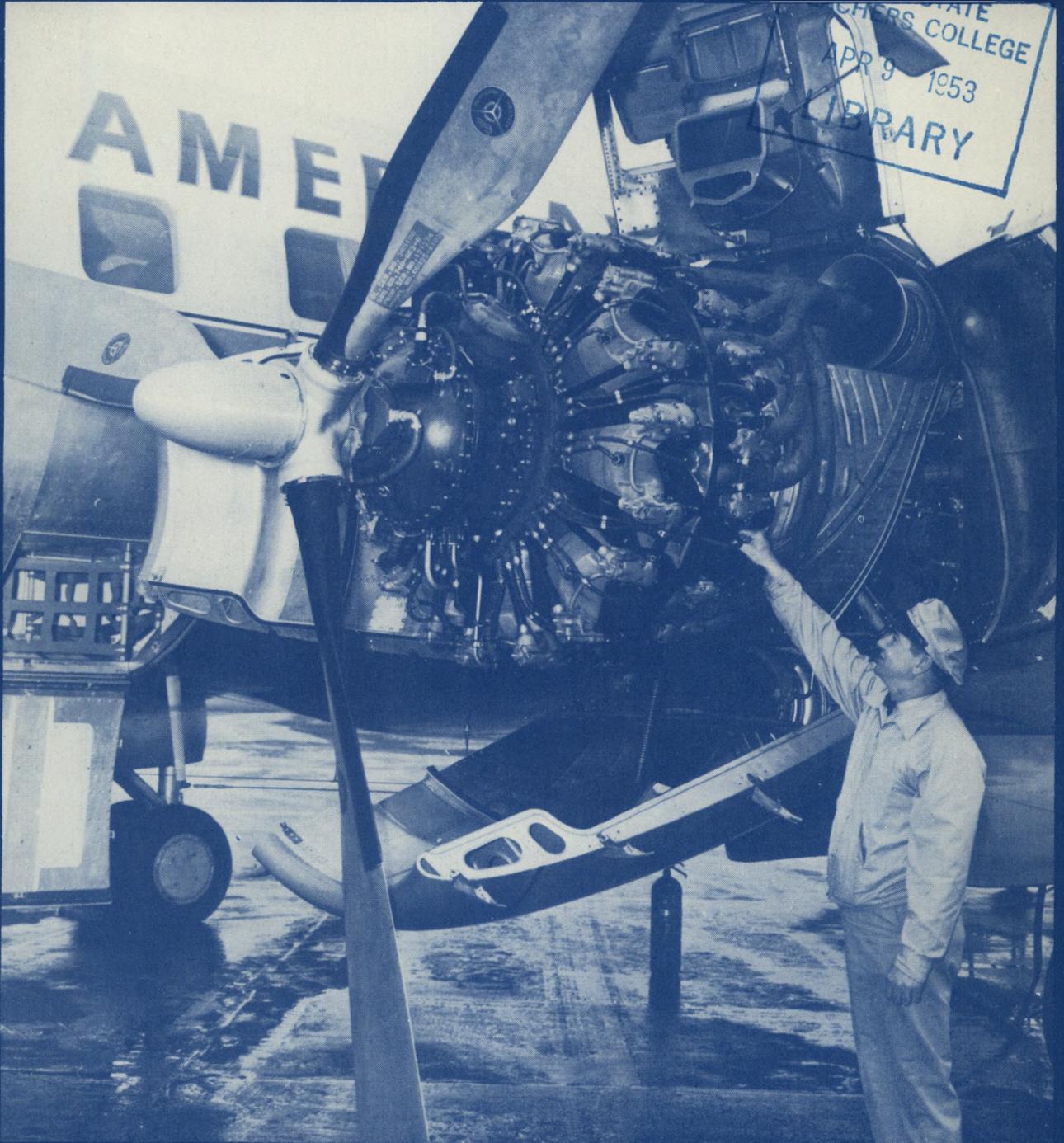


Employment Outlook for

AIR TRANSPORTATION



UNITED STATES DEPARTMENT OF LABOR

Martin P. Durkin, *Secretary*

BUREAU OF LABOR STATISTICS

Ewan Clague, *Commissioner*

In cooperation with VETERANS ADMINISTRATION

Employment Outlook in Air Transportation

A Reprint From The

1951 Occupational Outlook Handbook

Bulletin No. 1128

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Letter of Transmittal

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

The SECRETARY OF LABOR:

I have the honor to transmit herewith a report on the employment outlook in air transportation 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 aviation occupations to replace Bulletin No. 837-2, issued in 1946, 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.

EWAN CLAGUE, *Commissioner.*

Hon. MARTIN P. DURKIN,
Secretary of Labor.

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AIR TRANSPORTATION OCCUPATIONS

Air transportation, the newest of the Nation's transportation industries, has had a lure for young people out of proportion to the civilian jobs available. Thousands of boys and girls aspire to careers in aviation—as pilots, airplane hostesses, aviation mechanics or airline traffic representatives, to cite but a few of the vocations found in air transportation. Despite the long-run upward trend in employment, there has been sharp competition for jobs in peacetime in most aviation occupations. Since World War II, a large number of air force veterans have sought civilian jobs as pilots or mechanics or in other work comparable to their military assignments.

Air Transportation and Related Activities

The airlines which carry passengers, mail, and cargo on a regular schedule make up the largest group of employers in the air transport field. There were 43 scheduled airlines engaged in interstate or foreign commerce at the end of 1949. Sixteen were domestic trunk lines, of which 9 flew over international as well as domestic routes. Three lines were engaged only in international operations. Two small carriers operated only in the Territories; four carriers were certificated for cargo operations only; the remaining eighteen were domestic feeder lines. Altogether, scheduled carriers operated about 1,000 planes and employed approximately 80,000 men and women in 1949. The domestic trunk lines and international lines were the largest employers; their staffs represented more than 90 percent of the total work force.

Besides the employees of the scheduled lines, many thousands work for irregular (nonscheduled) carriers and in fixed-base and industrial operations. At the end of 1949, approximately 90 active companies were registered with the Civil Aeronautics Board as Large Irregular Carriers; in addition, more than 2,000 Small Irregular Carriers were authorized to engage in air transportation.

The major functions of fixed-base operators are flight instruction, charter flying, and servicing and overhauling planes. Industrial aviation includes a great variety of activities—among them, aerial

photography, sky-writing and other aerial advertising, patrolling pipe lines, seeding, crop-dusting, and other agricultural services. The aircraft manufacturing industry also employs specialized personnel of the types found in air transportation (see p. 273).

Large numbers of civilians are employed by the Air Force in ground jobs. Many of these are mechanics stationed both here and abroad. There are great numbers of military personnel in both flight and ground jobs.

The principal nonmilitary government agency which employs personnel in jobs comparable to those in civil air transportation is the Civil Aeronautics Administration, a branch of the United States Department of Commerce. This agency enforces the Civil Air Regulations which are set up by the independent Civil Aeronautics Board—for example, it certifies as to the competency of airmen and the airworthiness of aircraft and equipment and participates in accident investigations. Several hundred men with backgrounds as pilots or mechanics are employed by CAA as aviation safety agents and as airways flight inspectors. The CAA, through its Office of Federal Airways, also operates the Federal Airways System and the traffic-control towers at major civilian airports; thousands of airport and airway traffic controllers, aircraft communicators, and radio and airways technicians are employed in these operations.

The Civil Aeronautics Board employed a total of 68 aviation technicians in late 1949; these employees assist in preparing Civil Air Regulations and investigating accidents. Aviation commissions of various States also provide a small field of employment for technical aviation personnel.

Aviation Occupations

Air transportation offers employment in a wide variety of occupations. Each plane must, of course, carry at least one pilot. In addition, a flight engineer, a navigator, a flight radio operator, and one or more cabin attendants may be carried. Airline dispatchers and assistants superintend flights from ground stations. Air-route

and airport traffic controllers, most of whom are CAA employees, direct airplane movements along the airways and at airports. To handle the constant flow of communications, the airlines have radio operators and teletypists; in the CAA, aircraft communicators perform these and other functions. Planes are kept in good operating condition by ground mechanics, who are supplied with tools and other equipment by stock and stores clerks. Another occupational group are traffic agents and clerks who sell passenger tickets and handle cargo business.

