a power molding press,

Electrotyper placing wax mold on top of type form which is on bed of power molding press.

PHOTOGRAPH BY U. S. DEPARTMENT OF LABOR



and covers it with a wax-coated sheet of metal or with a sheet of plastic. He then applies the pressure and obtains an impression of the type form in the wax or plastic.

To produce a final metal plate ready for use in the pressroom, a metallic shell must be deposited on the mold, stripped from it, backed with metal, and carefully finished and mounted. First the electrotyper makes the wax or plastic mold electroconductive, by coating it with copper sulphate or nickel solution (in the case of a wax mold) or a thin film of metallic silver (in the case of a plastic mold). The mold is then suspended in an appropriate electrolytic solution, which is used to obtain a metallic shell deposit on the coated mold. Stripping, backing, finishing, and mounting follow in order.

The stereotyping process is much simpler, quicker, and less expensive than electrotyping, but it does not yield as fine a plate. Stereotypers make molds of papier mâché (a strong material composed of paper pulp) instead of wax or lead. This work involves placing a damp papier mâché pad (in newspaper printing, usually a dry mat) on top of the type form and running both through a rolling machine. After the paper mold has been dried, it is used in casting a composition-lead plate, which needs only trimming to be ready for the pressroom.

Journeyman electrotypers and stereotypers must know how to handle all the tasks involved in their respective processes, although in practice they are often assigned to only one phase of the work.

Electrotypers work mainly in large book and periodical plants, while stereotypers are principally employed in newspaper plants or in shops servicing newspaper publishers.

### *Qualifications*

To qualify for either type of work, a 5- or 6-year apprenticeship is usually required. Training is quite different for each trade; rarely do journeymen change from one occupation to the other.

Young men who wish to become electrotyper or stereotyper apprentices need about the same educational qualifications as are required for all printing trades. In addition, mechanical training and courses in chemistry and metallurgy are useful.

In workrooms where electrotyping or stereotyping is done, there are frequently fumes and dust, and the temperature and humidity are often extremely high. Moreover, the work involves lifting of very heavy plates and type forms. Persons entering the occupations should be sufficiently strong and healthy to work under these conditions, although they are being increasingly mitigated in large part through scientific air-conditioning, mechanical conveyors, and other means.

### *Outlook*

Although not much, if any, increase in employment is expected during the early fifties, journeymen electrotypers and stereotypers will generally find it fairly easy to get jobs. Under collective bargaining agreements, of the type which have been in effect for many years, a limited number of training opportunities for newcomers may be expected in this period—fewer than during the first year or two after World War II. Some men with all-round experience and managerial abilities will be able to go into business for themselves, with fair chances of success. But these are small occupations, employing in mid-1950 roughly 10,000 journeymen and probably 1,000 or so apprentices. The total number of job openings resulting from the need to replace workers who die or who retire or leave the occupation for other reasons, will therefore average no more than a few hundred each year.

The long-range trend in employment has been and is likely to continue to be slowly upward in these occupations. Men already in the trades in mid-1950 or about to complete their training have a good chance of holding their jobs indefinitely.

### *Earnings and Unionization*

Wage rates for electrotypers tend to be higher than those for any other printing trade, except photoengravers. Those for stereotypers are frequently lower than for electrotypers.

The average union wage scale for electrotypers in effect on July 1, 1950, was about \$2.70 an hour in the principal cities in which they are employed in book and job printing. Rates ranged from \$1.88 an hour, in Syracuse, N. Y., to almost \$3.00 an hour in New York City, and Newark, N. J.



PRINTING OCCUPATIONS

(See following tabulation.) Almost half the city scales were \$2.35 an hour and up. The highest scales were found principally in cities with heavy concentrations of electrotypewriter jobs. The bulk of the men covered were earning upward of \$2.70 an hour.

Newspaper stereotyper rates ranged from \$1.99 an hour, in Duluth, Minn., to \$2.81 an hour in Chicago, Ill. Their average rate of about \$2.52 was 17 cents an hour less than that for electrotypers in book and job work, but probably also much less than that for the smaller number of stereotypers in book and job work. Over half the newspaper stereotypers were on pay scales ranging from \$2.30 to \$2.55 an hour.

The minimum union wage scales for electrotypers and stereotypers as of July 1, 1950, for most of the important printing centers are shown in the following tabulation.

	Stereotypers (Newspapers)	Electrotypers (Book and job)
Atlanta, Ga.....	\$2. 45	\$2. 45
Baltimore, Md.....	2. 32	2. 00
Birmingham, Ala.....	2. 25	2. 44
Boston, Mass.....	2. 58	2. 30
Buffalo, N. Y.....	2. 37	2. 20
Butte, Mont.....	2. 38	-----
Charleston, W. Va.....	2. 13	-----
Charlotte, N. C.....	2. 10	-----
Chattanooga, Tenn.....	2. 29	-----
Chicago, Ill.....	2. 53-2. 81	2. 94
Cincinnati, Ohio.....	2. 48	2. 38
Cleveland, Ohio.....	2. 44	2. 60
Columbus, Ohio.....	2. 41	2. 35
Dallas, Tex.....	2. 45	2. 44
Davenport, Iowa.....	2. 14	1. 96
Dayton, Ohio.....	2. 34	2. 39
Denver, Colo.....	2. 36	2. 32
Des Moines, Iowa.....	2. 39	2. 40
Detroit, Mich.....	2. 65	2. 83
Duluth, Minn.....	1. 99	-----
El Paso, Tex.....	2. 18	-----
Eric, Pa.....	2. 11	-----
Grand Rapids, Mich.....	2. 34	2. 40
Houston, Tex.....	2. 31	2. 44
Indianapolis, Ind.....	2. 49	2. 38
Jacksonville, Fla.....	2. 39	-----
Kansas City, Mo.....	2. 37	2. 37
Knoxville, Tenn.....	2. 29	-----
Little Rock, Ark.....	2. 18	-----

	Stereotypers (Newspapers)	Electrotypers (Book and job)
Los Angeles, Calif.....	\$2. 35	\$2. 69
Louisville, Ky.....	2. 41	-----
Manchester, N. H.....	2. 08	-----
Memphis, Tenn.....	2. 31	2. 25
Miami, Fla.....	2. 52	-----
Milwaukee, Wis.....	2. 40	2. 48
Minneapolis, Minn.....	2. 52	2. 64
Mobile, Ala.....	2. 19	-----
Moline, Ill.....	2. 14	1. 96
Newark, N. J.....	2. 40	2. 96
New Haven, Conn.....	2. 10	2. 33
New Orleans, La.....	2. 18	2. 30
New York, N. Y.....	2. 43	2. 96
Norfolk, Va.....	2. 28	-----
Oakland, Calif.....	2. 52	2. 64
Oklahoma City, Okla.....	2. 33	2. 33
Omaha, Nebr.....	2. 25	2. 00
Philadelphia, Pa.....	2. 33	2. 77
Phoenix, Ariz.....	2. 35	-----
Pittsburgh, Pa.....	2. 37	2. 00
Portland, Maine.....	2. 00	-----
Portland, Oreg.....	2. 49	2. 64
Providence, R. I.....	2. 36	2. 30
Reading, Pa.....	2. 16	-----
Richmond, Va.....	2. 16	2. 03
Rochester, N. Y.....	2. 32	-----
Rock Island (Ill.) district.....	2. 22	2. 01
St. Louis, Mo.....	2. 40	2. 35
St. Paul, Minn.....	2. 38	2. 64
Salt Lake City, Utah.....	2. 23	-----
San Antonio, Tex.....	2. 20	-----
San Francisco, Calif.....	2. 52	2. 64
Savannah, Ga.....	2. 13	-----
Scranton, Pa.....	2. 30	2. 18
Seattle, Wash.....	2. 71	2. 79
South Bend, Ind.....	2. 25	2. 35
Spokane, Wash.....	2. 43	-----
Springfield, Mass.....	2. 00	2. 38
Syracuse, N. Y.....	2. 27	1. 88
Toledo, Ohio.....	2. 48	2. 34
Washington, D. C.....	2. 30	<sup>1</sup> 2. 56
Wichita, Kans.....	2. 11	-----
Worcester, Mass.....	2. 32	2. 30
York, Pa.....	2. 00	2. 09
Youngstown, Ohio.....	2. 24	-----

<sup>1</sup> Excludes Government Printing Office.

