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WOMEN TELEPHONE WORKERS AND CHANGING TECHNOLOGY

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U.S. DEPARTMENT OF LABOR
 W. Willard Wirtz Secretary
 WOMEN'S BUREAU
 Esther Peterson, Director
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**U.S. DEPARTMENT OF LABOR
W. Willard Wirtz, Secretary**

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WB Bulletin 286

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Foreword

During the past 40 years, women's employment opportunities in the United States telephone industry were strongly affected by conversion from manual to dial operations as well as by other technological advancement. Indications are that further automation and the addition of new telephone services will continue to change the nature of some jobs, eliminate others, and also provide new job opportunities.

Since the telephone industry has been an important employer of women for many years, the Women's Bureau has followed its growth and development with great interest. The Bureau's first major study in this field was titled *The Change From Manual to Dial Operation in the Telephone Industry* (bull. No. 110), 1933, followed by *The Woman Telephone Worker* (bull. No. 207), 1946, and by its supplement, *Typical Women's Jobs in the Telephone Industry* (bull. No. 207-A), 1947.

Primary aims of the current study are to indicate the effects of technological improvements on the number of women employed in the telephone industry, to consider in more detail gradual change in the job content of the principal group affected by automation—telephone operators—and to gain some insight into employment implications of future technological changes. Additional material is presented to give a better picture of the industry as a whole, and in so doing, to place in context the role which operators play.

While much of the adjustment in personnel requirements was made by attrition rather than layoff, the numerical impact represents but one of the human aspects of transition to newly automated systems. The possibility of displacement creates fears among many workers, even those to be retained or reassigned. Moreover, all displaced workers feel the separation strongly, regardless of how many or few are dismissed at one time.

It is recognized that often difficult adjustments and actual hardships are borne by those displaced or reassigned, and that need exists for positive programs to alleviate their distress. A meaningful discussion of these problems, however, requires careful study focused on psychological and sociological aspects of the subject. This study is limited to information readily available concerning numbers and job duties of those telephone workers most affected by technological change.

It is too early to predict which jobs and how many will be affected in the future. It is expected, however, the strongest impact will be felt in clerical rather than in operator jobs.

ESTHER PETERSON,
Director, Women's Bureau.

Acknowledgments

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Photographs which appear in this bulletin were furnished by the Chesapeake and Potomac Telephone Company, figures 1, 2, 3, 4, 5, 6, and 8; United States Independent Telephone Association, figure 7.

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Employment Patterns, 1945-60¹

Technological change in the United States influenced the employment of telephone operators during the long period of transition from manually operated switchboards to dial operation. But the exact extent of the impact—both immediate and long-range—was difficult to discern because of simultaneous countertrends.

On the one hand, the telephone industry was in a period of tremendous growth and required an increasing number of workers to build, maintain, and operate it. On the other hand, laborsaving automatic dial equipment was being introduced. Its introduction was spread over such a long period of time and a wide area of geography, and was accomplished at such a gradual rate that few people outside the industry realized automation was replacing manual activity. In addition other new equipment was being installed during the 10 years 1950-60 to enable customers to dial out-of-area calls with a minimum of operator assistance.

Planning permitted conversion from manual to dial operations in each community with little or no actual displacement of permanent employees. In many places experienced operators were reassigned from their manual switchboards to take training on new equipment, while temporary workers were hired to operate the manual boards.

Experienced operators were retrained for jobs in the new dial offices, and opportunities for beginners were limited during the transition period. If there had been no increase in use of the automatic dial system since its inception in 1921 and no change in productivity, more than 750,000 operators would have been needed in 1960 instead of the 225,000 employed. Technological improvements enabled the telephone industry to expand its services without increasing employment of operators—a trend that undoubtedly will continue. Many operators not needed in the new all-dial offices were given the opportunity to transfer to other departments of the company in the same city or to another area. Normal turnover removed others from the work force of the industry.

¹ Terminal points for Federal Communications Commission data presented in the main body of this report are 1945 and 1960 (with 5-year intervals arbitrarily chosen as checkpoints in some of the analyses). Reasonably complete and comparable statistical data were not readily available before 1945. At the time the study was begun, data for 1960 were the latest available. Data for 1961 were released later, but are not included in the main tables and text because they show a continuation of trends and do not warrant publication delay while revisions are made. Tabulations of 1961 data are included in the appendix.

In terms of physical equipment, the telephone industry expanded greatly during the 15-year period 1945-60. The number of telephones in service nearly tripled—from 28 million to 74 million—and the average number of daily conversations held by customers rose from 113 million in 1945 to more than 280 million in 1960. At the end of 1961 there were 77 million telephones in service, and average daily conversations totaled over 294 million.²

In 1961 the major telephone system operated almost 66 million telephones, and independent companies operated roughly 12 million.³ Most independent companies operate in small towns and rural areas, but some do service large metropolitan areas. The proportion of telephones served by independent companies, as compared with the major system, remained almost unchanged since 1945 at roughly 16 percent.

OVERALL EMPLOYMENT RISES

Personnel required to install, operate, and maintain this burgeoning telephone system rose from nearly 400,000 in 1945 to more than 625,000 in 1960, or a gain of 57 percent for class A telephone carriers.⁴ As indicated, major factors responsible for keeping the level of employment from rising even higher were the concurrent development and utilization of automatic equipment, more efficient work methods, and enlarged local calling areas.

Between 1945 and 1960 there was a sharp rise in the number of workers employed in each of the major occupational groups of the class A carriers *except* operators, whose employment dropped by 16,000 according to data reported to the Federal Communications Commission (table 1). Because of the extension of the dial system, operators did not share in the tremendous growth of the industry as did other groups of workers. The number of operators has declined almost continuously since its peak of 262,300 in 1952. With the introduction of additional automatic equipment, some further decline seems likely. It is important, however, to keep in mind the fact that although the number of operators actually declined between the terminal years of the survey, this group continued to be the largest single unit of telephone workers, and in 1960 it made up nearly a third of the total.

² Data exclude Alaska and Hawaii.

³ Data include Alaska and Hawaii.

⁴ The Federal Communications Commission defines class A carriers as those telephone companies having annual operating revenues exceeding \$250,000. Prior to 1951, class A carriers were those with annual operating revenues exceeding \$100,000. In 1960, class A carriers employed 90 percent of telephone industry personnel.

Table 1.—EMPLOYMENT IN CLASS A TELEPHONE CARRIERS, BY MAJOR OCCUPATIONAL GROUP, 1945 AND 1960¹

Major occupational group	1945		1960	
	Total	Women	Total	Women
Total employees.....	397, 955	288, 402	626, 399	359, 752
Officials and managerial assistants.....	3, 595	59	6, 031	134
Professional and semiprofessional employees.....	17, 160	1, 866	47, 202	6, 945
Business office and sales employees.....	18, 114	11, 730	45, 658	30, 486
Clerical employees.....	64, 903	58, 706	133, 479	121, 936
Telephone operators.....	207, 622	207, 533	191, 973	191, 943
Construction, installation, and maintenance employees.....	68, 658	506	174, 995	431
Building, supplies, and motor vehicle employees.....	17, 788	7, 972	26, 088	7, 856
Other employees.....	115	30	973	21

¹ See table A-1 for 1961 data.

Source: Data are based on annual reports (Form M) of class A telephone carriers to the Federal Communications Commission and compiled by the Bureau of Labor Statistics, U.S. Department of Labor. In 1945 data were compiled by the Federal Communications Commission.

The next largest group of telephone workers was engaged in construction, installation, and maintenance,⁵ and represented over one-fourth of the total, followed by those performing clerical duties, who represented one-fifth.