Still other occupations in the air-transport field range from top executive and professional positions to porter and other unskilled jobs. Most of these occupations are found in many industries besides air transportation. The nature of the work in major aviation occupations and the qualifications needed for employment are discussed in the statements on individual occupations in this handbook.

As of early 1950, practically all flight jobs were held by white persons. On the ground, Negroes were employed mainly in unskilled maintenance, freight handling, and related occupations.

The only flight position in scheduled operations open to women is that of hostess. However, many women hold ground jobs in traffic, communication, and clerical occupations.

Outlook

The number of workers employed in air transportation and related activities will probably tend to increase over the long run.

Airline traffic and employment have grown rapidly during most of the industry's brief history. In 1936, when it was 10 years old, the scheduled air transport industry had about 10,000 workers. Five years later, in late 1941, employment was over 26,000; by the end of 1945, it had climbed to 68,000.

During the first postwar year, the airlines greatly expanded their equipment and facilities; late 1946 saw their employment reach a peak of 96,000. Growth in traffic was not as rapid as was expected, however, and it soon became apparent that the industry was overexpanded. The shake-down which followed in 1947 was sharpest in

domestic operations, where employment dropped from 69,000 to 59,000 between late 1946 and late 1947, and then leveled off, remaining stable through 1949. In international operations, employment was 27,000 in late 1946 and only 1,000 less a year later, but it continued to decline through 1949. However, 1950 saw an improvement of the employment situation. Even before fighting broke out in Korea, the airlines had begun to increase their employment. The mobilization stimulated further expansion in the latter part of the year.

Growth of nonscheduled operations and other civilian aviation services was greatly stimulated during 1946 and 1947 by such factors as the wartime experiences of servicemen and civilians with air transportation, the large numbers of pilots trained in the Armed Forces and under the GI Bill of Rights, and the availability of Government surplus aircraft. Employment went on expanding in 1948, 1949, and 1950, in some types of operations, but contracted in others. While new operators continued to enter the field, many of the smaller ventures begun in the first postwar years encountered financial difficulties and were forced to close.

Slow growth in employment is likely during the early fifties and over the long run in air transportation and related services as a whole. The basic factors making for long-run expansion may be obscured at times by short-run influences but will persist. Air travel increases the business man's productive time and improves his competitive position—a factor that becomes more important as competition for business increases. Industry and agriculture are finding new uses for aircraft. Week-end and vacation travelers can stretch their leisure time by using flying services or their own personal planes. Air travel and other uses of aircraft will be stimulated by the improvements which are continually being made in aircraft and instruments, airway and airport facilities, and methods of operation; probably also by lower fares and other factors. Much depends upon international developments and upon how the industry, with or without government assistance, solves its many technical and economic problems.

Over the long run, expansion in traffic and in industrial and other uses of aircraft will probably

bring about increased employment in the air transport field as a whole, even though technological and other advances will tend to reduce the number of workers needed to handle given amounts of business. However, employment in some occupational groups is likely to contract while in others it will expand, as is indicated in the statements on individual aviation occupations included in this section.

Besides openings due to increased employment, vacancies will arise owing to deaths and retirements and withdrawals for other reasons. Neither in expanding nor in contracting fields, however, will the total number of opportunities for new workers be great in any one year.

Hours of Work and Earnings

An 8-hour day and a 40-hour week is the regular work schedule for most airline ground personnel. Flight personnel have irregular working hours. However, the Civil Air Regulations set upper limits on the flight time of pilots, navigators, flight radio operators, and flight engineers. Some union agreements set maximum limits on flying hours which are below the legal maxima or provide for overtime pay for flying hours beyond a specified number. There are no legal limits on the flight time of cabin attendants, but they generally spend about the same number of hours in the air as do other flight personnel. Besides their flying hours, pilots and other airmen may have to spend some time in ground duties. In general flight operations, hours of work tend to be much less regular than with the airlines.

Since air transportation is a 24-hour-day and 7-day-week business, many groups of workers with the airlines and other flying services may be required to work at night and on Saturdays, Sundays, and holidays. In some instances, the least desirable shifts and work days are assigned to the workers with least seniority; in other instances, a policy of rotation is applied; in still others, special compensation is given for these assignments.

Figures on earnings appear in the statements on individual occupations. Pay varies greatly both between and within occupations, depending on degree of skill, length of experience, amount of responsibility for safe and efficient operations, type of business, and many other factors.

Where To Go To Get More Information and Apply for Jobs

Additional information on the air transport industry and on aviation occupations is given in:

U. S. Department of Labor, Bureau of Labor Statistics. *Employment Opportunities in Aviation Occupations, Part 1—Postwar Employment Outlook; Part 2—Duties, Qualifications, Earnings, and Working Conditions.* Bulletin Nos. 837-1 and 837-2 (1945 and 1946). (Part 1 is out of print but available in many public libraries; Part 2 is available from Superintendent of Documents, Washington 25, D. C. Price 30 cents.)

To find out about openings with a specific airline and the special qualifications required, one should write to the personnel manager of the line. Addresses are listed in part 2 of the bulletin just mentioned, or may be obtained from the Air Transport Association of America, 1107 Sixteenth St., NW., Washington 6, D. C.

Men interested in setting up their own aviation businesses should consult State aviation commissions and local chambers of commerce; also the following publication:

Department of Commerce, Bureau of Foreign and Domestic Commerce. *Opportunities for Establishing New Businesses in Aviation.* 1948. Superintendent of Documents, Washington 25, D. C. Price 40 cents.

Inquiries regarding jobs with the Civil Aeronautics Administration should be addressed to the Regional Administrator, Civil Aeronautics Administration, at any of the following addresses:

- Region 1. Federal Building, New York International Airport, Jamaica, Long Island, N. Y.
- Region 2. 84 Marietta Street, NW., Atlanta, Ga.
- Region 3. Chicago Orchard Airport, Park Ridge, Ill.
- Region 4. P. O. Box 1689, Fort Worth, Tex.
- Region 5. City Hall Building, Kansas City, Mo.
- Region 6. 5651 W. Manchester Boulevard, Los Angeles 45, Calif.
- Region 7. P. O. Box 3224, Seattle, Wash.
- Region 8. P. O. Box 440, Anchorage, Alaska.
- Region 9. P. O. Box 4009, Honolulu 12, T. H.

Information on CAA-approved schools offering training for work as an aviation mechanic or pilot and in other technical fields related to aviation may be obtained from:

Aviation Education Division W-150,
Office of Aviation Development,
Civil Aeronautics Administration,
Washington 25, D. C.

Airplane Pilots

(D. O. T. 0-41.10 and .12)

Outlook Summary

Slow growth in employment expected over long run, but competition for jobs will probably continue to characterize the occupation in peacetime.

Nature of Work

Practically all civilian pilots work either for the scheduled airlines or in nonscheduled flying and related activities. Those with airlines fall into two main groups, captains and copilots.

Besides operating the controls of the plane, airline pilots have to keep close watch on a multitude of instruments, operate the voice radio, and handle other flight duties. They also have extensive ground duties—among them, studying weather reports, preparing flight plans, making preflight checks of the condition of planes, and filling out reports. The captain decides how work shall be divided between himself and the copilot, who acts as his assistant. On a small but growing number of flights, particularly on international routes, two pilots—or a pilot and flight engineer who is qualified to serve as pilot in an emergency—are carried in addition to the captain. Increasingly, pilots are also doing the navigation (see separate statement on navigators, p. 442).

Outside the airlines, pilots have a wide variety of jobs. Large numbers work for flying schools and commercial flying businesses (charter transportation, aerial photography and advertising, crop dusting and spraying, demonstration selling, and other activities). Probably 1,000 or more work for companies outside the field of aviation which use planes in connection with their business. A sizable group are in agricultural pursuits. A small number are on public pay rolls—as Civil Aeronautics Administration Aviation Safety Agents, for example. Still others are employed in aircraft manufacturing. Many operate small aviation businesses of their own, with or without paid help. The planes flown by nonairline pilots are frequently much smaller and less complex than airliners.

Airline pilots are stationed at a limited number of “division” points throughout the United States;

a few are based in foreign countries. Other pilots are located in all parts of the country where there are airports. The principal areas of employment for both groups are large metropolitan districts, mainly on the East and West Coasts.