In both occupations, the proportion of workers organized—by the International Stereotypers' and Electrotypers' Union (AFL)—is extremely high. This is one of the six major unions of printing workers.

## Photoengravers

(D. O. T. 4-47.100)

### Outlook Summary

The very few employment opportunities for newcomers expected each year will result largely from replacement needs. Long-run trend in employment has been very slowly upward, but may level off in the early fifties, or possibly decline slightly.

### Nature of Work

Photoengravers enter into the printing process when copy to be reproduced by letterpress includes pictures or designs. The photoengraving department supplies the composing room with any needed plates of illustrations and other material that cannot be set up in type. On these plates, the printing surfaces stand out in relief above the nonprinting spaces, as do the letters on the accompanying type.

Photoengravers are skilled journeymen, able to handle all the operations involved in the process. The entire job of producing a plate (photoengraving) may be done by one man, or the work may be divided among a number of photoengravers and the men then referred to as photographers, printers, etchers, finishers, routers, blockers, or provers, depending on the particular phase of work handled. The latter arrangement is frequently found in large shops; it is the method more commonly used.

A *cameraman* starts the process by photographing the material to be reproduced (using the necessary screens or color filters) and developing the negative. Making a print from the negative on a metal plate coated with sensitized solution is the job of a *printer*. A coating placed over the image areas of the plate hardens by exposure to light during the printing process or as a result of further chemical treatment and protects these areas against the acid into which the plate is put by an *etcher*, whose job is to "cut" away the background areas by means of this acid, leaving the image standing out in relief. After that, a few more operations remain—including finishing (careful inspection and touching up with hand tools), routing (cutting away metal from the nonprinting

parts of the plate to prevent them from touching the inking roller during printing), blocking (mounting the engraving on a wooden block to make it the right height), and proving (printing a sample copy on a proof press).

Upwards of eleven or twelve thousand men were engaged as journeymen photoengravers in early 1950. They are most numerous in service shops where the main business is making photoengravings for use by others; many craftsmen have their own shops. Newspaper plants, book and periodical houses, the United States Government Printing Office, and the United States Bureau of Engraving and Printing also employ, together, a considerable number of such photoengravers.

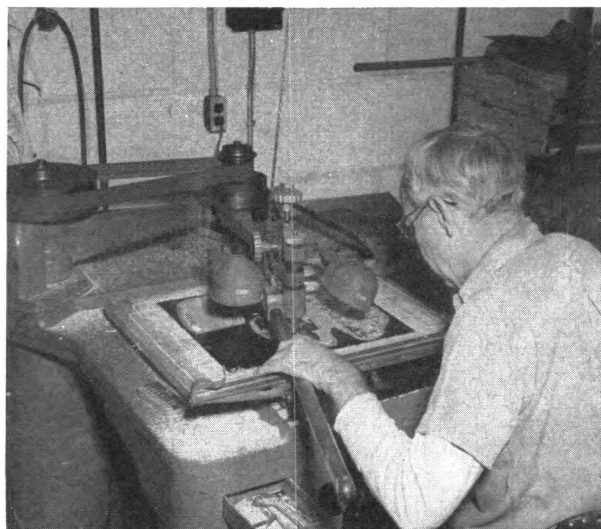
### Qualifications for Employment

A 6-year apprenticeship is generally required to become a journeyman. The training covers all phases of the process and includes 864 hours of classroom instruction. At least some of the skills acquired are readily adaptable to one or two phases of the lithographic process (see p. 325). In early 1950, the bulk of apprentices were registered with the union only, this figure then being close to 3,000.

Since photoengravers' duties involve constant

Photoengraver (router) cutting away metal from nonprinting areas of a plate.

PHOTOGRAPH BY U. S. DEPARTMENT OF LABOR



PRINTING OCCUPATIONS

close work, good eyesight is essential in this occupation. Because of the work with acids and other chemicals which give off fumes, the occupation is not a good one for people with respiratory disabilities. Many employers require physical examinations for prospective photoengravers, testing both eyes and lungs. Courses which photoengravers will find helpful in addition to those indicated as desirable for all printing workers (see p. 305) include chemistry and metallurgy.

*Earnings and Unionization*

Photoengravers are among the highest paid printing craftsmen. In both book and job and newspaper work the average minimum union wage scale in the 77 cities covered was \$2.84 an hour on July 1, 1950. The top rates in each case were (\$3.14 and \$2.92 respectively). The lowest scale was \$2.13 for book and job photoengravers. Over half the photoengravers earned more than \$2.70 an hour.

Union minimum wage scales for photoengravers as of July 1, 1950 in most of the important printing centers, are shown in the following tabulation:

	Newspapers	Book and job shops
Atlanta, Ga.....	\$2. 61	\$2. 56
Baltimore, Md.....	2. 68	2. 45-2. 67
Birmingham, Ala.....	2. 45	2. 45
Boston, Mass.....	2. 70	2. 45
Buffalo, N. Y.....	2. 73	2. 47
Charlotte, N. C.....		2. 37
Chattanooga, Tenn.....	2. 13	
Chicago, Ill.....	2. 92	3. 00-3. 06
Cincinnati, Ohio.....	2. 75	2. 53
Cleveland, Ohio.....	2. 76-2. 81	2. 67-2. 86
Columbus, Ohio.....	2. 84	2. 31-2. 53
Dallas, Tex.....		2. 25
Davenport, Iowa.....		2. 18
Dayton, Ohio.....	2. 48	2. 53
Denver, Colo.....	2. 57	2. 35
Des Moines, Iowa.....	2. 48	2. 48
Detroit, Mich.....	2. 75-2. 89	2. 67-2. 80
Duluth, Minn.....	2. 32	2. 13
Grand Rapids, Mich.....	2. 67	
Houston, Tex.....	2. 59	2. 58
Indianapolis, Ind.....	2. 65	2. 53
Jacksonville, Fla.....	2. 39	2. 20
Kansas City, Mo.....	2. 68	2. 40
Knoxville, Tenn.....	2. 13	2. 20
Los Angeles, Calif.....	2. 64	2. 67
Louisville, Ky.....	2. 65	2. 15-2. 53
Manchester, N. H.....		2. 40
Memphis, Tenn.....	2. 60	2. 44

	Newspapers	Book and job shops
Miami, Fla.....		\$2. 40
Milwaukee, Wis.....	\$2. 71	2. 66
Minneapolis, Minn.....	2. 68	2. 53
Moline, Ill.....		2. 18
Newark, N. J.....	2. 56	3. 06
New Haven, Conn.....		2. 27
New Orleans, La.....	2. 23	2. 13
New York, N. Y.....	2. 92	3. 06-3. 14
Norfolk, Va.....	2. 23	2. 13
Oakland, Calif.....	2. 71	2. 67
Oklahoma City, Okla.....	2. 59	2. 13
Omaha, Nebr.....	2. 48	2. 45
Peoria, Ill.....	2. 48	2. 27
Philadelphia, Pa.....	2. 75	2. 76
Pittsburgh, Pa.....	2. 71	2. 58
Portland, Maine.....	2. 14	
Portland, Oreg.....	2. 62	2. 67
Providence, R. I.....	2. 68	2. 45
Richmond, Va.....	2. 38	2. 13
Rochester, N. Y.....	2. 80	2. 55
Rock Island (Ill.) district.....	2. 26	2. 27
St. Louis, Mo.....	2. 71	2. 45
St. Paul, Minn.....	2. 67	2. 73
Salt Lake City, Utah.....	2. 40	2. 40
San Antonio, Tex.....	2. 47	2. 47
San Francisco, Calif.....	2. 71	2. 80
Scranton, Pa.....	2. 88	2. 13
Seattle, Wash.....	2. 77	2. 79
South Bend, Ind.....		2. 40
Springfield, Mass.....	2. 27	2. 27
Syracuse, N. Y.....	2. 67	2. 41
Toledo, Ohio.....	2. 79	2. 23
Washington, D. C.....	2. 77	*2. 59
Wichita, Kans.....	2. 45-2. 58	2. 45
Worcester, Mass.....	2. 51	2. 27
Youngstown, Ohio.....	2. 40	2. 40

\*Government Printing Office: \$2.63.