While the number of women telephone employees, many of whom were operators, increased by 25 percent from 1945 to 1960, the number of male employees rose by 143 percent during this period. As a result, the proportion of women in the telephone industry in 1960 represented only 57 percent of all employees, compared with 72 percent 15 years earlier.

OCCUPATIONAL RATIOS SHIFT

In 1945 operators constituted over half of all telephone workers; in 1960 they represented less than one-third. This reduction can be attributed largely to the fact that in 1945 just under two-thirds of the telephones in the major communications system were dial operated for local calls, while in 1960 nearly all were dial operated. In 1945 all long distance calls were processed manually by the operator, while in 1960 half of all telephone customers were able to dial out-of-town station-to-station calls themselves.

⁵ These workers are primarily concerned with telephone company equipment.

Women Telephone Workers

Concurrent with the decrease in the proportion of operators, there was a sizable increase in the proportion of employees engaged in construction, installation, and maintenance of increasingly complex equipment, and a doubling of the small group of professional and semiprofessional employees (table 2). Lesser gains occurred among clerical workers and business office and sales employees.

Table 2.—PERCENT DISTRIBUTION OF EMPLOYEES IN CLASS A TELEPHONE CARRIERS, BY MAJOR OCCUPATIONAL GROUP, 1945-60¹

Major occupational group	1945	1950	1955	1960
	Percent			
Total employees.....	100	100	100	100
Officials and managerial assistants.....	1	1	1	1
Professional and semiprofessional employees.....	4	5	6	8
Business office and sales employees.....	5	5	6	7
Clerical employees.....	16	18	21	21
Telephone operators.....	52	43	37	31
Construction, installation, and maintenance employees.....	17	24	25	28
Building, supplies, and motor vehicle employees.....	5	4	4	4

¹ See table A-1 for 1961 data.

Source: Data are based on annual reports (form M) of class A telephone carriers to the Federal Communications Commission and compiled by the Bureau of Labor Statistics, U.S. Department of Labor. In 1945 data were compiled by the Federal Communications Commission.

DISTRIBUTION WITHIN OPERATOR CLASSIFICATION REMAINS CONSTANT

Within the operator group the proportion of chief operators, service assistants and instructors, and other switchboard employees remained relatively constant in the years 1945-60. At the end of World War II in 1945, there was an unusually large buildup in the total operator work force. This accounted for the significantly larger proportion of operators in training than in subsequent years (table 3).

WOMEN PREDOMINATE IN THREE MAJOR GROUPS

In the telephone industry women tend to be employed in jobs different from those of men. Virtually all telephone operators are women; and nearly all construction, installation, and maintenance employees are men. Women also predominate as clerical workers and

Table 3.—PERCENT DISTRIBUTION OF TELEPHONE OPERATORS IN CLASS A CARRIERS, 1945-60¹

	1945	1950	1955	1960
Telephone operators-----	100	<i>Percent</i>		100
Chief operators ² -----	} 14	13	6	6
Service assistants and instructors ² -----			8	7
Experienced switchboard operators ³ -----			67	73
Operators in training-----	28	15	18	13
Others-----	2	1	1	1

¹ See table A-3 for 1961 data.

² Prior to 1951, chief operators and service assistants and instructors were combined.

³ All operators other than those in training status are classified as experienced, regardless of their length of service.

Source: Data are based on annual reports (form M) of class A telephone carriers to the Federal Communications Commission and compiled by the Bureau of Labor Statistics, U.S. Department of Labor. In 1945 data were compiled by the Federal Communications Commission.

as business office and sales employees, whereas men outnumber women in building, supplies, and motor vehicles⁶ employment. Men outnumber women by a large margin in the professional and semiprofessional jobs (chart A). This appears to follow tradition, since on the basis of mental and physical requirements, most of these jobs are equally suitable for both men and women. Telephone companies hire young men just out of college to become management trainees. Few companies, however, hire women for such training.

The trend toward simplification of testing, maintenance, and replacement of certain central office equipment may give employment to more women in the telephone industry, and make it possible for women to fill some installation and maintenance jobs previously considered unsuited to them.

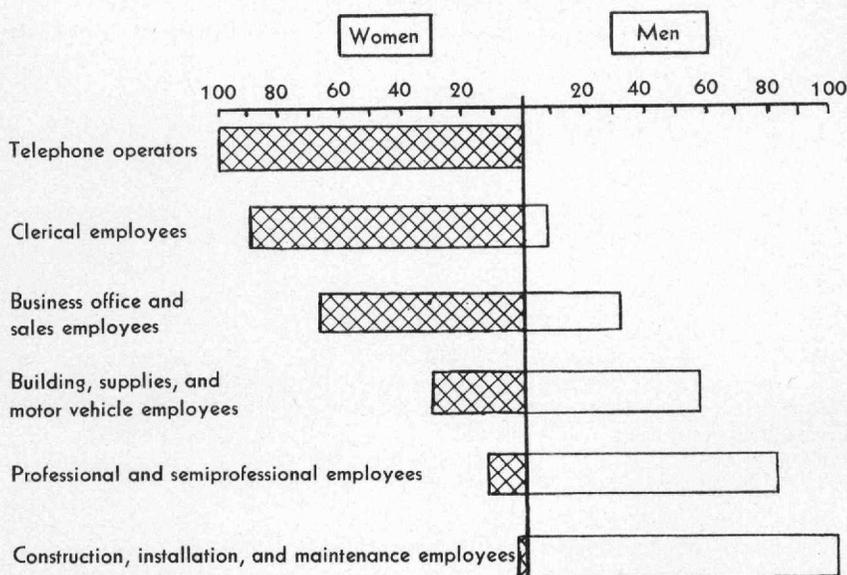
PROPORTION OF OPERATORS DROPS SIGNIFICANTLY

As a group, the proportion of operators decreased significantly between 1945 and 1960 by comparison with the total number of women in the industry. Simultaneously, there was a rise in the proportion of clerical employees and in business office and sales employees (table 1).

⁶ Employees in this group are chiefly engaged in maintenance of telephone company buildings and motor vehicles.

Women Telephone Workers

Chart A.—PROPORTION OF WOMEN AND MEN IN MAJOR OCCUPATIONAL GROUPS IN CLASS A TELEPHONE CARRIERS, 1960¹



¹ See table A-1 for 1961 data.

Source: Data are based on annual reports (form M) of class A telephone carriers to the Federal Communications Commission and compiled by the Bureau of Labor Statistics, U.S. Department of Labor.

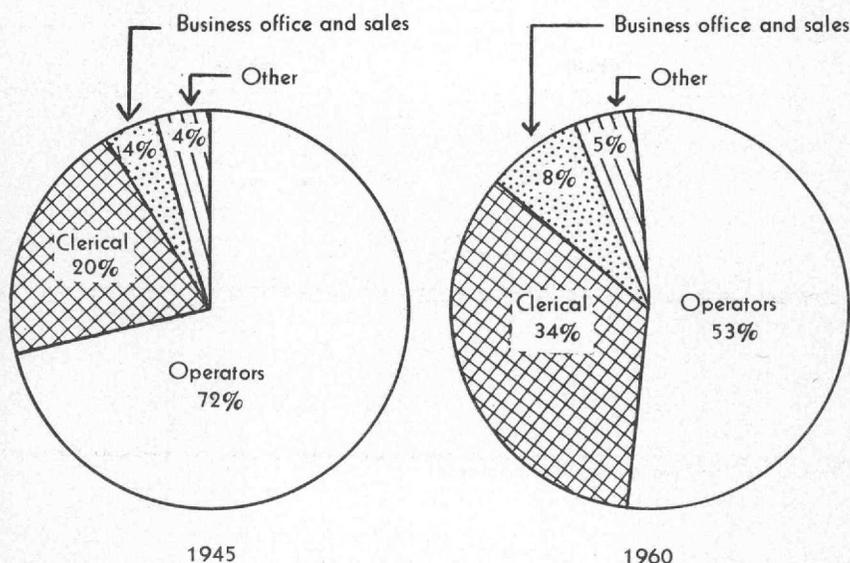
In other occupational categories (professional and semiprofessional; construction, installation, and maintenance; and building, supplies, and motor vehicles) the proportion of women remained relatively constant in the 15-year period (chart B).