Qualifications and Advancement

To pilot a civil aircraft one must hold a valid CAA or foreign pilot certificate, attesting to technical competence, specified flight experience, and satisfactory physical condition. Every person who pilots a plane for hire or gives flight instruction for hire is legally required to hold a commercial or an airline transport license; the latter is a “must” for airline captains. In addition, pilots must hold a flight instructor rating to give flight instruction which the CAA will accept toward the requirements for a pilot rating.

Instrument flying is also restricted. It may be done by pilots holding an airline transport license. Pilots with other licenses or ratings must obtain an additional instrument rating.

To operate a voice radio transmitter, the non-Government pilot must have a Federal Communications Commission aircraft radiotelephone operator authorization. Navigation may be done only by those who can meet the separate legal requirements for this work.

Physical standards for the airline transport rating are especially high. All classes of pilots must pass physical examinations periodically, based on the same standards applied in issuing the original rating.

Entrance into the occupation with the scheduled airlines is as a copilot; this is often true in the larger nonscheduled operations as well. Beginning pilots must be young. Nevertheless, employers—especially the airlines—insist on far more flying time than is specified in the legal requirement. In addition, employers generally demand a high school education or better (heavy preference is given men with college credits). Personality, temperament, appearance, and height (tall men are preferred) are also considered. For the CAA Safety Agent positions, long and varied

flying experience, as well as specified pilot ratings, is required.

Copilots who make good are given a chance, usually on a seniority basis, to qualify for advancement to captain. At least 2 years' experience is generally needed to be eligible for such up-grading; it may be many more years, however, before a copilot is actually reached for promotion. In nonscheduled operations promotion policies vary considerably from company to company.

A typical line of promotion in a large airline is copilot to captain to chief pilot to assistant superintendent of flight operations and other executive positions on up the ladder. But positions above the captain level are not numerous enough nor turn-over in these groups great enough, to make chances for advancement particularly good; relatively few men complete their service in the industry at these higher grades.

Outlook

Employment of pilots is likely to rise moderately over the long run in air transport activities as a whole.

The scheduled airlines had nearly 7,000 pilots and copilots on their payrolls during most of 1948 and 1949, three times as many as in 1940. Hiring was sharp during the first postwar year, but in 1947 a shake-down occurred, particularly in domestic operations. Following the shake-down, the number of pilots employed by the airlines had fluctuated by only a few hundred until mid-1950.

The number of pilots with nonscheduled carriers and other flying services was about 10,000 in early 1948, half again as large as the number of airline pilots. In the 2½ years which followed, employment rose in some fields including crop dusting and other agricultural services, but decreased in flight instruction. In both expanding and contracting fields, a good many flying services had to close at the same time that new business ventures were started.

Pilot employment rose moderately in 1950. Further gains are anticipated during the next few years.

The really great peacetime expansion in air transportation still appears to be years ahead, awaiting further technical, operational, and other



Captain and copilot making a preflight cockpit check on a four-engine plane.

developments which will encourage large-scale travel by air. All-weather flying is one of the goals of a 15-year program to establish the so-called "RTCA, SC-31 System" (Radio Technical Commission for Aeronautics, Special Committee 31); this program was already well under way before the outbreak of hostilities in mid-1950 and will probably be accelerated by the mobilization program. Lower fares through such devices as "air coach service" may also be influential in increasing air traffic.

Expansion in activity, however, does not automatically spell expansion in employment. Larger and faster planes, which are increasingly coming into use, permit given volumes of traffic to be handled by fewer planes and pilots.

Competition for any pilot job openings that arise has generally been keen in peacetime. In the beginning of 1950, men without a flying history had practically no chance of jobs or of good business opportunities. Even highly qualified applicants were more numerous than vacancies. Trained and experienced men who failed to keep abreast of advances in piloting and related techniques were finding the advantage of their background becoming less and less important.

Under the impact of the Korean war and expanding mobilization in 1950, competition for jobs eased. By early 1951, several airlines were lowering hiring standards and making special recruiting efforts for the first time in years, in order to meet actual or anticipated shortages. In time, however, competition for pilot positions is likely to be intensified again, as many of the young men who will be trained as pilots in the Armed Forces become available for civilian jobs.

Earnings and Working Conditions

Highest-paid pilots are captains employed by the scheduled airlines. Most of these men had monthly earnings of well over \$700 in 1949; many made \$1,000 or more in some months. Typical earnings for the year are estimated at between \$8,000 and \$10,000, depending on such factors as flying time and mileage, speed of plane, length of service, and whether the flying was done in domestic or international operations. Earnings of copilots were considerably less—about \$400 a month, on the average. Union agreements in effect on several lines in 1950 provided for a minimum number of flying hours, in order to establish a floor under pilot earnings.

Average flight time of airline pilots was between 75 and 80 hours a month in 1949. The permissible maximum is 85 hours a month, 255 a

quarter, and 1,000 a year in both domestic and international flying. Ground duties require many additional hours of work a month.

In the past few years, pilots in nonscheduled activities have had earnings nearer to those of copilots than to those of captains, although they have often had to put in many more flight hours than pilots in scheduled operations. CAA pilots started at an annual salary of no less than \$4,600 as of late 1950; their top rate of pay was \$8,600, but this applied only to men who had had several promotions and many years of service. The basic CAA workweek has been 40 hours for several years; however, actual worktime has been irregular, as in private nonscheduled operations.

Airline pilots, flying on domestic routes are generally allowed a 2 weeks' vacation with pay; those flying on international routes, a month. CAA agents, like most other Federal employees, receive 26 days of paid annual leave a year.

As a rule, airline pilots are on duty away from their base about a third or more of the time. When they are away, their living expenses are usually paid by the airline.

Most airline—but few other—pilots belong to the Air Line Pilots Association (AFL).

See also Dispatchers and Assistants, page 447; Airport and Air-Route Traffic Controllers, page 448.

Flight Engineers

(D. O. T. 5-80.100)

Outlook Summary

Opportunities will be limited both in the early fifties and over the long run in this small but slowly growing occupation. Men who qualify also as pilots or mechanics will have an advantage in competing for jobs.

Nature of Work

Flight engineers are employed mainly in scheduled international and transcontinental flying, where the Civil Aeronautics Administration has ruled that they are necessary for safety of operations. The circumstances under which they must

be carried depend on such factors as the routes flown and the complexity and size of the aircraft.

Flight engineers are responsible for the proper functioning of the aircraft (and engines) in flight, permitting the captain and copilot to concentrate more fully on piloting the aircraft. In the air, their duties include watching and keeping logs on engine performance, operating certain controls under the direction of the captain, and making emergency repairs. At stops where there are no mechanics, they do needed ground maintenance work themselves; at other stops, they direct this work.

Most engineers are stationed in or near large cities on the East and West coasts, where inter-

national and transcontinental operations generally originate. Some few are stationed elsewhere in the United States and in other countries.

Qualifications

Every person serving as a flight engineer is legally required to have a Civil Aeronautics Administration Flight Engineer Certificate. This calls for a broad knowledge of such matters as flight theory, aircraft performance, fuel consumption, and aircraft loading. Written and practical tests are given to determine not only the adequacy of the engineer's grasp of these and related subjects, but also his skill in repair work. The skills and knowledge needed are usually obtained through formal training. Such training is not often provided by airlines. Rigid physical examinations must be passed periodically.

In hiring, employers frequently emphasize personal characteristics and specified types and amounts of education. Applicants practically always need some training or experience in airline ground maintenance to qualify for flight engineer jobs. Preference is given to young men who have or can obtain an air-transport pilot certificate. Before Korea, some carriers were hiring only such men.

The line of advancement for flight engineers is to pilot or to chief engineer. Before Korea, all prospective pilots began as flight engineers on at least one line.

Outlook

Employment will rise somewhat over the years, with increased use of planes requiring flight engineers. Civil Aeronautics Administration rulings requiring that flight engineers be carried under specified circumstances have bolstered employment in this occupation since early 1948. However, the total number in the occupation has remained small. At the end of World War II, there were not more than a few hundred men working as flight engineers; the number was still only in the hundreds in late 1950. Under the most favorable circumstances likely to develop in the next several years, the number employed should continue to be of this general magnitude, probably not exceeding 1,000.



The flight engineer of an overseas air liner noting dial readings on his log.

There are likely to be many candidates for the limited number of openings which arise, including former flight engineers of the military and naval air forces, some newly trained men, and many ground mechanics for whom a flight position would be an advancement. However, few ground mechanics are likely to be able to qualify—certainly not without on-the-job training, which is not commonly available. In general, job chances will be favorable only for qualified men, who require little or no further training after being hired.