Photoengravers are almost completely organized by the International Photo-Engravers' Union of North America (AFL), one of the six major unions of printing workers.

*Outlook*

Employment of photoengravers rose substantially during 1945, 1946, and 1947, but leveled off in 1948 and 1949. In the next several years and also over the longer run, replacement needs rather than expansion will provide the bulk of job openings.

In 1939, journeymen photoengravers numbered about 10,000, but many were unemployed. There was, on the average, 1 apprentice to every 10 or

12 employed craftsmen, the ratio varying from area to area and from shop to shop; some shops offered no training opportunities of any kind.

During World War II, a shortage of skilled workers, trainees, and trainee replacements developed, primarily because of workers going into the Armed Forces and transferring to war industries. In the immediate postwar years, employers, in order to make up for the labor shortage, meet normal replacement needs, and handle the increasing demand for photoengraving, hired virtually all qualified journeymen who were available and took on many more trainees than usual. Generally, it was still not difficult for craftsmen to obtain jobs

during 1948 and 1949, although apprenticeship opportunities in particular had become considerably fewer than in the immediate postwar period.

In the early fifties and thereafter, the number of openings for trainees is not likely to exceed two or three hundred in any one year. Some very few persons may find favorable opportunities to go into business for themselves; generally, those with good all-round experience in the field will have the best chances of success. The over-all outlook appears to be for fairly stable employment during the fifties although the number of jobs may possibly decline slightly.

## Rotogravure Photoengravers

(D. O. T. 4-47.100)

### *Outlook Summary*

Expanding field, but likely to remain small for many years. As a result, there will be at most only a few job opportunities for trainees each year.

### *Nature of Work*

Rotogravure photoengravers, like photoengravers (p. 318) and lithographic process workers (p. 325), make plates for use in reproducing pictures, but these are gravure plates with the image etched below the surface. The printing has to be done on special rotogravure presses, and often the entire process, from preparation of the plates through printing, is carried out in separate plants specializing in this kind of work.

Rotogravure photoengravers are a very highly skilled group. Like regular photoengravers, they are required to know all phases of the photoengraving process, more particularly, the rotogravure process, although they usually specialize in one of them. The operations which they handle are much like those involved in photoengraving, except that a positive (instead of a negative) is used in making the plate, and it is the image (rather than the background) areas which are etched away.

A few large newspaper and commercial plants have departments which reproduce pictures by this method. However, rotogravure men are employed mainly in independent rotogravure plants. Most of them work for a small number (perhaps

a dozen or so) big firms which handle a large proportion of all rotogravure work.

### *Qualifications for Employment*

It is possible to enter the occupation either by a 6-year apprenticeship in a rotogravure shop or by transferring from photoengraving. Photoengravers are usually required to complete a probationary training period before being classified as skilled rotogravure men. The qualifications needed by apprentices are the same for rotogravure work as for photoengraving. A number of the nearly 3,000 young people reported to be in training under registered "photoengraving" apprenticeship programs in early 1950 are actually preparing for rotogravure jobs. (See p. 318).

Rotogravure is a relatively new process, which was being used increasingly before World War II and has made rapid gains since the war's end. In the entire country, however, there were fewer than 2,000 journeymen employed in rotogravure work in mid-1950. Young men seeking apprenticeship opportunities have always had difficulty breaking into rotogravure photoengraving.

During World War II, the amount of rotogravure printing was somewhat reduced, and a large proportion of the journeymen and apprentices either went into the armed services or transferred to photoengraving. However, the postwar return to prewar output of rotogravure was rapid. The prewar level of activity was soon surpassed, and

expansion has continued steadily through early 1950, especially in the magazine publishing field. But the need for additional personnel and replacements since the war's end has been met in large part by the return of craftsmen to the trade and the transfer of letterpress photoengravers to rotogravure. Since the occupation is expected to go on expanding for an indefinite period, there should be increasing opportunities for newcomers in the years ahead, although only a small number of openings in any one year.

### *Earnings and Unionization*

Rotogravure men are among the best paid printing craftsmen. Generally, their wage scales are above even the comparatively high rates for photoengravers doing letterpress work. Rates shown for photoengravers in the table on page 319 include those for rotogravure photoengravers.

Rotogravure photoengravers, like regular photoengravers, are practically all represented by the International Photo-Engravers' Union (AFL).

## Printing Pressmen and Assistants (Letterpress and Gravure)

(D. O. T. 4-48.010; .020, .030, and .060; 6-49.410, .420, and .430)

### *Outlook Summary*

Fairly strong demand for journeymen pressmen in early fifties. Opportunities more limited for apprentices and press assistants during this period. Long-range outlook also generally favorable for pressmen, but probably not for assistants.

### *Nature of Work*

Type forms from composing rooms, press plates from electrotyping and stereotyping departments, and rotogravure and lithographic plates all go to a pressroom for use in printing. In small shops, this department may consist of only one or two small presses in a back room or a corner of the shop. In big plants, however, pressrooms are large. Many workers and, frequently, huge presses are employed. These machines may be so heavy and create so much vibration that the department has to be located on the ground floor or in the basement.