EARNINGS OF TELEPHONE WORKERS

Earnings of telephone workers showed a noteworthy gain during the 15-year period 1945-60. Although telephone operators had the largest percentage increase in average weekly earnings among the major occupational groups in which women predominate, they had the lowest earnings in 1945 and in 1960 (table 4).

Building, supplies, and motor vehicle employees had the highest percentage increase in average weekly earnings of any major occupational groups in which men predominate. They, too, started from a relatively low level and were still at a low level in 1960. As in many other industries, workers in the professional and semiprofessional occupations had the highest earnings both in 1945 and 1960.

Chart B.—PERCENT DISTRIBUTION OF WOMEN IN SELECTED OCCUPATIONAL GROUPS IN CLASS A TELEPHONE CARRIERS, 1945 AND 1960¹



¹ See table A-1 for 1961 data.

Source: Data are based on annual reports (form M) of class A telephone carriers to the Federal Communications Commission and compiled by the Bureau of Labor Statistics, U.S. Department of Labor. In 1945 data were compiled by the Federal Communications Commission.

However, they had the smallest percentage increase in earnings during the 15-year period.

In 1960 the lowest earnings were in occupational groups in which women predominate—operators and clerical workers. The highest earnings were in occupational groups in which men predominate—professional and semiprofessional, and construction, installation, and maintenance.

Although there is limited comparability between the jobs in the service-oriented telephone industry and those in manufacturing, it is interesting to note that average weekly earnings of telephone operators rose from \$28.32 in 1945 to \$69.37 in 1960—a rise of 145 percent, compared with factory production workers' earnings which rose from \$44.39 in 1945 to \$90.91 in 1960—a gain of 105 percent. In terms of 1947-49 dollars, however, factory workers' earnings increased 24 percent from \$57.72 in 1945 to \$71.87 in 1960, whereas telephone operators' earnings increased 49 percent from \$36.83 to \$54.84.

Table 4.—AVERAGE WEEKLY EARNINGS OF WORKERS IN CLASS A TELEPHONE CARRIERS BY MAJOR OCCUPATIONAL GROUP, 1945 AND 1960

Occupational group	Average weekly earnings					
	Current dollars ¹			1947-49 dollars ²		
	1945	1960 ³	Percent change	1945	1960	Percent change
Professional and semiprofessional employees.....	\$87.84	\$180.31	105	\$114.23	\$142.54	25
Business offices and sales employees.....	45.58	101.95	124	59.27	80.59	36
Nonsupervisory employees.....	40.01	90.72	127	52.03	71.72	38
Clerical employees.....	34.40	79.59	131	44.73	62.92	41
Nonsupervisory employees.....	32.51	75.04	131	42.28	59.32	40
Telephone operators.....	28.32	69.37	145	36.83	54.84	49
Chief operators, service assistants, instructors.....	38.91	96.57	148	50.60	77.26	53
Experienced switchboard operators.....	28.47	67.53	137	37.02	53.38	44
Operators in training.....	22.42	52.56	134	29.15	41.55	43
Construction, installation, and maintenance employees.....	56.66	119.30	111	73.68	94.31	28
Building, supplies, and motor vehicle employees.....	33.48	81.81	144	43.54	64.67	49

¹ Based on annual reports (form M) of average hourly earnings of employees of class A telephone carriers to the Federal Communications Commission, multiplied by average weekly hours worked by each group.

² Derived by applying Consumer Price Index to average weekly earnings in current dollars. Base for Consumer Price Index: 1947-49=100; index for 1945 was 76.9; for 1960, 126.5.

³ See table A-2 for 1961 data.

Source: Data are based on annual reports (form M) of class A telephone carriers to the Federal Communications Commission and compiled by the Bureau of Labor Statistics, U.S. Department of Labor. In 1945 data were compiled by the Federal Communications Commission.

SCHEDULED HOURS OF WORK

In general, scheduled weekly hours for telephone workers have remained stable since 1945. The only change which amounted to as much as one hour difference was in hours scheduled for operators, which decreased by 5 percent. The reduction in number of hours scheduled for operators undoubtedly reflected both increased utilization of operators in part-time work and a shorter work week for full-time operators (table 5).

Table 5.—AVERAGE NUMBER OF SCHEDULED WEEKLY HOURS FOR WORKERS IN CLASS A TELEPHONE CARRIERS, BY SELECTED OCCUPATIONAL GROUP, 1945 AND 1960¹

<i>Occupational group</i>	<i>1945</i>	<i>1960</i>
Professional and semiprofessional employees.....	37.7	37.8
Business office and sales employees.....	38.3	37.9
Clerical employees.....	37.8	37.9
Telephone operators.....	38.8	36.9
Construction, installation, and maintenance employees.....	39.9	39.9
Building, supplies, and motor vehicle employees.....	37.2	37.7

¹ See table A-2 for 1961 data.

Source: Data are based on annual reports (form M) of class A telephone carriers to the Federal Communications Commission and compiled by the Bureau of Labor Statistics, U.S. Department of Labor. In 1945 data were compiled by the Federal Communications Commission.

Traffic Department Personnel

The traffic department handles customers' telephone calls. To carry out this function, traffic personnel operate the switchboards, measure the quality of service, make sure the equipment is working smoothly, and develop better methods and equipment for handling calls.

To clarify the effect of automation on the number of telephone operator employees, a special study was made of the changing nature of their jobs. Details of their job duties follow, along with information about hiring standards, training provisions, working conditions, and possibilities for advancement. There is also brief mention of other jobs in the traffic department, in order to place the role of the telephone operator in better perspective.

OPERATORS

Operators comprise more than 90 percent of traffic department workers. Together with their supervisors, almost all of whom are women, they make up a division sometimes called "operating" or "operations."

Organization of Operating Personnel

Before the turn of the century the staff of a typical central office consisted of a few operators (the number dictated by the volume of business) and a chief operator who sometimes also served as business office manager. As telephone business expanded in the early 1900's, the employment of separate business office managers became more common. A typical central office then consisted of a manager, a chief operator, several supervisors, and a corps of telephone operators. Supervisors were responsible for assisting operators in their day-to-day work, giving them initial training, and providing supplementary training as required (figure 1).

More recently, one additional level of supervisory personnel has been added—assistant chief operator.

The usual promotion line in a sizable central office today is from trainee to regular operator, service assistant (supervisor), assistant chief operator, and chief operator. Occasionally a chief operator is promoted to a staff position, such as supervisor of training or supervisor of operating methods.