Earnings and Working Conditions

In early 1950, earnings of fully qualified flight engineers generally ranged from \$350 to \$600 a month, depending mainly on length of experience and amount of flight time. Under most conditions, flight time may not exceed 85 hours a month in domestic flying or 255 hours a quarter in international flying; men generally fly close to the maxima of hours indicated. Additional time is spent in ground duties. Engineers in international operations usually get a month's paid vacation each year; those in domestic flying, 2 weeks.

As a rule, flight engineers are on duty away from base about a third or more of the time. When they are working away from home, their

living expenses are paid by the employing airline; often they are also allowed \$1 or more a day for incidental expenses while on land.

In late 1949 most flight engineers were repre-

sented by the Air Line Flight Engineers Association (AFL). Another union active in the field in that year was the Flight Engineers' Officers Association, an independent union.

Navigators

(D. O. T. 0-41.60)

Outlook Summary

Few opportunities expected in any one year in this small occupation. Employment likely to decline in long run; occupation may eventually become extinct.

Nature of Work

Navigators are carried on many trans-ocean airline flights. Before each flight, the navigator prepares the flight plan for the captain's approval and sees to it that all needed navigational equipment is in good condition and aboard the plane. In the air, he is responsible for knowing at all times whether the flight is progressing according to plan, and advising the captain as to revisions in routing made necessary by changing weather conditions or other unforeseen circumstances. Navigational methods used may include dead-reckoning, celestial navigation, obtaining radio bearings, and pilotage. Another of his duties is keeping the flight log.

Navigators are stationed mainly in coastal cities, where activities employing them are commonly based.

Qualifications

Every civilian navigator is legally required to have a Civil Aeronautics Administration flight navigation certificate. Among the qualifications which one must have to obtain this certificate is a comprehensive knowledge of air navigation and related subjects. This background has been obtainable so far mainly in the military and naval air services. Employers greatly prefer men with college education; a high school education is virtually always a minimum requirement. Flight experience and personal characteristics, such as height, appearance, and personality, are emphasized in hiring. Strict physical examinations must be passed to enter and remain in the occupation.

In the summer of 1950, the Civil Aeronautics Board provided for 3-month, nonrenewable "limited flight navigator certificates" for persons unable to satisfy immediately all the requirements for regular certificates; December 31, 1951, was set as the termination date of the regulation, "unless sooner superseded or rescinded." Holders of these temporary certificates may be employed only in military contract air carrier operations.

When starting out with a given company, both newcomers and experienced men are often designated "junior navigators." Promotion to "senior navigator" is usually based on length of service with the company.

Outlook

This is a very small field; in late 1949, employment was no more than two or three hundred. In the early fifties, a number of openings may result from expanding overseas airline operations and other developments. In addition, rising military and naval needs for air navigators are leading to the withdrawal of some men from civilian positions. Employment opportunities will therefore be considerably better in the near future than in the period from 1947 to early 1950, when the airlines had many navigators on furlough, with first claim to any openings. However, it may continue to be difficult for persons without civilian or military experience in air navigation to obtain positions.

In the long run, employment of navigators will probably tend to decline. The occupation may eventually be eliminated altogether. By 1949, one or two overseas airlines had already made pilots responsible for navigation and were no longer employing navigators as flight crewmen. Technological and other factors will continue to encourage this trend over the long run. Progress is being made in developing international airways with radio-range beams and other aids to navigation,

although the establishment of such airways on a scale comparable with our own Federal Airways System is probably still a long way off. The increasing application of radar to civilian aviation may also be a factor in making navigators unnecessary on a growing number of flights. Even if navigators should be eliminated from flight crews, at least a few men with training and experience in navigational work will continue to be needed to teach navigation to pilots and others in civil aviation; there will also be opportunities in the armed services.

Earnings and Working Conditions

Annual pay of junior navigators averaged about \$3,200 in 1949; senior navigators averaged about \$6,000, with some men earning as low as \$4,500 and others making as much as \$7,000. Salaries are on a monthly basis. The amount received by an

individual navigator depends not only on his grade but also on his length of service with the particular company and on other factors.

When navigators are away from base on duty (as they are a third or more of the time) their living expenses are paid by their employer. Often they also get \$1 or more a day while on land, for incidental expenses.

Flight time is generally not more than 255 hours a quarter, more or less equally divided among the 3 months. However, a few additional hours each month must always be spent in ground duties. One month's vacation with pay is usually given.

Navigators are covered by union contracts on almost all lines where they are employed. Most of them are represented by the Air Line Navigators Association (Transport Workers Union of America, CIO). In late 1949, the Association of Airline Navigators (Independent) represented the navigators on one line.

Flight Radio Operators

(D. O. T. 0-61.32)

Outlook Summary

Employment outlook poor in this small occupation. More than enough qualified men likely to be available for any job openings that arise. Occupation threatened with eventual extinction.

Nature of Work

In civil aviation flight radio operators (also known as flight communications or flight radio officers) are carried principally on overseas flights where safety regulations call for radiotelegraphic equipment and a qualified full-time operator. Their duties may include obtaining radio bearings, sending and receiving weather information and other messages in international code, and operating radio-navigational equipment. They may make needed adjustments and emergency repairs on the plane's radio equipment while in flight or, in some cases, on the ground. They also inspect and test the equipment between flights.

Qualifications

Every flight radio operator is legally required to have a Federal Communications Commission

radiotelegraph operator license of second-class or higher and a Civil Aeronautics Administration airman certificate. To obtain the former, one must show a comprehensive technical knowledge of radio and meet other requirements. The latter certificate is issued to persons demonstrating ability to perform the duties of the occupation. As for other types of positions on flight crews, appearance and personal characteristics are emphasized in filling vacancies, and strict physical examinations must be passed to enter and stay in the occupation. Furloughed operators are usually the first to be called upon to fill vacancies. Qualified ground radio operators who are in line for promotion come next.

Flight radio operator training is obtainable in private schools and with employing airlines. However, lines require trainees to have the necessary FCC license before they are hired. When they start out with a given company, both newcomers and experienced men are often designated "junior operator." Advancement to "senior operator" is usually based on length of service with the company.

Outlook

The employment outlook is poor in this small occupation, which employed no more than a few hundred men in late 1950. A CAA decision in August 1949 made it possible for flight radio operators to be eliminated on certain routes where their employment had previously been required by safety regulations. The CAA found that on these routes, radiotelephone facilities (which can be operated by the pilots) met safety requirements and that, consequently, planes no longer needed to carry radiotelegraph equipment and full-time operators. Immediately after the decision, flight personnel of this type were eliminated on some routes. Their continued use is likely for some time on other routes. But unless the CAA is overruled or reverses itself in this matter, flight radio operators will probably be carried on fewer and fewer routes; the occupation may eventually become extinct.

In any event, job openings will be very limited in number at best. The anticipated long-run expansion in international airline business will doubtless be moderate and gradual. Turn-over will create only occasional opportunities.

Continued, although increasingly more moderate, competition for any openings that arise is likely at least through the early fifties. Qualified men are usually available for flight radio operator positions from several sources; from among men with previous military or civilian flight experience, ground radio operators who can qualify for promotion, and veterans and nonveterans trained for other kinds of radio-operator work. However, under the impact of the Korean war and the mobilization program begun in mid-1950, these sources were being tapped to meet a variety of expanding needs; both in and outside the field of aeronautics.

Earnings and Working Conditions

Flight radio operators have higher monthly salaries than most other groups of radio operators. For the great majority, salaries were between \$400 and \$600 a month in late 1949, depending primarily on length of service with the given company. With work fairly steady for most men, take-home pay for the year averaged roughly \$6,000. A very few men made more than \$7,000 including overtime pay; a greater number made as low as \$4,000.

Flight time in scheduled operations was generally between 100 and 110 hours a month in 1949. It could not legally exceed 125 hours a month, 300 hours a quarter, or 1,000 hours a year. In addition to flight time, a few hours are usually spent each month in training in the air or on the ground, in preflight testing or other duties, or in stand-by time. A month's vacation with pay is commonly given. At least one union contract provides for severance pay which may amount to several thousand dollars for an individual employee.