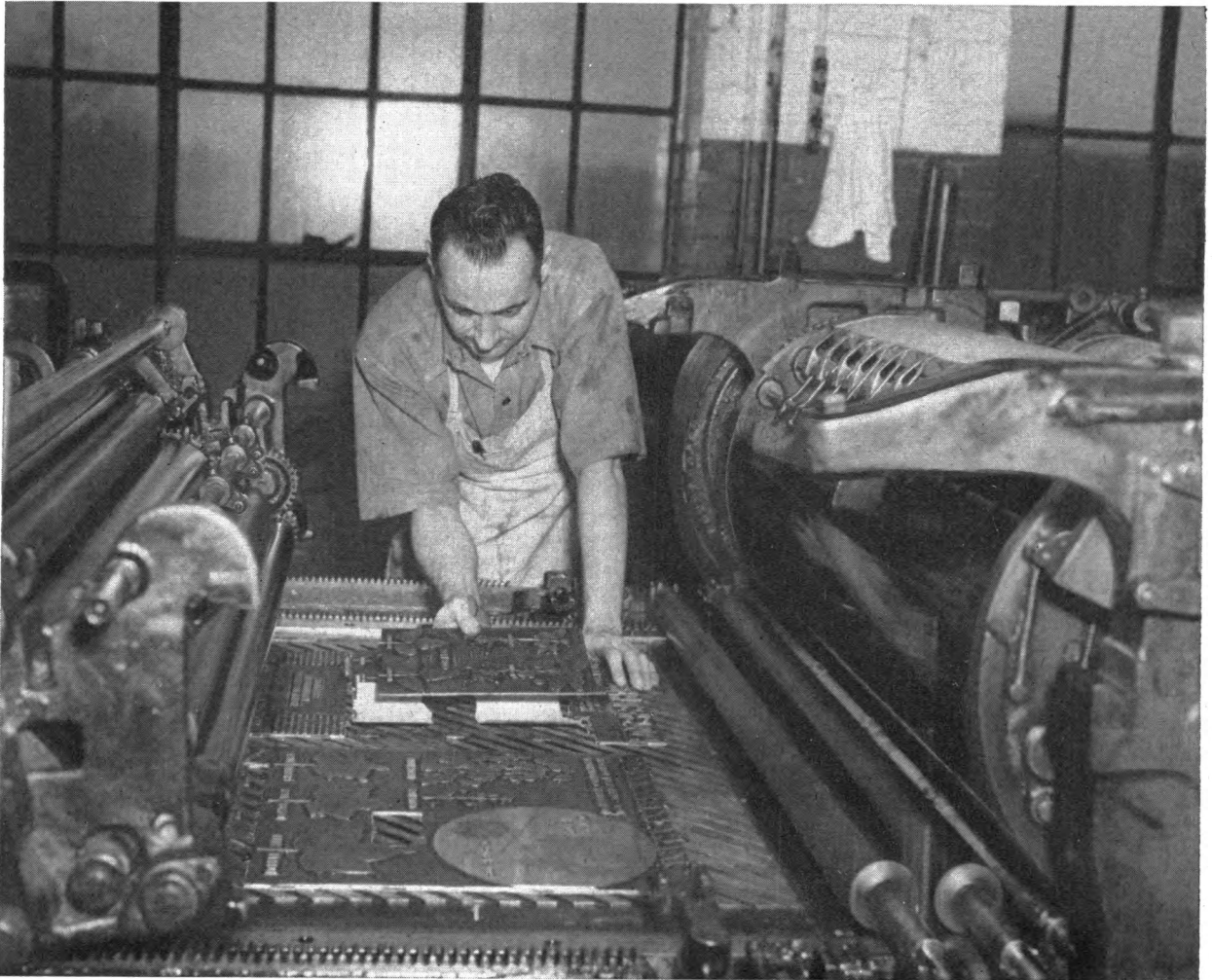
**PRESSMEN.** (D. O. T. 48.010, .020, .303 and .060). Skilled pressmen are the key workers in the department. Their basic duties are to "make-ready" and then tend the presses while in operation. The object of the make-ready, which is one of the most delicate and difficult parts of the work, is to insure printing impressions that are distinct and even, and neither too dark nor too light. This is accomplished by such means as placing pieces of paper of exactly the right thickness underneath low areas of the press plate or type form to level it, and attaching pieces of tissue paper to the surface of the cylinder or flat platen which makes the impression. Pressmen also have to make many other

adjustments—for example, those controlling margins and the flow of ink to the inking roller. In some shops, they are responsible not only for tending the presses but also for oiling and cleaning them and making at least minor repairs. In many cases they have assistants whose work they supervise.

Pressmen's work may vary greatly from one type of shop to another, because of differences in the kinds and sizes of presses used and for other reasons. Small commercial shops, many of which are owned and run by pressmen themselves in partnership with compositors, generally have small and relatively simple platen (or job) presses that are often fed paper by hand.

At the other extreme are the big newspaper plants with their tremendous web-rotary presses. These giant presses are fed paper in big rolls (or webs). They print the paper on both sides by means of a series of cylinders; cut the pages and assemble and fold them; and, finally, count the finished newspaper sections which emerge from the press ready for the mailing room. These steps are accomplished automatically by means of many different mechanisms, each of which calls for repeated attention while a run is being made. Presses of the kind described above are therefore operated by crews of journeymen and less-skilled workers directed by a pressman-in-charge.

Other types of presses on which men specialize are those used in offset printing (see p. 325), and the rotogravure press, a rotary press with a "doctor" blade which scrapes the surplus ink off the surface of the plate.



PHOTOGRAPH BY U. S. DEPARTMENT OF LABOR

Pressman using paper to level plate. Press is a small flatbed cylinder press for letterpress printing.

**PRESS ASSISTANTS.** (D. O. T. 6-49.410, .420, and .430). The duties of press assistants range from merely feeding sheets of paper into hand-fed presses to helping pressmen make ready and operate large and complicated rotary presses. Workers whose main responsibility is feeding are often referred to simply as feeders.

Helping in web-rotary work in newspaper plants are men commonly known as flyboys. They pick up the newspapers as they come off the press and load them onto hand trucks; they also wheel the trucks out of the pressroom and do other work.

The ratio of assistants to pressmen varies greatly from one establishment to another, depending on size of the plant, type of press used, and other factors. Many shops are too small to have any pressroom helpers.

### *Qualifications*

To become a skilled pressman requires 3 to 5 years of apprenticeship in most instances; in newspaper work, almost always 5 years. Usually, men receive training in only one type of press, and opinion differs as to how readily journeymen can become skilled on other types of presses. The length of the apprenticeship and the content of the training depend largely on the kind of press involved.

Individual companies choose apprentices generally from among press assistants and others already employed in the company. Thus, an apprentice often has worked for 2 or 3 years in the pressroom before starting the 3- to 5-year training period leading to journeyman status. To be se-

lected for training, one must have completed at least the eighth grade in school; some employers require high-school graduation. Since pressmen often have to blend their own inks, a knowledge of color is necessary. Art courses are therefore very helpful.

Physical strength and endurance are necessary for work on some kinds of presses, where the pressman has to lift heavy type forms and press plates and be on his feet all day. Mechanical aptitude is also important in making press adjustments and repairs.

### *Outlook*

**PRESSMEN.** During the early fifties, employment is not likely to change much from the 1948-49 levels. Vacancies arising as a result of deaths, retirements, promotions, and other causes will average around a thousand each year, providing apprenticeship openings for many nonjourneymen already employed in pressrooms or other departments of printing firms and even some outsiders. In mid-1950, there were more than 5,000 pressmen apprentices and about 40,000 journeymen. Pressmen made up the third largest group of printing craftsmen in 1940, and probably still held this position 10 years later.

Over the long run, a gradual growth of employment can be expected, although technological developments may limit this expansion. The effect of technical and other changes which tend to reduce labor requirements is likely to be at least partially offset by increasing demands for printing and the continued shortening of the workweek.

**PRESS ASSISTANTS.** With an average of one helper to about every three journeymen, no more than a few hundred newcomers may expect to find employment during any one year of the early fifties or the years immediately following. Before World War II, the printing industries tended not to fill all of the vacancies created through normal

losses of assistants. A resumption of this practice is likely and perhaps has already started. Declining employment may once more mark the occupation, at least as a long-run tendency. But lay-offs of journeymen will occur only in exceptional circumstances.

### *Earnings and Unionization*

Wage rates of pressmen vary with the make and style of press operated, as well as with the type of printing plant and other factors. They tend to be the highest in the newspaper industry (see following tabulation).

A range of \$1.10 to about \$3 an hour for day work is indicated for the four skilled groups covered by the Bureau of Labor Statistics taken together: Newspaper pressmen-in-charge and journeymen pressmen and book and job cylinder pressmen and platen pressmen. (In the Bureau of Labor Statistics data, the so-called "cylinder pressmen" group includes also other non-platen pressmen.) Hourly rates for book and job press assistants and feeders ranged from about 90 cents in Portland, Maine, to approximately \$2.55 for some workers in Chicago.

The Bureau of Labor Statistics survey of union wage scales in 77 cities as of July 1, 1950 showed that the average hourly rate for newspaper pressmen-in-charge was \$2.74; for newspaper journeymen, \$2.55; for book and job cylinder pressmen, \$2.40; for book and job platen pressmen, \$2.12; for book and job press assistants and feeders, \$1.94.