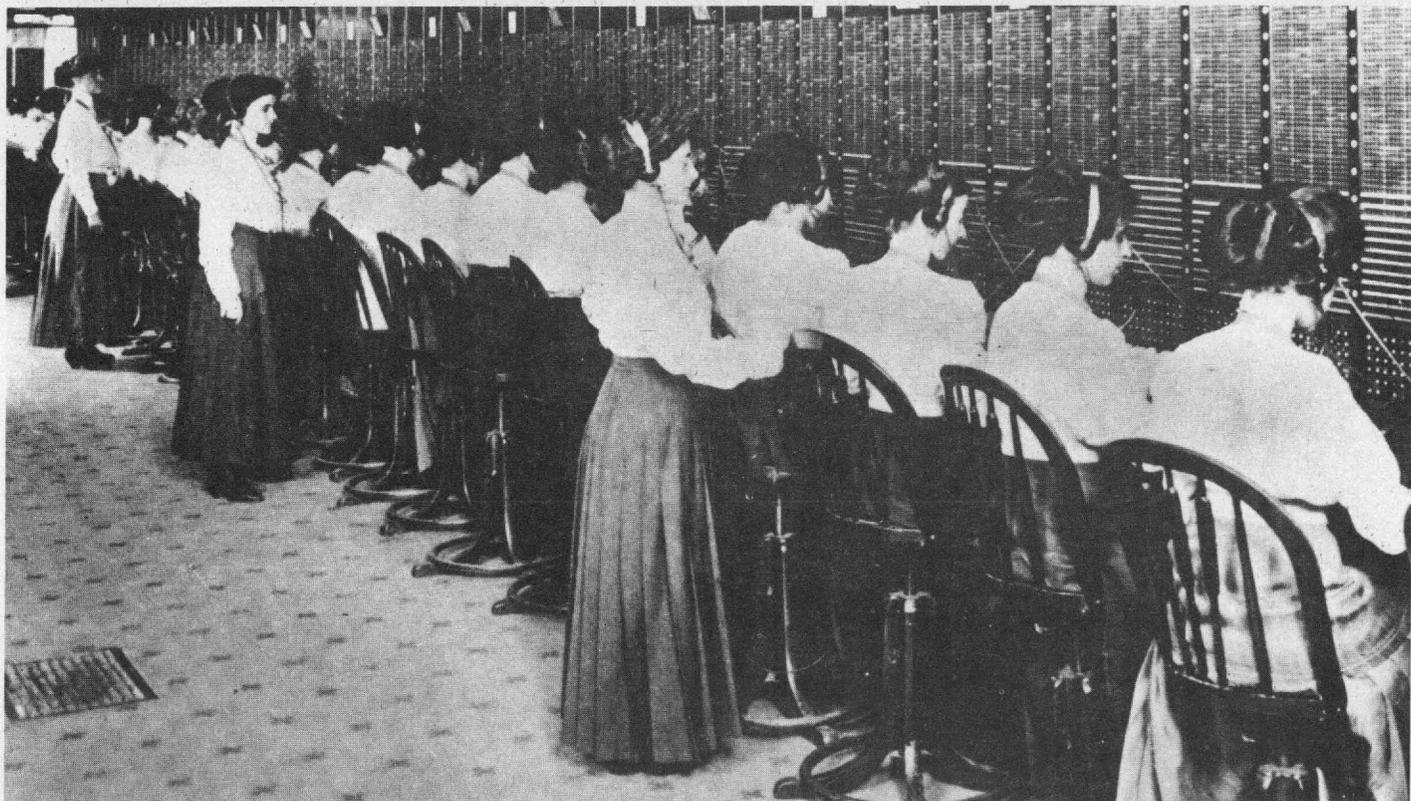


FIGURE 1.—Supervisory operators, in the early days, assist the corps of operators in their day-to-day work.

Job Duties

In general, the job duties and day-to-day activities of an operator or a chief operator are similar in each office. Some of the differences can be traced to variations in operating procedures or practices in a large metropolitan area as contrasted with those in a small community, or in one type of city office as contrasted with another office in the same area, or those carried on in an affiliated company of the major telephone system as contrasted with an independent company. For example, the long distance calls procedure is basically the same from office to office, but may vary with the type of equipment used, the size of the office, and the method of operation in the associated local exchanges.

In some areas a central office handles all types of calls including local, long distance, and information. There an operator may be trained to handle each type of call, or may specialize in one type. And in a large metropolitan area there may be one office that handles only long distance calls, another for intercept calls, and another for information calls.

The First Operators.—The first telephone operators were boys in their early teens. This was logical, for boys and young men had served as telegraph operators. In fact in England, to this day men serve extensively as telephone operators.

Early operators had a demanding job. They actually had to rush from one switchboard to another and seldom had a chance to rest. In addition to putting through telephone calls, they had to perform miscellaneous duties such as sweeping the office, running errands, collecting bills, and going outside to untangle slack wires crossed by high winds.

Women were not hired as operators until the early 1880's (figure 2). Ten years later, they were operating practically all the switchboards in the major system during daytime hours. Boys and men on night duty were still common as late as 1904. Even today there are a few male operators.

Telephone service in the early days was very personal. Operators knew each subscriber by name and subscribers knew the operators. Often an operator was asked to do personal favors for subscribers. It was not uncommon for a customer to ask an operator to locate someone and give him a message. Operators also provided what might be called a news service, for they would willingly relay results of elections, sporting events, or the location of a fire.

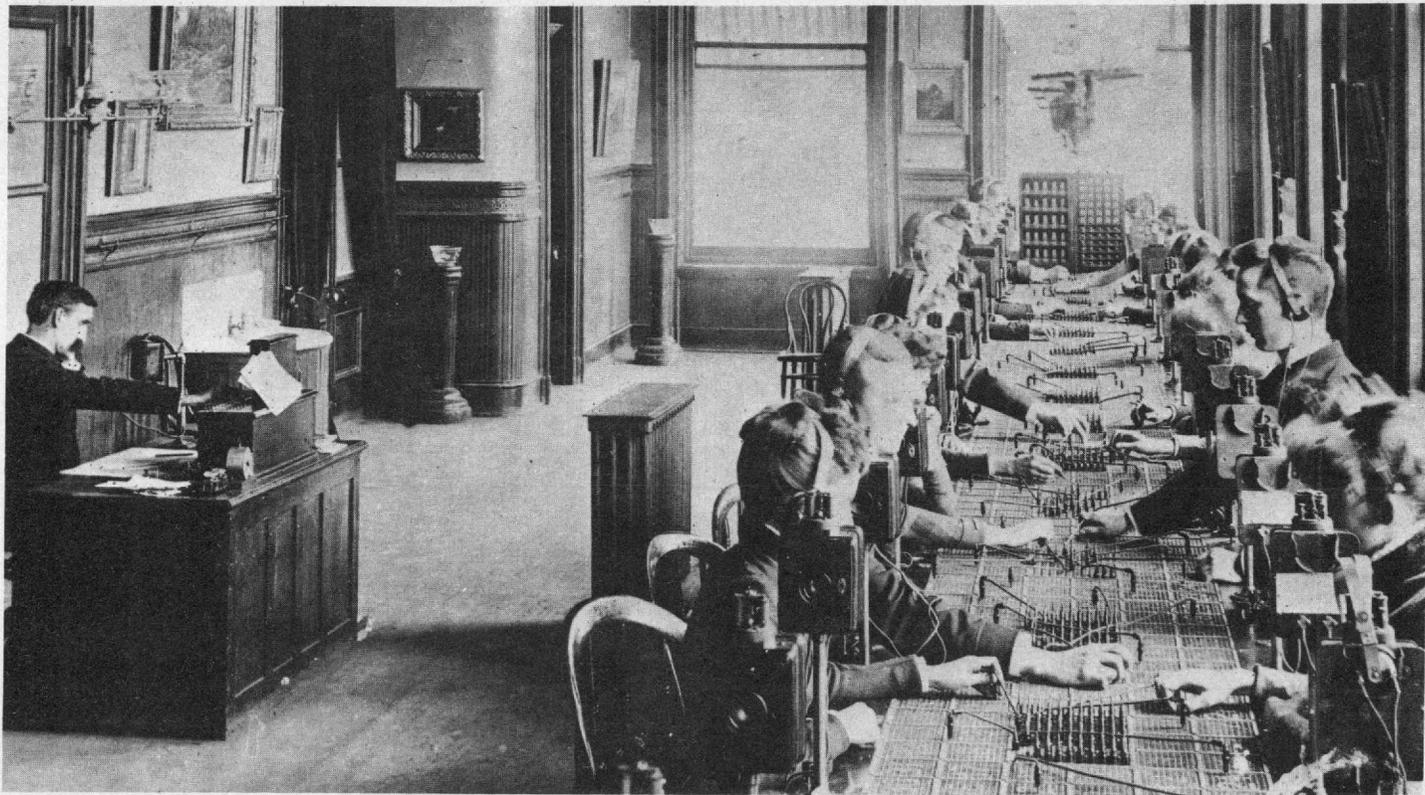


FIGURE 2.—Male and female telephone operators at work in the early days of the industry.