As a rule, flight radio operators are on duty away from base a third or more of the time. When they are working away from home their living expenses are paid by the employing airlines.

Flight radio operators are highly organized. Several different unions were involved in early 1950—principally, the Air Line Communications Employees Association (American Radio Association, CIO), Radio Officers Union (Commercial Telegraphers Union, AFL), Flight Radio Officers Association (Independent), and Transport Workers Union of America (CIO).

See also Ground Radio Operators, page 450; Ship Radio Operators, page 105; Radio Operators (Broadcasting), page 103; Radio Operators (Telephone and Telegraph Industry), page 106.

Airplane Hostesses

(D. O. T. 2-25.37)

Outlook Summary

A good many openings for qualified applicants each year, but continuing competition for these jobs likely. Occupation will remain small for many years; slow rise in employment probable.

Duties

Hostesses (also known as flight stewardesses) are carried on most airline passenger flights within this country; also on some international flights. They are responsible for attending to

passengers' needs and comfort while in flight—by serving meals, giving minor medical aid, helping to adjust seats, answering questions, supplying passengers with reading matter, and in other ways. They also have to keep some records. When a hostess and steward work together, as is often the case on big planes, the former tends to specialize in service to the women and children aboard.

Hostesses are stationed mainly in the few sea-board cities where international and transcontinental flights originate and inland at a number of airline division points. A few are stationed in foreign countries.

Qualifications and Advancement

Entry into the occupation is usually as a "student" stewardess, for training by the employing air line. Frequently, however, girls trained in special private schools are hired through the placement facilities provided by such institutions for their own graduates. At least one airline requires training at a specified school.

Applicants must be in excellent physical condition; have a pleasing personality and appearance; be in their twenties or within even narrower age limits; and also be within specified height and weight limits. As a general rule, single women (or widowed or divorced women without children) are preferred for stewardess jobs; their continued employment may be conditioned upon their remaining unmarried. Applicants who are registered nurses are strongly preferred. Girls who have not completed nurses' training must, as a rule, have at least 1 or 2 years of college education. For international flying, knowledge of an appropriate foreign language is frequently required and always preferred.

From the position of hostess, the line of promotion is to instructor and division chief hostess.

Outlook

Employment in this occupation will probably tend to rise slowly in the early fifties as well as over the longer run.

At the end of World War II, the airlines had about 1,000 hostesses on their payrolls. Several thousand new hostesses were hired in the next 2

years, partly to staff the many additional larger planes in service, and partly to fill vacancies owing to very heavy turn-over. Although the airlines made some nonseasonal lay-offs during 1947, employment still totaled over 3,500 at the end of that year. Thereafter, it resumed an upward trend which will be further encouraged by the mobilization program.



An air-line hostess serving lunch.

Opportunities for new entrants will be more plentiful in this occupation than in many other aviation jobs. Most vacancies will result from the high turn-over rate, although some girls will be hired as additions to staff. Interest in the occupation has continued to be great in the postwar years despite the airlines' strict hiring standards. Competition for jobs is likely to be keen. However, registered nurses with the other qualifications needed should find it easy to obtain positions; the number of qualified nurses applying for jobs will continue to be much less than the number desired by the airlines, especially as expanding military requirements once more withdraw nurses from civilian activities.

Earnings and Working Conditions

Base pay scales on domestic lines ranged from \$175 to \$260 or more a month for most stewardesses in late 1949. Additional monthly bonuses ranging from \$15 to \$25 or more were generally paid for overseas work.

Working time has averaged well over 100 hours a month for the past few years. Most of this time (as high as 85 hours a month) is spent in flight. Domestic lines generally give 2 weeks' vacation with pay each year; international lines, 1 month.

As a rule, airplane hostesses are on duty away from base about a third or more of the time. When they are working away from home, their living expenses are paid by the employing airline; they may also be allowed \$1 or more a day while on land for incidental expenses.

Many hostesses belong to unions. Most of those organized are represented by either the Air Line Stewards and Stewardesses Association, a branch of the Air Line Pilots Association (AFL) or the Flight Purser and Stewardesses Association (AFL).

Flight Stewards

(D. O. T. 2-25.32)

Outlook Summary

This small occupation will provide only a very few openings, chiefly in international operations.

Duties

Stewards are carried on most international airline flights and on a moderate number of scheduled domestic operations. Their work includes serving meals while aloft, attending to the comfort of the passengers in different ways, and keeping records. With increased use of larger planes, stewards will more and more be assigned ticket-collecting and related tasks usually identified with the job designation of purser. When a steward and hostess work together, as is often the case on large planes, the former tends to handle the heavier work (such as making berths on sleeper planes); the latter, to specialize in service to the women and children aboard.

Stewards are stationed mainly in the few seaboard cities where international and transcontinental flights originate, but some are located inland at a limited number of airline division points. A few are stationed in foreign countries.

Qualifications

High school education is a minimum requirement for this occupation; some college education is preferred. Knowledge of a foreign language is required for international flying. Excellent physical condition is a must, as are a pleasing per-

sonality and a good appearance. In addition, airlines may specify a maximum height and weight. Also important is experience in handling food; many of the flight stewards now employed were formerly restaurant cooks or waiters.

Standards are more rigidly applied in filling purser openings than in hiring stewards.

Outlook

Employment in this very small occupation was at about the same general level in early 1950 as in early 1948, when the number of stewards on airline payrolls was estimated at under 1,000. Even this volume of employment represented marked growth in the occupation since the end of World War II. On VJ-day, the two airlines doing overseas flying on a commercial basis together employed only a hundred or so stewards, nearly all in the occupation at that time. Heavy hiring of stewards in the first post war year was followed by some nonseasonal lay-offs in 1947. In the 2 years which followed, the number employed tended to rise slowly.

Future employment opportunities in the occupation will depend on whether airline traffic expands as anticipated, creating occasional new positions; on the rate of turn-over; and on the industry's policies with regard to employment of men and women as cabin attendants. On the basis of the hiring practices followed in early 1950, it appeared that the number of stewards would probably not rise much above the mid-1950 level

and might even decline. The mobilization program will probably further increase the hiring of stewardesses, whether to fill new jobs or to meet replacement needs. Thus steward openings will be very scarce.

Earnings and Working Conditions

In late 1949, monthly base salaries for most stewards ranged from \$175 to \$260. A bonus ranging from \$15 to \$25 a month was generally paid for overseas work. Purser received from \$190 to \$260 a month on domestic routes; their salaries ranged up to \$355 in international operations.

Working time has averaged well over 100 hours a month for several years. Most of this time

(as high as 85 hours a month) is spent in flight. Domestic lines generally give 2 weeks' vacation with pay each year; international lines, 1 month.

As a rule, flight stewards are on duty away from base a third or more of the time. When they are working away from home their living expenses are paid by the employing airline; they may also be allowed \$1 or more a day for incidental expenses while on land.

Many stewards belong to unions. Most of those organized are represented by either the Air Line Stewards and Stewardesses Association, a branch of the Air Line Pilots Association (AFL), or the Flight Purser and Stewardesses Association (AFL).

See also Traffic Agents and Clerks, page 455 and Railroad Clerks, page 424.

Dispatchers and Assistants

(D. O. T. 0-61.61)

Outlook Summary

Dispatcher positions practically always filled by promotions or transfers from within the company. Some job chances for outsiders as assistants.

Duties

An airline dispatcher (or flight superintendent) has control over all of his company's flights within an assigned sector. He approves flight plans, authorizes take-offs, follows the progress of flights as reported by radio, and keeps captains informed of changing weather conditions and other developments affecting their flights. In addition, the dispatcher is responsible for keeping records on the aircraft and engines available, on the amount of time logged by each plane and engine, and on the number of hours flown by flight personnel based at his station. He also sees to it that crew members are notified when to report for duty.

Assistant dispatcher and various grades of clerical employees aid in this work. Assistants assume such duties as securing weather information, helping to keep track of the progress of aircraft in the sector, and handling communications with the planes.

Where Employed

Dispatchers and assistants are employed mainly by air lines certified by the Civil Aeronautics Board for scheduled operations. A few work for the largest nonscheduled lines. The majority are stationed at large airports in different parts of the United States. However, a good many are stationed outside the country.