The July 1950 minimum union hourly wage scales (day work) for most of the important printing centers in the selected pressroom occupations listed are shown in the following table.

Pressroom workers are usually covered by union agreements. Practically all the letterpress and rotogravure pressmen and assistants who are organized belong to the International Printing Pressmen's and Assistants' Union of North America (AFL).

OCCUPATIONAL OUTLOOK HANDBOOK

TABLE 1.—Union wage scales in important printing centers in selected pressroom occupations, July 1, 1950

	Newspapers		Book and job shops		
	Journeymen pressmen	Pressmen-in-charge	Cylinder pressmen	Platen pressmen	Press assistants and feeders
Atlanta, Ga.	\$2.45	\$2.67	\$2.38-2.44	\$2.28	\$1.54
Baltimore, Md.	2.52-2.59	2.52	1.86-2.09	1.70	1.30-1.67
Birmingham, Ala.	2.25	2.41	2.08-2.30	2.08	1.04-1.44
Boston, Mass.	2.33-2.45	2.51-2.64	2.07-2.24	1.86-1.95	1.17-1.93
Buffalo, N. Y.	2.37-2.57	2.57	2.23-2.47	2.06	1.61-2.07
Butte, Mont.	2.36	2.48	2.31	2.17	.97-1.38
Charleston, W. Va.	2.05	2.28	2.15	2.03	
Charlotte, N. C.	2.10		2.00	1.75	
Chattanooga, Tenn.	2.29	2.43	2.13	2.13	
Chicago, Ill.	2.41-2.67	2.59-2.72	2.57-3.01	2.37-2.57	1.82-2.54
Cincinnati, Ohio	2.46	2.59	1.76-2.46	1.77-1.87	1.15-1.97
Cleveland, Ohio	2.42-2.78	2.66-2.78	2.35-2.49	2.10-2.31	1.60-1.98
Columbus, Ohio	2.40	2.53			1.92
Dallas, Tex.	2.40	2.62	1.86-2.00	1.68	1.65
Davenport, Iowa	2.14	2.30	1.25-1.87	1.50-1.59	1.09-1.62
Dayton, Ohio	2.39	2.52	2.25-2.40	2.02-2.25	1.43-1.93
Denver, Colo.	2.36-2.43	2.49	2.19	2.02	.98-1.69
Des Moines, Iowa	2.37	2.53	2.01-2.30	1.89	1.35-1.75
Detroit, Mich.	2.52-2.59	2.72-2.79	2.55-2.63	2.27	1.65-2.16
Duluth, Minn.	2.07	2.21	1.72	1.35-1.57	.98-1.23
El Paso, Tex.	2.18	2.00	2.00	1.87	
Erie, Pa.	2.11		2.00	1.90	
Grand Rapids, Mich.	2.22	2.32	2.00	1.75	1.30-1.60
Houston, Tex.	2.24	2.31	2.16-2.30	1.88-2.05	1.83-1.90
Indianapolis, Ind.	2.41	2.59	2.23-2.44	2.09-2.24	1.21-2.11
Jacksonville, Fla.	2.39	2.52	1.50	1.50	1.30
Kansas City, Mo.	2.40	2.53	2.37-2.44	2.21-2.31	1.50-1.88
Knoxville, Tenn.	2.29	2.43	1.90-2.10	1.43	
Little Rock, Ark.	2.18		1.92	1.70	.98-1.18
Los Angeles, Calif.	2.40	2.60	2.47-2.51	2.37	1.78-2.14
Louisville, Ky.	2.41	2.68	1.61-2.45	1.61-1.74	1.36-1.85
Manchester, N. H.	2.00	2.27	1.70	1.43-1.51	
Memphis, Tenn.	2.31	2.56	1.95-2.05	1.68	.90-1.35
Miami, Fla.	2.62	2.89	2.23-2.42	2.23	1.24-1.70
Milwaukee, Wis.	2.40-2.50	2.60	2.20-2.40	2.18-2.22	1.38-2.03
Minneapolis, Minn.	2.52	2.72	1.70-2.59	1.52-2.43	1.03-2.09
Mobile, Ala.	2.19	2.46	2.00	2.00	
Moline, Ill.	2.14	2.30	1.25-1.87	1.50-1.59	1.09-1.62
Newark, N. J.	2.48	2.68	2.03-2.66	2.25-2.53	1.49-2.22
New Haven, Conn.	2.10	2.23	1.88-2.37	1.75-2.05	1.50-1.84
New Orleans, La.	2.15	2.30	2.10-2.18	1.47-1.86	1.03-1.60
New York, N. Y.	2.61-2.76	2.78-3.01	2.45-2.81	2.19-2.34	1.05-2.21
Norfolk, Va.	2.28	2.55	2.11		
Oakland, Calif.	2.41	2.78	2.74	2.63	1.73-2.16
Oklahoma City, Okla.	2.18		2.00	1.84	1.17-1.54
Omaha, Nebr.	2.28	2.33	1.90	1.90	1.65
Peoria, Ill.	2.27-2.47	2.41	2.03	1.91	1.63-1.88
Philadelphia, Pa.	2.27-2.47	2.47-2.70	2.27-2.70	2.11	1.60-2.20
Phoenix, Ariz.	2.35		2.35	2.20	1.70
Pittsburgh, Pa.	2.34	2.54	2.40-2.57	2.31	1.41-2.08
Portland, Maine	2.00		1.21-1.33	1.10	.88
Portland, Oreg.	2.42	2.62	2.51	2.44	
Providence, R. I.	2.36	2.49	2.04	2.04	1.66
Reading, Pa.	2.16	2.29	2.02	1.90-1.95	1.63-1.95
Richmond, Va.	2.16	2.41	1.62-2.00	1.22-1.50	1.15-1.39
Rochester, N. Y.	2.41	2.55	1.86-2.50	1.86-2.16	1.45-1.91
Rock Island, Ill.	2.22	2.36	1.35-1.97	1.60-1.69	1.29-1.72
St. Louis, Mo.	2.40	2.59	1.91-2.76	1.91-2.16	1.00-2.09
St. Paul, Minn.	2.37	2.64	1.70-2.61	1.75-2.41	1.38-2.02
Salt Lake City, Utah	2.23	2.36			
San Antonio, Tex.	2.20	2.47	1.90-2.33	1.75	1.15-1.40
San Francisco, Calif.	2.53	2.78	1.97-2.63	2.53	1.65-2.08
Savannah, Ga.	2.13	2.48	1.55	1.55	
Scranton, Pa.	2.26	2.51	2.19-2.30	1.88	1.48-1.87
Seattle, Wash.	2.53	2.67	2.71	2.50	1.79-2.15
South Bend, Ind.			2.03-2.18	2.03	1.84
Spokane, Wash.	2.41	2.67	2.32	2.32	1.73-1.78
Springfield, Mass.	1.95		2.00		1.43
Syracuse, N. Y.	2.21	2.38	2.08	1.82	1.39-1.63
Toledo, Ohio	2.38-2.47	2.45-2.75	2.06	1.94-1.99	1.79
Washington, D. C.	2.42	2.62	* 2.28-2.74	* 2.06-2.19	1.55-2.06
Wichita, Kans.	1.97	2.04	2.13	1.88	1.43-1.80
Worcester, Mass.	2.20				
York, Pa.	2.00		2.07-2.12	2.07	1.80-1.85
Youngstown, Ohio	2.13	2.26	2.00-2.06	2.00	.90-1.41

<sup>1</sup> Pressmen, first, \$1.88; pressmen, second, \$1.81.

<sup>2</sup> Excludes Government Printing Office.



## Lithographic (Offset) Occupations

(D. O. T. 4-46, 4-48.050, .070)

### *Outlook Summary*

Better chances for newcomers in early fifties than in other printing fields. Long run upward trend in employment, but number of jobs will remain relatively small.