Manual Operator in the 1930's.—Each operator, during the 1930's, sat at an assigned place at the switchboard and was responsible for a certain number of subscribers whose incoming calls appeared on the board in front of her (figure 3). When a light appeared beside a small hole (jack) on the switchboard, it signaled the operator that a customer had lifted his receiver to make a call. It also told her which subscriber was making the call, because each jack was labeled with the subscriber's number.

When the operator saw the light, she inserted into the corresponding jack the metal plug attached to one end of a connecting cord, and asked: "Number, please?" If the customer requested a local number served by the same office, the operator inserted the plug on the other end of the cord into the jack of the desired line and rang on the circuit. Light signals showed whether the called number answered and also when the persons on both ends of the line had hung up, so that the operator knew when to remove the plugs. When a called number was out of order, or disconnected, or busy, the operator so advised the caller.

When the call was for a local number served by another office, the operator had to pass the call for completion to an operator in the other office, using an interoffice trunkline.

Intercity calls required the cooperation of at least two operators, although frequently four operators were involved on a single call. A local operator who answered the call advanced it to a nearby toll (long distance) operator; that is, to an operator handling nonlocal calls for which an additional fee was charged. The call then was forwarded to a distant toll operator, who in turn passed it to the distant city's local operator for completion.

Long-distance operators had jacks on their boards labeled with the names of various towns and cities which were on the main routes used for calls. If these circuits were busy, an operator would look up an alternate route. When the customer was connected with the station or individual he desired, the operator stamped the ticket in a timeclock device (known as a calculagraph), which indicated the time the conversation began. At the end of the conversation the operator stamped the ticket again to determine the length of the call, so that the customer could be billed accordingly. All the information on these tickets, such as customer's name, place and number of the called party, were written in longhand by the operator. Afterward, tickets were collected and sorted by hand for billing purposes.

Between 1922 and 1930, the average time needed to make a long-distance connection dropped from approximately 12 to 2 minutes be-



FIGURE 3.—Operators of the 1930's handle calls at a manual switchboard.

cause of improved equipment and procedures. This meant that in 1930 most long-distance calls were handled while the customer remained on the telephone, whereas in 1920 less than 10 percent of the calls were handled in this manner.

In larger towns and cities, the information operator was specially trained for her job. In small offices the regular operator provided information in addition to performing her other duties. This job has not changed much over the years, except that the directories which must be consulted are much larger.

The Modern Operator.—Since automatic dialing machinery now handles 98 percent of all local calls in the United States, operators are seldom needed to complete such connections. They assist customers who are unable to dial for themselves, such as children, the blind, and persons making emergency calls. For an emergency call the operator obtains as much information as possible from the person calling, and then dials the appropriate number to summon an ambulance, police, fire department, or whatever service is required. She stays with each emergency call as long as necessary.

In addition, operators are needed to complete certain types of long-distance calls, to provide information, and sometimes to let a customer know that a telephone has been disconnected or is out of order.

The tasks of the operator changed with the introduction of the dial system, from the repetitive manual plugging of cords and pushing of keys to a more or less secretarial type of operation. Operators are becoming centralized in the larger communities, for information, long-distance calls, and customer inquiries. These functions require a consistently higher degree of consideration, knowledge, and initiative, and a more alert attitude than required for the simple dialing and ringing of a telephone number.

Person-to-person techniques demand, among other qualifications, a high level of persistence and patience. The art of locating the called party of the customer's person-to-person call, while keeping that calling customer from becoming impatient, can be a task requiring skill and finesse.

Long-Distance (Toll) Operator.—Today's long-distance operator has before her a number of devices—cords, keys, a key pulsing set, a calculagraph clock, billing tickets, and a bulletin showing the rates and routes to about 95 percent of all frequently called places (figure 4). Since all calls show up in front of each operator, any operator who is not busy may pick up any incoming call with very little reaching. About 50 percent of the long-distance calls can be dialed directly by the customer.

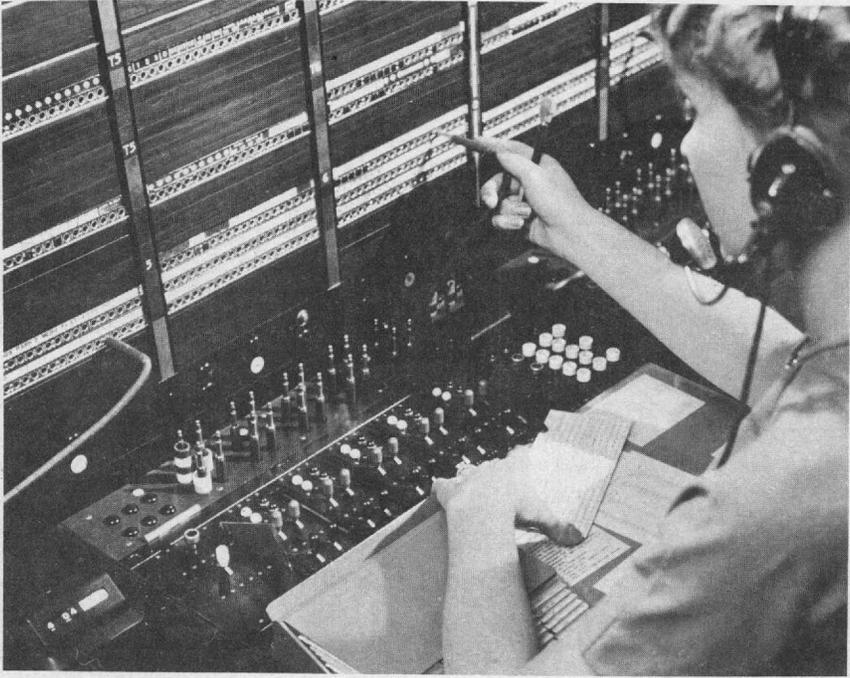


FIGURE 4.—A long distance (toll) operator has at her fingertips the equipment necessary to establish most connections.

A toll operator handles many different types of calls each day, and each has its own variation from the basic call. She helps customers with calls they cannot or do not wish to dial themselves. She may supply area code numbers to customers who have the local number of their party—thus enabling the customer to dial directly. The operator handles all person-to-person calls, collect calls, calls charged to a credit card, calls charged to a third party, calls from a coin box, calls from areas which do not have access to direct distance dialing, and emergency and other special kinds of calls.

Generally one operator is able to complete an entire call, but sometimes she has to call a distant city operator for the number being called. If the distant city does not have a dial system, the local operator must secure the number, or she may have to call the rate and route operator for the area code if it is not in her own bulletin. So even today several operators may be involved in a single call.

A basic (simple station-to-station) toll call is handled in this manner: When an operator sees a light on her board, she opens her key (switch), and plugs her back cord into the jack, answering "Operator." The caller usually gives her the city and number of the place he

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wishes to call. The operator looks in her rate and route bulletin for the city to be called, determines the area code and any special routing information, and inserts the front cord into the proper circuit. Then she key pulses (dials with a pushbutton dial) the area code number and the called number and pushes a start button.