Qualifications

A Civil Aeronautics Administration certificate is legally required for work as an aircraft dispatcher, although not for work as an assistant. To qualify for certification, an applicant must have been employed for at least 90 days in the 6 months prior to certification in work connected with dispatching of airline planes under supervision of a certified dispatcher, and must meet other experience requirements. He has to pass a written examination on such subjects as the Civil Air Regulations, aircraft characteristics, weather data and analysis, air-navigation facilities and principles, and airport and airway traffic procedures. He also has to demonstrate his skill in weather forecasting and certain other functions involved in dispatching.



Assistant dispatchers at work in an air line dispatchers office—telephoning a CAA airways traffic-control center, entering the estimated time of arrival of a plane, and reading a teletype report on weather conditions.

It is airline policy to fill dispatcher positions by promotions or transfers from within the company. Many present dispatchers were formerly employed as station managers or meteorologists by the same line and were selected as particularly adapted to dispatching work. However, outsiders are sometimes hired as assistant dispatchers and may be promoted to regular dispatcher jobs after they have had a training period of from 1 to 3 years and have obtained their certificates.

For assistant jobs, 2 years of college is generally required by the carriers, and men who have completed a 4-year college course—including training in mathematics, physics, chemistry, meteorology, and related subjects—are strongly preferred. Experience in flying, as an airman or a meteorologist,

or a background in business administration is advantageous. Personality factors also count heavily.

Outlook

Job opportunities for outsiders as dispatchers are almost certain to remain very limited in number indefinitely. The increase in airline traffic which is expected will not create many new dispatcher (or assistant) positions. Replacement needs will rise as the mobilization program develops, but will also not be great. The dispatcher vacancies arising out of these and other developments will generally be filled, as in the past, by promotions or transfers of personnel already with the company.

Prospects for well qualified outsiders will be more favorable for the greater number of assistant openings anticipated. Job chances will be best for highly qualified job seekers with experience as operations officers or pilots in the Armed Forces who meet the high educational and personal standards specified by the airlines.

Earnings and Working Conditions

For most dispatchers, monthly salaries were between \$375 and \$640 a month in late 1949. Assistants earned less, of course—about \$250 to \$350 a month in most cases. The standard workweek is usually 40 hours. Daily hours are irregular and, on occasion, very long. Two weeks' vacation with pay is usually given to both dispatchers and assistants.

The Air Line Dispatchers' Association (AFL) is the only labor organization with contracts covering dispatchers and related workers. It had negotiated 26 agreements with airlines by late 1949.

See also Meteorologists, page 100.

Airport and Air-Route Traffic Controllers

(D. O. T. 0-61.60)

Outlook Summary

Rising volume of air traffic control work and probably also increasing employment of controllers both in the fifties and over the long run.

Duties

Airport traffic controllers supervise all flights within a carefully defined flight-control area around their airport. They issue directions (by

radio or other means) to planes taking off, landing, and flying within the area, including instructions as to flying levels as well as when to take off and land. Other tasks include giving weather and position information to planes in the vicinity and keeping records of messages.

Senior controllers have responsibility for all aspects of the work. Assistant controllers, regarded as trainees for senior positions, aid them in specific duties. In their supervisory capacity, senior controllers are also responsible for seeing that defects in airport lighting, communication, and other facilities are reported, and that information regarding flights is regularly obtained from and relayed to air-route traffic-control centers in the vicinity.

Air-route traffic controllers operate air-route traffic-control centers, which regulate traffic on civil airways. As a rule, the controllers do not communicate directly with planes but constantly receive information on the progress of flights and related matters from airline dispatchers, airport traffic controllers, other control centers, and CAA communications stations. In return, instructions, advice, and information are given as to the conditions under which flights may be commenced or continued and as to the progress of flights under way. Telephone, interphone, teletype, and radio are used in transmitting these messages.

Where Employed

Most airport traffic controllers work in the towers operated by CAA's Office of Federal Airways; the remainder in towers operated by airports. In early 1951, 170 or more CAA towers were in operation, but only 40 or so airports were operating their own. The towers, both CAA and non-Federal, are located at large fields with heavy traffic. They are in many different parts of the country, mostly near big cities; a few are outside continental United States.

The Office of Federal Airways is the only employer of air-route controllers. These workers are located at the various CAA traffic control centers scattered throughout the country.

Qualifications

Entry into either of the occupations under discussion is almost always as an assistant controller.



COURTESY OF CIVIL AERONAUTICS ADMINISTRATION.

An airport traffic controller giving instructions to a pilot by radio-telephone.

All permanent appointments to CAA jobs are made on the basis of competitive civil-service examinations. Such examinations have not been held for several years. In the meantime, hiring has been done directly by CAA regional offices, and successful applicants have been given only temporary status. In filling assistants positions, the CAA has adhered to the minimum standards for admission to the last civil service examination for the "trainee" classification; these standards include specified experience or education in one of several alternative fields, including meteorology, aeronautical communications, dispatching, or flying.

Positions above the level of assistant are filled mainly by promotions from within. Special CAA certificates are required for airport jobs above this level; these certificates are good for work at a specific airport only. Rigid criteria are used in determining fitness for advanced positions.

Outlook

Employment in these occupations had an upward trend during the first few years after World

War II. In the first half of 1951, CAA had an authorized staff of about 1,900 airport controllers and 1,500 air-route controllers. These numbers were substantially higher than on VJ-day.

A rising volume of air-traffic-control work is expected both in the near future and over the long run, owing to construction of additional airports and increasing airport and airway utilization. The bulk of the towers being federally owned and operated, employment in the occupation is governed largely by the size of congressional appropriations for these CAA positions. It is reasonable to expect that persistently expanding needs will be reflected in increased appropriations and in rising employment in these occupations. Additional openings will, of course, arise yearly owing to turn-over. Replacement needs may increase materially in 1951 and the year or two following as a result of withdrawals for military service.

To fill these positions, the Federal Government and other employers can ordinarily draw upon a wide variety of persons with military or civilian experience: pilots and other airmen, meteorologists, communication specialists, and dispatchers. But the usually large numbers of available persons in these categories were declining under

the impact of the Korean war and the partial mobilization program begun in 1950. This development sharply reduced the possibility of continued competition for trainee openings, at least in the early fifties.

Earnings and Working Conditions

Like Federal workers generally, CAA employees have a basic 40-hour week. However, air-route traffic controllers often have to work 4 or 5 hours overtime in a week, which is compensated for by time off or premium pay. Since towers must be manned 24 hours a day, night work is required; employees are assigned to night shifts on a rotating basis.

The starting salary for assistant airport controllers with CAA was \$3,450 a year in late 1950; that for assistant air-route controllers, \$3,825. The minimum salary for top grade of senior controllers in both airport and air-route work was \$6,400. In addition, within-grade increases are given every 12 or 18 months, depending on the grade. Other benefits of these Government jobs include 26 days of paid annual leave, 15 days of sick leave, and 8 paid holidays a year.

Ground Radio Operators and Teletypists

(See D. O. T. 0-61.33 and 1-37.33)

Outlook Summary

Many radio-operator openings in early fifties; fewer teletypist opportunities. Technological developments likely to result in long-run decline in employment, especially among ground radio operators.

Nature of Work

Ground radio operators and teletypists are employed by the scheduled airlines, both domestic and international, by some of the large nonscheduled carriers, and by the Civil Aeronautics Administration. The military and naval Air Forces use civilians and also uniformed personnel in comparable work.

Radio operators working for air lines relay messages between ground personnel and between flight and ground personnel, using radiotelephone, radiotelegraph, or both. Airline ground com-

munications are also handled by teletypists, who operate a machine with a keyboard much like that of a typewriter. The CAA employs "aircraft communicators" in its Federal Airways System to collect and relay information on weather conditions and other matters affecting flights. In the airlines as well as in CAA, some workers use both radio and teletype.

The jobs are widespread geographically, with some workers located in the Territories and foreign countries. Airline personnel work mostly at airports near metropolitan areas; CAA communicators are at stations scattered along the airways, often in remote places.

Qualifications and Advancement

For radio-operator positions with airlines, applicants must usually have at least a second-class radiotelephone or radiotelegraph license from the

Federal Communications Commission, be able to type, and have specified educational and other qualifications. Teletypists who are called on to do radio-operator work must also have an FCC license.

To qualify for positions as CAA aircraft communicators, applicants must meet requirements set by the United States Civil Service Commission. All permanent appointments are made on the basis of competitive civil service examinations. Pending the holding of new examinations (none has been given for several years), all hiring has been done directly by CAA regional offices and only temporary appointments have been made.