### *Nature of Work*

The main groups of lithographic workers are cameramen, artists and letterers, platemakers, and pressmen and assistants.

**CAMERAMEN.** (D. O. T. 4-46.200).—Cameramen who photograph the copy to be printed are highly skilled workers. As a group, they do several different kinds of photography, developing, and related work in black and white or color; the photographing of drawings or photographs, as well as taking original shots; developing glass plates on negative paper or film. The individual cameraman nearly always specializes in one type of photography.

**ARTISTS AND LETTERERS** (D. O. T. 4-46.700).—After negatives have been made and developed, they frequently have to be retouched, to lighten or intensify certain parts. This is done by hand, with chemicals and dyes, and is one of the many highly skilled operations handled by craftsmen in the art department. Artists may have to correct colors in the final press plates. They also draw posters or other pictures on stone or metal plates or on special paper, on the comparatively rare occasions when hand methods are used in place of photolithography. Lettering is usually done by hand.

To be journeymen, artists have to be adept either in one or more of the various retouching methods or in hand drawing with lithographic crayon. Like cameramen, they are customarily assigned to one phase of the work and may then be known, for example, as dot etchers (who do a highly specialized type of retouching), retouchers, crayon artists, or letterers, depending on the particular job.

**PLATEMAKERS.** (D. O. T. 4-46.300 through .600).—In photolithography, negatives and positives (made by cameramen and corrected by art-

ists) are transferred onto press plates by workers in the platemaking (chemical or processing) department. First, a platemaker places a metal plate with a light sensitive coating in a vacuum frame or photocomposing machine; puts a photographic negative (or, sometimes, a positive) on top of it; and makes an exposure under an arc lamp. The plate is then developed and chemically treated so as to make the nonimage areas repellent to grease when damp, while leaving the image areas receptive to it.

The foregoing indicates only a few of the main steps in this highly complicated and technical process. Platemakers in small shops often perform all the different operations. Those in large shops, however, are likely to be more specialized; they may, for example, operate only a vacuum frame or a photocomposing machine. Besides platemakers using these photo-mechanical methods, there are some who do hand transferring—although this latter process has been largely displaced by photomechanical platemaking.

**PRESSMEN AND ASSISTANTS** (D. O. T. 4-48.070 and 6-49.410).—Although the basic duties of lithographic (offset) pressmen and assistants are similar to those of letterpress and gravure men (see p. 321), there are many differences. These variations arise at least in part from the specialized character of lithographic presses.

An offset press has three, rather than two, cylinders. The first carries the curved plate; the second, a rubber blanket; and the third, the paper (or other material) on which an impression is to be made. The plate does not print directly onto the paper; instead, it transfers the impression to the rubber blanket around the second cylinder which then offsets the image onto the paper. Another special feature is the dampening rollers which pass over the plate before each inking, to prevent the greasy ink from adhering to the nonprinting areas of the plate. Both these features create extra complications for the pressman. In printing by this method much less pressure is needed than in relief and gravure printing, and unusually delicate and skillful adjustments by the pressman are required to attain exactly the right pressure.

A few pressmen specialize in operating direct lithographic presses. When these presses are used, impressions are made on paper or other printing surfaces directly from the plate (stone) instead of by a blanketed middle cylinder.

### *Training and Qualifications*

A large proportion of offset workers are skilled. To become an all-round craftsman generally requires a 4- or 5-year apprenticeship covering the basic techniques of the process. The main emphasis of the training is on the operations related to the specific occupation in which journeyman status is being sought.

Beginners are usually hired as helpers (or assistants) and promoted to apprentices after a year or two, if they show promise and there are openings. Besides on-the-job training, many plants have supplementary courses for their workers. Courses are offered also in vocational schools. Although the skill requirements for lithographic work are often similar to those in other printing methods, opinions differ as to how readily journeymen can transfer from jobs in this field to the more or less comparable activities in letterpress and gravure printing.

A high school education is needed for most jobs. Work in the art, engraving, and camera departments calls for natural drawing ability and an eye for color and design, as well as technical ability. Since pressmen often must blend their own inks, they too should have a knowledge of color. In platemaking, manual dexterity and an interest in chemistry are more important. Many types of physical handicaps are not bars to employment in offset jobs.

### *Outlook*

There will be openings for a limited number of trainees in lithographic work during the early fifties. Employment is expected to rise moderately, but the offset field will remain relatively small in comparison with letterpress printing. Platemakers make up the largest occupational group in offset work (over 5,000 were employed in mid-1950), and there will be more openings in platemaking than in any other offset job.

The longer run employment prospects in lithography are also generally favorable. Any kind of printing job that can be done by letterpress or

gravure can be done also by lithography. Practical considerations determine which method is used. Lithography has special advantages when the copy to be reproduced includes photographs, drawings, or paintings, and particularly when these are in color. Recent improvements affecting the life of plates and the speed of presses have been enabling the process to gain headway in the important mass magazine field. But even before these latest developments, offset was a rapidly expanding graphic art, perhaps the fastest-growing reproduction method. Employment gains will occur not only in plants specializing in lithographic work, but also in the growing number of letterpress establishments setting up offset departments. Such combination plants are playing an increasingly important role in the printing industries.

There will be opportunities for a few men to open their own shops. The initial investment is greater than in letterpress printing, and the chances for success are likely to be best in localities which do not already have well-established lithographic businesses.

For many years, New York, Chicago, and San Francisco have been the principal lithographic centers, accounting for perhaps half or more of all offset jobs in the country. Excessive humidity or dryness and other factors have retarded offset progress in some parts of the country. Jobs will become more and more widespread, however, in future years. Offset work has had an especially rapid growth in recent years in some of the large western cities.

### *Earnings and Unionization*

A large proportion, if not a majority, of lithographic craftsmen and operatives belong to the Amalgamated Lithographers of America (CIO), the only printing union organized on an industrial basis. All or almost all of the occupations involved are well represented. A small number of offset pressmen and assistants are in the AFL's International Printing Pressmen's and Assistants' Union, and their wage scales (see p. 324) have been included with those of other nonplaten pressmen and helpers in the separate statements on letterpress and gravure pressmen and assistants.

Union wage scales under the agreements of the Amalgamated Lithographers of America are not included in the regular annual surveys of the

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TABLE 2.—Union hourly wage scales in lithographic occupations in selected cities, Dec. 15, 1949