As soon as the ringing starts, the operator asks the person calling for his number. When someone answers on the other end of the line, she records on a billing ticket the time the conversation began. This ticket provides spaces for recording all the information necessary for billing purposes, such as area code, telephone number of called place, customer's telephone number, type of call (credit card, message unit, charge to third party), and time of day. Meanwhile, although the operator is assisting other customers, she must keep watching the base of the set of cords for calls in progress.

As each call is terminated and the base lights go on, she stamps the ticket to show the time the conversation ended and clears the circuit by removing the plugs. When a customer has requested "time and charges" (the length of the call and the charge for it), she refers to her bulletin and calls him back with this information.

Often calls are much more complicated. In a person-to-person call, the person being called may be out. The operator asks when he is expected or if he can be reached at another number, or if the person placing the call would like to speak with someone else. When the person being called cannot be reached immediately, the operator usually leaves word for him to call her when he returns.

In recent years many telephone companies have been using the "mark-sense" card to record billing information. Operators place simple marks on these preprinted cards with a special pencil to indicate the area code, telephone number, type of call (including credit card, and charge to third party), and the number of the telephone from which the call was made. Subsequently, the cards are fed into an electronic billing machine which "senses" the markings and forms the basis for the toll charges portion of each customer's monthly bill. So the operator has to write out only the name of the person called or make any special notation. Prior to the use of mark-sense tickets, all numbers had to be written by hand and the toll tickets sorted by hand.

The differential in charges between person-to-person long-distance calls and station-to-station calls is being increased in a number of States, so customers may make fewer person-to-person calls. This may further affect the need for telephone operators, for while all person-to-person calls require operator assistance, most station-to-station calls do not.

Information Operator.—Memory plays an important role in the job of an information operator. Directly in front of each operator is a list of frequently called numbers which change from time to time (figure 5). The operator must become familiar with this list to minimize time spent looking up numbers in the directory. There are two main parts to some directories—an alphabetic listing by name and an alphabetic listing by street. In many places this directory is printed about once a month. And in addition to the regular listing, sometimes a daily addendum is inserted.



FIGURE 5.—An information operator uses a large city directory in order to fill a customer request.

When a customer gives a complete and accurate request, the operator usually has little trouble finding the correct number. Often the customer is not sure of the spelling of a name or street, of the first name of the person being called, or of the house number. The oper-

ator tries to get as much information as possible before beginning her search. If after looking under all possible spellings of a name she does not find it in the street or name directory, she looks in the addendum. Frequently, she refers to the addendum first for new or recently changed listings.

An information operator must be a good speller, a quick reader, and have a good memory, as well as possess other desirable traits. An experienced operator sometimes is able to handle 100 calls an hour, whereas a new operator may average about 60 calls an hour.

Intercept Operator.—If a customer dials a number which is not in working order, an intercept operator usually comes on the line. She asks the customer what number he was dialing, and looks it up in her directory or reference file. Each number in her directory has a notation beside it to tell her that a customer has moved, or the telephone has been disconnected, or the number is not a working number, or the calls are being referred to another number. If she has no such notation, she suggests redialing.

In some areas, when a customer dials a nonworking line, a recording, instead of an operator, advises him to consult his directory for the correct number and to redial.

TWX Operator.—The job of the Teletypewriter Exchange (TWX) operator is comparable to the job of the toll operator, except that the TWX operator communicates with the customers by typewriter instead of by speech.

TWX has approximately 60,000 subscribers, any one of whom can communicate with any other subscriber by special typewriter. A number of stations also can be connected simultaneously in a conference service. TWX service is used mainly by business concerns to transmit orders and specifications, to interchange information concerning availability and price of goods, and to make sales and purchases; and by law enforcement agencies to transmit information in connection with crimes, arrests, and police orders. TWX operators generally work during normal business hours. However, some of them must work on shifts so as to provide around-the-clock service.

Since TWX service recently has been converted to dial operation, service is much quicker (figure 6). No delay is interposed by an operator who must answer the caller and make the connection. Calls are put through by the caller, who simply dials through to his intended receiver instead of typing with the assistance of an operator.

The introduction of dial TWX service eliminated the need for many TWX operators. However, some operators still are needed for special types of calls, such as information, conference, and collect calls.



FIGURE 6.—Teletypewriter exchange (TWX) customers now are able to get faster service since the recent conversion to dial operation.

Supervisory Operators.—An operator may advance to the position of *service assistant* (supervisor) after becoming experienced on the job and showing a potential for supervisory duties. Each service assistant is responsible for a certain number of operators to whom she gives initial instruction, provides supplementary training, explains new operating procedures, and for whom she handles unusually difficult calls and customer complaints. From time to time she takes progress observations on this group of operators, most frequently on recently trained operators. The service assistant is able to listen in to any operator at the switchboard. Sometimes an operator is aware that the service assistant is on the line and sometimes she is not. The service assistant notes tone of voice, speed of performance, accuracy of dialing, correctness of timing length of calls, and correctness of charges. She then discusses her observations with the operator to plan ways to improve the operator's service.

In a large city telephone system, there may be a group of workers called *service observers*. These women probably once were service assistants (supervisors) in a central office. Now their job is to sample daily the quality of operator and equipment service from each office. The calls which come in to the service observer are selected mechanically to provide a balanced sampling. The service observer listens to the portion of the call in which the operator participates. She also provides summarized reports that give a measure of the quality of service rendered in that central office. The service observer also samples calls that customers dial directly, in order to measure equipment performance.

There may be one or more *assistant chief operators* in a central office. As the name implies, these operators assist the chief operator, and perform her duties when she is out of the office. Usually each assistant chief operator is responsible for the activities of a group of operators and one or more service assistants.

The *chief operator* is the manager of a traffic office, where she supervises the work of the operators, service assistants, assistant chief operators, and clerical workers. She is responsible for seeing that the office runs smoothly and that the service is good. Among her duties are adequate staffing of all tours of duty (work shifts), helping to solve operators' problems, and assuring that all personnel under her direction have the required training.

She continuously evaluates the service her office provides. For example, she is alert to see that slowly answered calls are kept to a minimum and that operators give prompt and courteous service. If she finds that her office is weak in certain respects, she must determine the reason for these deficiencies and try to remedy them. If her office

is not giving the desired level of service because there are insufficient operators, she may borrow operators from another office or reschedule hours so that there will be more operators on duty at times of peak activity. Or she may institute practice or training sessions to improve the speed of the operating force.

The chief operator may be responsible for hiring the operators for her office, although in large cities there may be a centralized employment office. Also the chief operator is the direct contact between her office and other central offices in the area, and her office and other departments in the company. As mentioned previously, chief operators are occasionally promoted to staff jobs such as supervisor of training or supervisor of operating methods.

Changes in Job Duties.—Some important differences in job content of a manual operator of the 1930's and a modern operator can be summarized as follows:

The manual operator of the 1930's spent a large portion of her time handling simple, routine, local calls. Today nearly all local calls can be dialed directly by the customer, and the modern operator is concerned with them only for emergency purposes or by customer request.

Long-distance calls formerly required the cooperation of two or more operators. Today most intercity calls that require operator assistance can be put through by a single operator in a matter of seconds, mainly because she has more automatic equipment with which to work.

With the continuing expansion of customer direct distance-dialing facilities, few operators today are concerned with routine intercity calls. For the most part they handle person-to-person, credit card, and coin box calls. Many of the calls the manual operator handled were routine in nature, so the operator was instructed to use standard language. Today she is not required to use stock phrases; she may use her own words to meet the demands of a particular call.

It generally is agreed that the mental demands on an operator are greater than in earlier years, while the physical requirements are less rigorous. Today the operator does very little standing, stretching, and reaching. In addition, the manual operator had the monotonous task of repeating numbers to other operators all day. Today's operator usually is able to dial the desired number herself rather than having to request it of another operator.