The airlines commonly employ women as teletypists but increasingly also as radio operators. Most CAA aircraft communicators are men.

Outlook

Radiomen and teletypists together make up a fairly large occupational group, as aviation occupations go. The number on public and private pay rolls in late 1949 was estimated at over 10,000.

Gains in airline employment were heavy during 1946 and early 1947, but there was a "shake-down" in domestic operations during the rest of the latter year. In 1948 and 1949, airline employment in these occupations showed little change. No more than a moderate rise is to be expected in the early fifties, even after allowing for the limited military and naval expansion programs set in motion in the summer of 1950. Much heavier military commitments would mean heavier job gains.

CAA communications activity has increased sharply in the postwar period, but employment among aircraft communicators has not risen proportionately and has even declined. At the end of the war, August 1945, there were about 3,700 aircraft communicators working for CAA; a year later, 4,500 or thereabouts; in early 1951, 4,000 or so. Future employment levels will depend on congressional appropriations for this activity, as they have in the past. In any event, job chances will continue to be somewhat better for persons willing to work in Alaska and other places outside continental United States.

The long-run outlook in these occupations will be greatly affected by technological developments.

Much progress has been made in the substitution of teletype and other automatic equipment for radiotelegraph and radiotelephone, and efforts at technological improvement continue unabated. Radar, for example, is being increasingly used in civil aviation. The comprehensive program for all-weather flying, referred to as the "RTCA SC-31 System" (Radio Technical Commission for Aeronautics, Special Committee 31), will involve highly complex electronic installations, including items still in the developmental stage. These and other technical advances are designed primarily to promote safe, all-weather flying, reduce communication time, and speed air transport operations. But in the long run they may have the effect of reducing the number of radio operators needed, even with rising air traffic. Teletypists will probably be affected also, but not as much as radio operators.

In the early fifties, openings will arise in both types of work owing to transfers to military service, deaths, retirements, and other turn-over. These openings, plus those arising from expansion, will create a substantial number of opportunities for new entrants with public and private employers.

A surplus of qualified job applicants, especially radio operators, existed in most parts of the country from 1946 through early 1950. Persons without experience in the work, either in the Armed Forces or in civilian employment were able to obtain radio-operator jobs only in scattered instances. Under the impact of the Korean war and the mobilization program begun in mid-1950, this situation changed. Job opportunities became more widespread; the surplus of qualified job applicants was sharply reduced. This trend will continue at least through the early fifties, and the surplus of skilled and experienced radiomen seeking employment as ground radio operators (or aircraft communicators) will be wiped out as related occupations also expand both in aeronautics and in other fields.

Earnings and Working Conditions

For airline radio operators, earnings typically ranged from about \$180 to \$300 or more a month in late 1949; for teletypists, from about \$155 to \$240. CAA aircraft communicators, like Federal

workers generally, are on annual salaries. Under the scale in effect in late 1950, these ranged from \$3,100 to \$5,350 a year.

Airline personnel usually get 2 weeks' paid vacation; CAA employees, 26 days of paid "annual leave." The basic workweek is 40 hours both with the air lines and with CAA.

A number of lines have union agreements cover-

ing radio operators and teletypists. Organizations involved, as of late 1950, were the Air Line Communications Employees Association (American Radio Association, CIO), and the Radio Officers Union (Commercial Telegraphers Union, AFL).

See also Flight Radio Operators, page 443; Ship Radio Operators, page 105.

Airplane Mechanics

(D. O. T. 5-80.120 and .130)

Outlook Summary

Employment prospects good for skilled mechanics in early fifties; also many openings for non-journeymen. Continued uptrend in employment over long run.

Duties

Airline mechanics are assigned either to line maintenance or to overhaul work. Line-maintenance men service and inspect aircraft, including power plants and instruments, and make minor repairs and adjustments. This work may be done at large terminals or at stops along the route. When an engine or other part has to be sent to the main overhaul base for major repairs, line mechanics remove it from the plane and install new or overhauled equipment in its place. The line-maintenance mechanic is usually an all-round "A" and "E" (aircraft and engine) man.

Mechanics at the main base usually specialize in engine or airplane overhaul or in some other division of the work, such as overhaul of electrical equipment, radio servicing, instrument work, painting, or upholstering. Generally, the larger the base, the greater is the specialization of work.

Outside the airlines, most mechanics do servicing and inspection work roughly comparable to that of the airline line-maintenance men, but some do overhaul work. The planes which these mechanics service are frequently much smaller than airliners; often they have only a few comparatively simple instruments, no radio, and no elaborate propeller mechanism. However, a single mechanic frequently has to do the entire servicing job with little supervision, and has to be able to work with many different types of planes and en-

gines. It is estimated that one good mechanic and a helper can take care of the line-maintenance requirements of several light planes, if the work is properly organized. Overhauling, too, is a relatively simple job where light planes are involved.

Where Employed

Mechanics work principally for the scheduled airlines engaged in interstate and foreign commerce and for fixed-base operators. Some men operate their own small repair shops, with or without the help of hired mechanics. Other employers include Government agencies and private aircraft and engine factories; the Nation's military forces employ large numbers of civilians in this occupation, besides the enlisted men assigned to mechanic duty.

Mechanics are employed in more different parts of the country than most other types of aviation workers. However, large numbers of all-round mechanics, and almost all specialists in civilian activities, work at the main overhaul bases, located mainly in coastal cities. A few are on the payrolls of foreign-owned and -operated carriers with maintenance facilities in the United States.

Qualifications

To qualify as a skilled mechanic or specialist, a 4-year apprenticeship or its equivalent is often needed. For many jobs, a Civil Aeronautics Administration mechanic certificate with an aircraft mechanic ("A") or aircraft engine ("E") rating, or both, is legally required. In early 1951, establishment of special ratings for radio, propeller, instrument, and accessories mechanics, and possibly other types of specialists not then covered

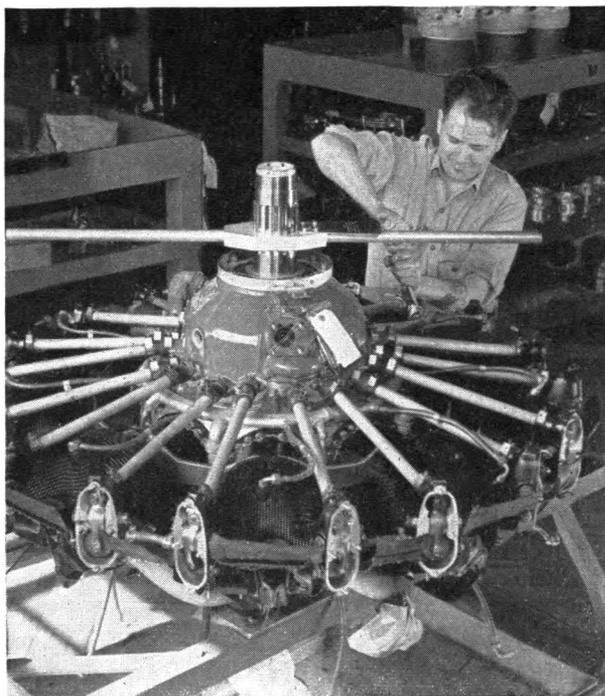
by the certificate system, was being considered. Before Korea, employers were insisting upon a certificate for many jobs for which they were not legally necessary.

In competing for jobs, applicants will find high school or trade school education—including such subjects as mathematics, physics, chemistry, and machine-shop—a great advantage, when not a definite requirement. Training as an aviation mechanic, particularly at a CAA-approved school, is valuable; persons with such training may be taken on as advanced apprentices. Experience in automotive repair or other mechanical work is also helpful. It is customary for apprentices to own a sizable kit of tools. Mechanics trained in the Armed Forces usually need additional training for licenses and for jobs above the apprentice or helper level. Most airlines require a fairly rigid pre-employment physical examination, although waivers are allowed in some instances.

The line of advancement is to such positions as lead mechanic, crew chief, shop foreman, lead inspector, and, finally, supervisory and executive positions in maintenance departments. There are a small number of advanced positions with the CAA and other non-airline employers which require mechanic experience and training. The CAA, for example, employs some former mechanics as Aviation Safety Agents, who administer the sections of the Civil Air Regulations relating to airworthiness of aircraft, participate in the investigation of accidents and CAR violations, and perform related duties.