	Artists*	Platemakers and related workers	Camerasmen	Pressmen	Press assistants
Ashland, Ohio	\$2.50	\$1.85-2.21	\$1.87-2.58	\$2.03-2.85	\$1.58
Atlanta, Ga.		2.25	2.25	2.10-2.41	1.45
Bennington, Vt.	2.44-2.71	1.65-2.31	1.98-2.80	1.78-3.56	1.49-1.78
Boise, Idaho		2.15	2.15	1.88-2.15	
Boston, Mass.	2.30-2.56	1.64-2.20	2.04-2.55	1.84-2.86	1.43-1.58
Buffalo, N. Y.	2.60	1.91-2.27	1.62-2.60	1.91-2.35	1.36-1.41
Chicago, Ill.	1.85-2.66	2.00-2.51	2.12-2.81	2.25-3.34	1.66-2.01
Cincinnati, Ohio	2.21-2.49	1.58-2.35	2.07-2.63	1.90-2.55	1.62-1.73
Cleveland, Ohio	2.17-2.49	1.78-2.25	1.90-2.52	1.37-1.48	1.37-1.48
Dayton, Ohio	2.18-2.48	1.68-2.25	1.82-2.22	1.63-2.63	1.43
Denver, Colo.	2.22-2.34	1.63-2.22	1.88-2.47	1.83-2.47	1.50-1.63
Des Moines, Iowa	2.09	1.27-1.78	1.96-2.09	1.56-2.09	1.30-1.40
Detroit, Mich.	2.40-2.52	2.19-2.40	2.02-2.52	2.11-3.00	1.63
Evansville, Ind.	2.02	1.87		1.77-2.27	1.33-1.38
Indianapolis, Ind.	2.42	2.09-2.31	2.20-2.48	2.09-2.59	1.64
Kansas City, Mo.	2.56	1.55-2.34	2.01-2.65	2.09-2.56	1.33-1.52
Los Angeles, Calif.	2.48-2.69	2.08-2.48	2.57-2.68	2.00-2.90	1.70-1.78
Louisville, Ky.	2.02	.94-1.71	1.71-2.02	1.58-2.02	1.19-1.35
Milwaukee, Wis.	2.43-2.46	1.85-2.37	2.02-2.64	1.85-2.70	1.64-1.72
Minneapolis, Minn.	2.50	1.60-2.30	2.32-2.51	1.85-2.57	1.66-1.76
New York, N. Y.	2.75-3.05	2.08-2.75	2.15-3.31	2.22-3.53	1.68-2.22
Oklahoma City, Okla.	2.04-2.35	1.48-2.04	1.98-2.29	1.79-2.25	1.35
Philadelphia, Pa.	2.44-2.77	1.72-2.44	2.05-2.94	1.85-3.20	1.28-1.79
Pittsburgh, Pa.	2.50	1.88-2.50	2.04-2.65	2.01-2.85	1.49-1.56
Portland, Oreg.	2.62	2.07-3.48	2.48-2.62	2.35-2.48	1.70
Poughkeepsie, N. Y.	2.82	1.80-2.49	2.49-2.75	2.13-3.51	1.54-2.01
Providence, R. I.	2.37-2.60	2.00-2.28	2.12-2.60	2.12-3.10	1.21-1.71
Racine, Wis.	2.50	1.75-2.41	2.50-2.76	1.97-3.17	1.35-1.77
Rochester, N. Y.	2.70	1.75-2.39	2.70	2.10-3.09	1.61-1.67
Salt Lake City, Utah	2.14	2.14	2.14	2.01-2.39	1.41-1.48
San Francisco, Calif.	2.48-2.62	2.08-2.48	2.57-2.90	2.34-2.95	1.70-1.78
Schenectady, N. Y.	2.62	2.39	2.39-2.80	2.32-2.83	1.45-1.87
Seattle, Wash.	2.48	2.00-2.48	2.48	2.00-2.70	1.70-1.77
St. Louis, Mo.	2.20-2.42	1.65-2.13	1.82-2.50	2.04-3.12	1.69
St. Paul, Minn.	2.50	1.60-2.30	2.32-2.51	1.85-2.57	1.66-1.76
Syracuse, N. Y.	2.58-2.88	1.67-2.28	2.28-2.88	2.12-2.43	1.67
Toledo, Ohio	2.44-2.50	2.23-2.44	1.89-2.50		
Wilmington, Del.	2.78	1.76-2.44	2.94	1.93-2.91	1.53-1.66

\*Excludes opaquers and spotters.

Bureau of Labor Statistics. The information on union wage scales in lithography (shown above) is based on data for 38 cities compiled by the National Association of Photo-Lithographers, but the data are of a similar nature to those of the Bureau.

At the end of 1949, more than half the city scales for artists were between \$2.40 and \$2.70 an hour (not including opaquers and spotters, whose rates were much lower). Rates for camerasmen frequently ranged below those of skilled artists shown, but the top-grade camerasmen usually made as much or more than the top-skilled artists.

Nearly all the platemaker and related scales reported were between \$1.60 and \$2.50. This range includes men with varying degrees of skill and responsibility; the scales of the more highly skilled men, such as the journeymen discussed in this report, were toward the upper end of the range.

A wide range of scales is indicated also for pressmen. The great majority of the scales reported for these workers were between \$1.90 and \$2.60 an hour. Press assistant rates ranged largely from \$1.30 to \$1.80. The number and size and complexity of the presses operated and tended by journeymen and helpers influence their rates.

## Bookbinders

(D. O. T. 4-49.010)

### Outlook Summary

Job opportunities will continue to become fewer because of expected employment declines during the early fifties and also over the longer run.

### Nature of Work

Many products are finished when they leave the pressroom. This is true of a wide variety of items

produced by job shops—business forms, printed stationery, labels, advertising flyers, etc. Newspapers, except the few that are bound for libraries, never see a bindery department. Nevertheless, binderies play a part in the manufacture of many items besides books. The sewing or stapling of magazines, pamphlets, or small calendars is considered a bindery operation.



PHOTOGRAPH BY U. S. DEPARTMENT OF LABOR

Bookbinder putting gold lettering on back of book with hand tool.

There are several different kinds of binderies, serving a variety of purposes. Edition and pamphlet binderies (or bindery departments) bind the regularly published editions of books and pamphlets printed in large quantities. Trade binderies serve a function similar to the service shops of other branches of the printing industry discussed on page 302. Job binderies do odd jobs on order for customers direct or for the trade. Blankbook binderies bind ledgers and bookkeeping and accounting volumes. There are also library binderies (or properly staffed and equipped specialized departments of job binderies) which bind and rebind books and other printed materials for libraries, and do various kinds of related work.

Edition binding—making books in quantity out of the big, flat sheets of paper that come into a bindery from the pressroom or from an outside printer—is by far the most complicated kind of bindery work. The first step is to fold the printed sheets, each of which contains many pages, so that these pages will be in the right order. When so folded into sections of 16 or 32 pages, the sheets are known as signatures. The next steps are to insert any illustrations that have been printed separately, to assemble the signatures in proper

order, and to sew them together. The resulting book bodies are shaped in various ways, usually with power presses and trimming machines, and fabric strips are glued to the backs to reinforce them. Sometimes the edges of the pages are gilded or colored. Covers are glued or pasted onto the book bodies, after which the books undergo a variety of finishing operations and, frequently, are wrapped in paper jackets. Machines are used extensively throughout the process.

Skilled bookbinders seldom handle all these different tasks, although many journeymen have had training in all of them. In large shops especially, bookbinders are likely to be assigned to one or a few operations, most often to the operation of complicated machines.

The majority of journeymen are employed in shops whose chief business is bookbinding. However, a good many work in the bindery rooms of large book, periodical and commercial printing plants. Some are employed in libraries, where the work is done mainly by hand and also differs in other respects from that performed elsewhere.

#### *Qualifications for Employment*

Completion of a 4-year apprenticeship is usually required of men seeking to qualify as skilled bookbinders. Apprenticeship programs may vary considerably among the different types of shops or services. Where large quantities of books are bound on a mass-production (edition) basis, emphasis is on the most modern machine methods. Where fine hand binding is done, the training is mainly in hand methods, including artistic designing and decorating of leather covers.

#### *Outlook*

During the early fifties, employment of skilled bookbinders is likely to slip further from the high immediate postwar levels. Many new bookbinders were trained between 1946 and 1949—to make up for the wartime labor shortage, take care of normal replacement needs, and handle the expanded volume of bookbinding work. Despite an apparent decline in employment in the closing year or two of the forties, the number of jobs in early 1950 was probably still several thousand above the 1940 total of less than 25,000. The recent downtrend in employment is a resumption of the long-run decline of the occupation which was interrupted by the

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war and the immediate postwar boom. Job openings are likely to be relatively few, on the whole, in the years to come.

### *Earnings and Unionization*

Wage scales in this occupation tend to be below the general average of the skilled printing trades. On July 1, 1950, the union rates for journeymen bookbinders in book and job printing in about three-fourths of 77 cities surveyed were from \$1.80 to \$2.40 an hour. The average union rate was \$2.07 an hour.