Hiring and Working Conditions

Hiring Standards.—The personal characteristics and work habits that telephone companies desire in their newly hired operators have

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not changed much over the years. High among them are intelligence, conscientiousness, trustworthiness, and neatness.

Most companies require applicants for operator jobs to pass a general intelligence test. High school graduates are preferred, but non-graduates often are considered when they meet other hiring requirements.

Usually an operator must be at least 18 years of age. Exact age requirements vary, however, with the minimum working age set in each State. For the most part, women over 40 years of age are not accepted for initial training although there is no fixed maximum age limit.

Frequently an applicant must be able to meet the company's medical department standards for hearing, sight, and weight.

In addition to meeting educational, age, and physical requirements, an operator must have a pleasing voice, good diction, and no extreme regional accent.

Telephone companies usually prefer to hire young women just out of high school, with little or no work experience, for training as operators. This group, however, is most apt to marry with subsequent withdrawal from the labor market, or to continue education at college, or to go "job hopping." Therefore high turnover among operators is a problem for telephone companies in many communities. Through school and home investigation, companies attempt, before hiring, to determine whether applicants intend to remain in their jobs for a reasonable period of time.

In many companies high school juniors and seniors are hired as operators on a part-time basis, working a few evenings during the week and on Saturdays. Those who plan no further schooling may become full-time employees upon graduation, whereas those who go on to college may continue to work on a part-time basis during summer and vacation periods. Where the college is a local one, some of these operators work a few evening hours also.

Operators must agree to accept weekend, evening, night, and holiday tours of duty. Some companies also require each operator to ascertain that there is adequate, inexpensive, and convenient transportation for all possible tours of duty.

According to an industry manpower survey by the Bureau of Employment Security⁷ there appears to be no expansion demand for operators. Employment opportunity stems only from the need to replace operators who leave the industry. This, however, creates

⁷ Industry Manpower Surveys, No. 103, Telephone Communication Labor Market Developments, May 1962, Bureau of Employment Security, U.S. Department of Labor.

a considerable number of openings at the entry level, although in some communities there is very little turnover of operators.

Training.—Because of the relatively unique nature of their operations, in recent years telephone companies have carried on rather elaborate and continuous training programs. At one time there was no formal training. Instead, each new girl reporting for work was regarded as an apprentice. She was seated next to an experienced operator, and learned by observation. The chief operator or an experienced operator seated next to the trainee pointed out the various pieces of equipment: the plug, the jack, and the transmitter (mouth-piece), and gave a few instructions. During periods when telephone traffic was light, a trainee was allowed to begin regular work. In time she became a full-fledged operator.

As telephone service increased and equipment and techniques became more complex, these informal training methods became inadequate. As a result, some companies issued a series of operating rules to each operator, with which she was to become familiar, and in some cases she was required to memorize.

The first formal in-plant classes were held in 1902. Classroom work was emphasized along with practice on the switchboard. Groups of six or eight newly hired operators heard lectures, received instruction in voice modulation and diction, and had drills on a practice switchboard. Classroom teaching became standard practice both in large cities and in small towns. But many operators trained under this method found it difficult to go from the classroom to an actual work-situation, so training procedures were changed again.

In recent years the trend has been toward on-the-job training. Today classes generally consist of two trainees and a service assistant. The length of training depends on the complexities of the procedures being taught. Training of a toll operator may take 3 weeks, while for an intercept or information operator it may take only 1 week. In large metropolitan areas where there are a number of central offices, each office may have its own specialized training program.

An operator trainee usually begins her training by taking a position at an actual switchboard on which practice equipment has been superimposed. After she learns to put through a specific type of call, she is given controlled practice. A control operator uses the facilities at another position and originates practice calls according to a study plan. She simulates customers' calls so that the student may develop accuracy and speed. As new situations are mastered, advanced drills are given.

From time to time a student may be allowed to listen in on calls handled by an experienced operator. Toward the end of the initial

training period a trainee may be allowed to put through actual calls, with her instructor readily available to assist.

When a trainee has satisfactorily completed initial training, she usually is able to handle the types of calls which occur most frequently in the office to which she has been assigned. Training in handling less common types of calls follows thereafter.

Working Conditions.—Most telephone offices today are clean, well-lighted, and often air conditioned. Lunchrooms and cafeterias usually are available in the larger central offices. Sometimes lounges equipped with radios, television sets, and telephones are provided for use during rest periods and lunch hours.

Since telephone service is furnished around the clock, some operators are on duty at all times. More operators are scheduled to work during the heavy traffic hours of the day and evening, and fewer during the night hours. The amount of telephone traffic varies from office to office and from day to day. Work schedules are changed frequently to adjust the operating work force to the expected traffic load.

A typical daytime tour of duty may be from 7 a.m. to 4 p.m. Another might be from 7:30 a.m. to 4:30 p.m. A larger number of operators usually are scheduled to be on duty from 8 a.m. to 5 p.m. Some operators may work several hours during the morning and the remainder of their tours in the evening. This type of duty is called a "split trick." Some of the less desirable hours may be grouped into tricks totalling less than 8 hours.

Generally, operators with the longest service (highest seniority) are allowed first choice of work shifts, and new operators are scheduled to work the less desirable "split trick" tours of duties. Some operators prefer night tours because they mesh more conveniently with home and family responsibilities.

Employee Benefits.—Fringe benefits are more or less uniform throughout the nationwide telephone system. For example, there is a plan by which each affiliated company provides retirement benefits—based either on age and length of service or on disability—accident disability benefits, sickness disability benefits, death benefits, and stock purchase plans.

Generally, employees with 6 months or more of service are entitled to vacations with pay. Length of vacation varies with length of service, and ranges from 1 week to 4 weeks. Operators usually have an hour for lunch, and a 15-minute relief period to be taken within every 4 hours worked. There are a number of paid holidays each year, ranging from 6 in some areas to 11 in others. Operators who are scheduled to work on holidays are given equivalent time off.

Group health and hospitalization plans are available on a voluntary basis. In recent years many telephone companies have supplemented this coverage, to provide benefits for extended illness at no cost to employees.

Unions.—It is estimated that nearly two-thirds of telephone company employees are represented by labor unions. The predominant union in the industry is the Communications Workers of America, AFL-CIO, whose members are employed primarily in operating telephone companies and in companies which manufacture communications equipment. The International Brotherhood of Electrical Workers, AFL-CIO, represents the second largest number of telephone workers, although the majority of its members work in two other industries—the electrical machinery, equipment, and supplies industry, and the construction industry. In addition, there are a number of smaller independent telephone unions which represent workers in certain geographic locations or in specific departments within a company.

Women workers, chiefly those employed in the traffic department of telephone companies, comprise about half the membership of the Communications Workers of America. They also comprise a large proportion of telephone workers' membership in the International Brotherhood of Electrical Workers. Male employees in plant departments represent the other large block of union members.

OTHER TRAFFIC PERSONNEL

Two other major divisions in the traffic department are often called administration or administrative, and engineering.

Among the most common designations for *administrative* workers are general traffic manager, general traffic supervisor, division traffic manager, and district traffic manager. Relatively few if any of these high level administrative jobs are held by women. Employees in these positions are concerned primarily with measuring and analyzing traffic loads and traffic patterns, to insure that sufficient personnel are available and to develop new or improved operating techniques or methods.

Dial equipment administration is an area of growing opportunity for women in this division. Formerly handled by men, these jobs now are held predominantly by women. Dial equipment administration workers are responsible for assigning telephone numbers, lines and trunks, and assuring that all dial equipment is carrying approximately the same traffic load.