Outlook

Employment of airplane mechanics is expected to increase both during the early fifties and over the long run. In mid-1950, more than 20,000 of these workers were employed by the airlines; the number on the payrolls of other employers, public and private, may have been still greater. Sizable gains in employment in the next few years are virtually assured by the mobilization program begun in the summer of 1950. The longer-run trend will probably be upward also, owing to continued gains in the use of aircraft for an increasing variety of purposes and the growing size and complexity of planes and equipment.



An engine mechanic reassembling an air-line engine which had been torn down for overhauling.

Prior to the partial mobilization program begun in mid-1950, the supply of would-be civilian mechanics was ample to meet the demand for apprentices and other nonjourneymen. Some 6,000 men finished training in CAA-approved mechanic-training schools in 1950. In late 1950, about 9,000 were enrolled in these schools. Additional trainees were enrolled in nonapproved schools. There were other groups of potential job seekers.

It is expected that the total number of mechanics trained each year in mechanic schools and elsewhere will continue to be fairly large. Nevertheless, looking ahead in late 1950, continued partial mobilization appears likely to mean good employment prospects for qualified, fully trained men in the early fifties at least. Best job chances are expected, of course, for highly skilled and experienced men, but above all, for instrument mechanics and other specialists who qualify also for general "A and E" work. Improved prospects for advancement are anticipated for workers with records of long service and good work performance. Many trained but inexperienced men will obtain jobs as nonjourneymen; wholly untrained men will find entry job chances better than they have been for some years.

Earnings and Working Conditions

In late 1949, the most common starting rate for apprentices with the airlines was about 90 cents an hour; for helpers, about \$1 an hour. Under pay scales then in effect, apprentices and helpers with 3 or 4 years' experience generally earned \$1.50 or more an hour. Journeymen typically ranged from a beginning rate of \$1.40 an hour to \$2 or more for those with many years' service. Salaries of CAA agents ranged from \$4,600 to \$8,600 a year.

The airlines usually give their men 2 weeks' vacation with pay. CAA employees, like most other Federal personnel, receive 26 days of paid leave a year.

Mechanics are covered by union agreements on all major airlines. Several different unions were involved in late 1950—principally the International Association of Machinists (Independent), the United Automobile, Aircraft and Agricultural Implement Workers of America (CIO), and the Transport Workers Union of America (CIO).

Stock and Stores Clerks

(D. O. T. 1-38.01)

Outlook Summary

Job chances fairly good for newcomers. Employment expected to have upward trend in early fifties and over long run.

Nature of Work

Most stock and stores clerks employed by the air lines are in the storerooms at the main overhaul bases and, to a lesser extent, at the smaller service stations where day-to-day line maintenance work is done. Duties include receiving and unpacking the tremendous number of different parts and supplies, issuing these to mechanics and other personnel, packing and shipping materials and equipment, and keeping records and inventory controls. In the larger stockrooms, different groups of clerks may specialize in different phases of the work; there may be several levels of responsibility, junior clerk being the usual entry job.

There are also a few stock clerks in the larger fixed-base operations, and on the payrolls of foreign-owned and -operated carriers with maintenance facilities in the United States. The work done by these two groups of clerks is of the same general nature as that done in the stockrooms of large American carriers. However, since the operations are on a much smaller scale, there is likely to be little if any specialization of work or distinction between grades of clerks. In many instances, only one clerk is employed, who may be required to perform some minor mechanical tasks so that he will be fully occupied.

Most jobs will be found in the areas where the main overhaul bases of the scheduled airlines are located. There were 25 or more such areas in early 1951. Some stock and stores clerks are employed at large airports in other localities.

The armed services also employ civilian stock and stores clerks, besides assigning enlisted men to this type of work.

Qualifications and Advancement

There are no legal requirements for work in this occupation, and the standards used in hiring junior clerks vary considerably from one employer to another. Ability to read and to write legibly is always essential for employment. Some airlines require a high school education, or may prefer applicants with college or business school credits. The minimum age limit is usually 18; the maximum may vary from 35 to 50. On a few airlines the passing of a physical examination is necessary. Previous clerical experience, especially in stock and stores work in aircraft manufacturing or in automotive activities, is always an asset (sometimes a prerequisite) for the job. Positions above the level of junior clerk are generally filled by promotions from within the company.

Outlook

Several thousand stock and stores clerks were employed by the airlines and in other air transportation activities in mid-1950; their number was moderately greater than at the end of World

War II. Further gains in employment are expected during the early fifties and over the long run in this as in most other occupations in aviation maintenance departments.

The pool of qualified job applicants from among persons with and without experience in the field has, in the past, been ample to meet hiring needs. Employers' hiring standards for this occupation are broad; no technical training is required. This fact, plus the fairly interesting and pleasant character of the work, has attracted many young people and others to the occupation. Competition for jobs has usually been keen. However, it may be much reduced or may even be eliminated in the early fifties as a result of the mobilization program.

Working Conditions

Typical starting rates of pay for nonsupervisory clerks with the airlines ranged from 90 cents to as high as \$1.25 an hour in late 1949. Advancement was possible to rates as high as \$1.85.

The usual work schedule for airline stock and stores clerks is a 40-hour week and an 8-hour day. A 2-week vacation with pay is usually given.

Stock clerks are widely organized for collective bargaining. Among the unions which represent them are: Transport Workers Union of America (CIO), International Association of Machinists (Independent), and Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Agents (AFL).

Traffic Agents and Clerks

(D. O. T. 1-44.12, .27, and .32)

Outlook Summary

Chances for newcomers likely to be better in these than in many other aviation occupations. Long-run employment trend slowly upward in occupational group as a whole; rise likely to be more rapid in positions concerned with cargo traffic than in other types of work.

Nature of Work

These workers are employed mainly in airline departments handling passenger and freight traffic; a very small number work for foreign-owned and -operated carriers with offices in the United States. They include ticket agents, passenger and freight agents, and reservation and cargo clerks. Traffic representatives have a somewhat higher level of responsibility. Still farther up the ladder are city and district traffic and station managers.

Traffic staffs are located principally in downtown offices or at airports in or near large cities, where most airline passenger and cargo business originates. Some are in smaller communities where airlines have scheduled stops. A few Americans on the staffs of United States carriers are stationed in foreign countries.

Qualifications

There are strict hiring standards with respect to appearance, personality, and education—to qualify employees for the constant contact with the public which is involved in most traffic jobs. High school graduation is generally required; some college training is considered desirable. Courses in air transportation, offered by increasing numbers of colleges and universities, may improve one's chances for jobs and later advancement; these courses cover such topics as government regulations, principles of rate-making, traffic analysis, and problems of aviation management. Experience in connection with freight or express traffic in other branches of transportation will be increasingly valuable. Aviation background and sales experience are helpful for higher-grade jobs. Women are often employed as reservation and ticket agents; some few are passenger agents.

The occupations covered in this statement are among the best in the industry from the point of view of advancement.

Outlook

Employment in these traffic jobs is expected to increase both in the near future and over the long

run. In early 1950 considerably more than 10,000 people were in such work in air transportation. By 1955, the number should be substantially greater. The expected rise in employment will be slowed, however, by measures designed to increase efficiency and reduce costs in traffic departments.

The largest number of openings will probably be for ticket and reservation clerks, but the most rapid gains will be in employment connected with cargo traffic. The air-transport industry has been placing increasing emphasis on air-freight business, and such traffic has been expanding faster than any other class of transportation, passenger or freight, in the last year or two. This trend will continue. But passenger work will remain the more important field of employment indefinitely.

Job chances for persons without experience in the aviation field appear to be somewhat better in these traffic positions than for many other occupations in air transportation. Competition for

traffic jobs has generally been considerable in the past—partly because the requirements for employment are broad and nontechnical, and many people can qualify. The mobilization program will probably lessen competition in the early fifties; it will probably improve job chances for women.

Earnings and Unionization

Earnings vary widely, depending on the degree of responsibility of the job. In late summer of 1949, the bulk of agents and clerks had monthly salaries ranging from \$175 to \$325; a few made as much as \$350 or more a month. Station managers and district traffic managers in large cities had monthly salaries of \$400 or better.

Reservations and transportation agents are covered by union contracts on several lines. They are represented chiefly by the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Agents (AFL).