The union wage scales for bookbinders as of July 1, 1950, in most of the important printing centers, are shown in the following tabulation.

Although employees in binderies are not so strongly organized as other groups of printing workers, many skilled bookbinders are represented by the International Brotherhood of Bookbinders

(AFL), one of the six major unions of printing workers. A higher proportion of journeymen than of nonjourneymen bindery workers belong to this union.

Atlanta, Ga.....	\$2.27	Minneapolis, Minn.....	\$2.40
Baltimore, Md.....	1.77	Newark, N. J.....	1.86-2.28
Birmingham, Ala.....	2.08	New Haven, Conn.....	2.05
Boston, Mass.....	2.07	New Orleans, La.....	2.10
Buffalo, N. Y.....	2.02	New York, N. Y.....	.97-2.50
Butte, Mont.....	2.31	Oakland, Calif.....	2.63
Charleston, W. Va.....	2.15	Oklahoma City,	
Charlotte, N. C.....	1.60	Okla.....	2.00
Chicago, Ill.....	2.37-2.60	Philadelphia, Pa.....	1.90-1.95
Cincinnati, Ohio.....	2.22	Pittsburgh, Pa.....	2.06
Cleveland, Ohio.....	2.23	Portland, Oreg.....	2.51
Columbus, Ohio.....	2.35	Richmond, Va.....	1.78
Dayton, Ohio.....	2.08-2.28	Rochester, N. Y.....	2.16-2.24
Denver, Colo.....	1.98	St. Louis, Mo.....	2.08-2.10
Des Moines, Iowa.....	2.00	St. Paul, Minn.....	2.28-2.33
Detroit, Mich.....	2.25-2.40	San Antonio, Tex.....	1.80
Houston, Tex.....	2.16	San Francisco, Calif.....	2.63
Indianapolis, Ind.....	2.23	Scranton, Pa.....	1.92-1.99
Jackson, Miss.....	1.60	Seattle, Wash.....	2.71
Jacksonville, Fla.....	2.00	South Bend, Ind.....	2.18
Kansas City, Mo.....	2.27	Spokane, Wash.....	2.32
Little Rock, Ark.....	1.87	Springfield, Mass.....	2.00
Los Angeles, Calif.....	2.42	Syracuse, N. Y.....	1.55
Louisville, Ky.....	1.79-1.80	Toledo, Ohio.....	1.91
Memphis, Tenn.....	1.90	Washington, D. C.....	2.19
Miami, Fla.....	1.85	Wichita, Kans.....	2.09
Milwaukee, Wis.....	2.18	York, Pa.....	1.95
		Youngstown, Ohio.....	1.77

<sup>1</sup> Excludes Government Printing Office.

## Bindery Workers

(D. O. T. 6-49.000 through .199)

### *Outlook Summary*

A gradually growing field made up mainly of women workers. Fairly large number of openings for newcomers in early fifties to replace workers leaving their jobs.

### *Nature of Work*

In many binderies, especially large ones, a great part of the work is done by employees trained in only one operation or in a small number of related tasks. These semiskilled workers, often classified as *bindery workers* or *bindery hands*, are mostly women (hence the common designation *bindery women*). Women handle a variety of hand or light-machine operations, such as hand-folding, pasting-in of inserts, assembling signatures by hand, machine-sewing, gluing fabric reinforcement on signatures, and feeding machines. The small number of men involved are usually assigned to more intricate machine jobs; they may operate assembling, trimming, stamping, and many other types of machines. Bindery workers are employed both in independent binderies and in the bindery departments of big printing plants and of other operations.

### *Training*

For inexperienced men and women entering the occupation a training period which may be as long as 1 or 2 years is frequently required. In union shops, there are always formal training programs.

### *Outlook*

Employment of bindery workers has risen considerably since the end of the war. During the early fifties the number of jobs is expected to remain about the same as in 1949, with a slight increase possible.

Bindery workers are by far the largest group of semiskilled workers in the printing and allied industries. In 1939, roughly 70 to 80 thousand women and men were in bindery work and substantially more are now employed. Because this is a relatively big field, and because there is usually considerable turn-over among women employees, there should be a fairly large number of openings for new workers during the early fifties. The long-range trend in employment is upward, and those who obtain jobs in the early fifties have good chances of reasonably steady work for many years if favorable general business conditions continue.

*Earnings and Unionization*

Women bindery workers have the lowest wage rates of any group of production workers in the printing and allied industries (see following tabulation). For example, even the union scales for bindery women in effect in book and job printing on July 1, 1950, in the cities covered in the annual union wage scale survey of the Bureau of Labor Statistics, were rarely over \$1.45 an hour and more than half of them were under \$1.20. No scale, however, was below the rate of 75 cents found in Baltimore. The highest rate, \$1.50, was in effect in Seattle. The general average of the union rates for bindery women in the cities surveyed was \$1.18.

Men doing semiskilled machine work are generally paid somewhat more than the usual top rate for women. The few men performing semiskilled hand operations are paid rates similar to those for women workers.

The union hourly wage scales for bindery women in book and job printing plants as of July 1, 1950, in most of the important printing centers, are shown in the following tabulation.

Although employees in binderies are not so strongly organized as other groups of printing workers, many bindery workers are represented by

the International Brotherhood of Bookbinders (AFL), one of the six major printing unions. The proportion of semiskilled bindery personnel organized is smaller than that for bookbinders and bookbinder machine operators.

Atlanta, Ga.....	\$1. 17	Newark, N. J.....	\$1. 19
Baltimore, Md....	. 75-. 93	New Haven,	
Birmingham, Ala...	1. 10	Conn .....	1. 00-1. 05
Boston, Mass.....	1. 11	New Orleans, La....	1. 00
Buffalo, N. Y.....	1. 04	New York, N. Y. 1. 00-1. 23	
Butte, Mont.....	1. 37	Oakland, Calif.....	1. 48
Charleston, W. Va..	1. 21	Oklahoma City, Okla.	1. 09
Charlotte, N. C....	. 95	Philadelphia, Pa....	1. 00
Chicago, Ill....	1. 37-1. 42	Pittsburgh, Pa.....	1. 12
Cincinnati, Ohio...	1. 27	Portland, Oreg.....	1. 39
Cleveland, Ohio..	1. 08-1. 15	Richmond, Va.....	. 94
Columbis, Ohio....	1. 29	Rochester, N. Y. 1. 14-1. 25	
Dayton, Ohio....	1. 05-1. 31	St. Louis, Mo.....	1. 15
Denver, Colo.....	1. 15	St. Paul, Minn... 1.10-1. 17	
Des Moines, Iowa..	1. 11	San Antonio, Tex... . 93	
Detroit, Mich... 1. 15-1. 25		San Francisco, Calif.	1. 48
Houston, Tex.....	1. 22	Scranton, Pa.....	1. 13
Indianapolis, Ind...	1. 24	Seattle, Wash.....	1. 50
Jacksonville, Fla...	. 90	South Bend, Ind... 1. 15	
Kansas City, Mo....	1. 28	Spokane, Wash.... 1. 29	
Little Rock, Ark... . 98		Springfield, Mass... 1. 03	
Los Angeles, Calif...	1. 45	Syracuse, N. Y..... . 93	
Louisville, Ky... 1. 03-1. 06		Toledo, Ohio..... 1. 20	
Memphis, Tenn.... . 95		Washington, D. C... <sup>1</sup> 1. 05	
Miami, Fla..... 1. 05		Wichita, Kans..... 1. 16	
Milwaukee, Wis.... 1. 08		York, Pa..... 1. 10	
Minneapolis, Minn..	1. 20	Youngstown, Ohio... . 85	

<sup>1</sup> Excludes Government Printing Office.