Traffic *engineers* are concerned both with solution of day-to-day operating problems and with planning future operations. Because

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of their knowledge of techniques required to operate current equipment and equipment scheduled for future installation, they adjust the numbers and types of circuits and the amount of equipment needed to handle the traffic load.

Relatively few women in this country have been trained in any branch of engineering, so few are employed in this technical field. From a practical point of view, there is no evidence that professionally qualified women could not perform these jobs.

3

Other Jobs in the Industry

The organizational structure of most telephone companies includes, in addition to the traffic department, four other functional units—the accounting department, commercial department, engineering department, and plant department. A majority of workers in both the accounting and commercial departments are women. Comparatively few women work in the plant department and even fewer in the engineering department.

A brief description follows of the work carried on in these departments, and of some of the jobs commonly found there. The jobs are typical of those in telephone companies throughout the country whose clerical operations are performed either manually or with traditional office machines.

ACCOUNTING DEPARTMENT

The accounting department maintains a great variety of telephone company records (figure 7), so most of the jobs are concerned with clerical or statistical procedures. Activities often are grouped under two main divisions—revenue accounting and disbursement accounting. The number of jobs and the work performed in this department vary considerably from area to area. Most of the workers in this department are women who hold nonsupervisory jobs. Many of the immediate supervisors are men, and they also hold most of the high level administrative positions.

Revenue Accounting Division.—This division is concerned mainly with preparing and sending out bills to customers. This involves handling regular customer accounts, pay telephone accounts, special accounts (teletypewriter, mobile, ship), service orders, long distance message tickets, and customers' monthly payments.

Service order clerks work with customers' original orders for service, which include information needed to bill customers for their monthly service. Such items as basic charges, extension telephone charges, and directory advertising are included on the service order. When additional service is ordered or service is canceled, a clerk records this information on the customer's record card. From time to time this clerk reviews service orders to insure that accurate rates are being charged, and that other details are correct.

Ticket raters compute the rates on toll and message unit tickets which come from the traffic department. This worker must determine the charge for each item with a high degree of accuracy, by



FIGURE 7.—Telephone companies hire large numbers of employees in the accounting department to maintain the many company records.

using charts which show various types of calls, such as message unit, person-to-person, and day rates, as well as the rate for calls to various cities.

When toll and message unit tickets have not been sorted in the traffic department, *ticket sorters* must separate the tickets by telephone numbers, so that all the charges for each customer can be included on the monthly bill.

Customer billing machine operators enter all the assembled information (service record, toll statement, message unit total, other charges and credits) on customers' bills by punching the keys of a billing machine which resembles a huge cash register.

Other workers check bills and rate computations; sort incoming materials; and run calculators, bill-printing machines, addressing machines, bill-enclosing machines, typewriters, and mimeograph machines.

In some companies, automatic devices have replaced many of the manual operations just described. For example, an electronic data processing system, along with automatic message accounting converters, have been installed on an experimental basis in Conshohocken, Pa. When this system is fully operative, each day the Conshohocken accounting office—which serves 300,000 subscribers in suburban Philadelphia—will be able to prepare 15,000 bills, compute rates for 300,000 account records, post 15,000 payments, review 300,000 collection records, and report other kinds of statistical information. This system and similar ones, although not yet widespread, probably will be installed soon in large city telephone offices. These electronic data processing machines reduce the work of billing clerks since the billing computations are performed automatically.

Disbursement Accounting Division.—This division checks and classifies incoming bills, summarizes and records expenditures made by each department of the telephone company, and keeps payroll and company equipment information (property records). This division also may prepare other statistical and financial reports monthly, quarterly, or annually.

Payroll clerks perform the functions of their counterparts in every branch of industry, commerce, and government: They record and compute data needed to pay telephone company workers; keep a great variety of records of taxes and other payroll deductions for each employee; compute pensions and determine dates for retirement and for service pin notices; compile complex reports on such taxes as those withheld for social security, Federal income, State disability funds, and unemployment compensation.

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Property and cost clerks check the many bills and credits for items bought and returned each month. They also make inventories of equipment, supplies, and materials taken out of service or put in service.

Often general company accounts and final reports are brought together in the disbursement division, and a monthly record made of all financial transactions such as plant construction, wage expense, and vehicle costs.

In some companies the accounting department provides the entire company as well as individual departments with statistical information. In others this work is accomplished by electronic data processing machines.

In general, high school graduates are hired for the wide variety of clerical jobs which characterize this department. In most companies new employees are given on-the-job training to learn how to operate any special machines used.

Supervisory (management) jobs are sometimes filled by college graduates, sometimes by persons who have had some college work, and sometimes by workers with a high school education who have come up through the ranks.

COMMERCIAL DEPARTMENT

The commercial department is responsible for conducting the business relations of the company with the public. Among its major activities are writing contracts for service and equipment, receiving and processing orders for changes in and termination of service, collecting customers' bills, making coin box collections, maintaining customers' record files, and preparing and distributing directories.

In most companies the majority of workers in this department are women. Service representative jobs are filled almost entirely by women. However, men make up a larger portion of the personnel here than in the traffic and accounting departments. Men are usually coin box collectors, salesmen of telephone services and directory advertising, commercial engineers, and managers.

Each *service representative* is responsible for a number of customer accounts. She maintains records of equipment assigned to her customers, the types of service contracted for, recent toll tickets, and collection data. She also handles billing inquiries, orders for new service, changes in service, complaints and adjustments, and customer telephone and letter requests.

In large city offices, public business offices usually are separate from customer record offices. For this reason some service representatives work only in the public business office, assisting customers

who come in person to discuss their problems. In smaller offices, service representatives usually assist customers who come in as well as those who call or write (figure 8).

High school graduates are preferred for most entry jobs in the commercial department. However, some companies prefer to hire as service representatives college graduates or those who have had some



FIGURE 8.—A commercial department service representative assists a customer to select the kind of telephone service she prefers.

college work. An applicant must speak well, have clerical aptitude, and manual dexterity, as well as tact and good judgment.

Companies usually give on-the-job training to their service representatives. Classes last about 6 weeks, and are usually limited to two or three new employees. They are given classroom training, and toward the end of their initial training period they take calls from customers. Additional training is given from time to time as the need arises.

Service representatives may be promoted to business office *supervisor*, and qualified supervisors may advance to *staff assistant*. Employees in these jobs are concerned with personnel, training, methods, and procedures.

Staff assistants who demonstrate unusual qualifications may be promoted to business office *manager* or to *staff supervisor*.

A *supervisor* may be in charge of six to eight service representatives, depending on the size of the office. It is her responsibility to help representatives grow in the job, to evaluate their day-to-day performance, and to help them with unusual problems.

A business office *manager* is responsible for the smooth running of several offices, each of which may consist of several supervisors and their service representatives.

Counter tellers receive payment of phone bills when a customer makes a payment at the office. *Mail tellers* process mail payments. They sort incoming communications, send the stubs to the appropriate service representative, and prepare money for bank deposit.

ENGINEERING DEPARTMENT

The principal job of the engineering department is planning the physical facilities and equipment needed for current and future operation. The duties of engineers in this department include study of depreciation and costs of plant and equipment; evaluation of present service; and coordination of major companywide projects, such as conversion to dial equipment.

Most companies have teams of engineers who constantly are studying the facilities needed to provide adequate service in the future for local and for toll calls. Others determine the proper location for wire centers and the type of equipment needed in central offices. Still others estimate the cost of labor, of building construction, and of new equipment purchases, and they make layout designs for outside telephone plants.

As already stated, few women engineers are employed in the telephone industry. Most women in the engineering department hold

clerical jobs. A growing number, however, are entering subprofessional and technical jobs in this department, such as draftsmen and certain types of technicians.

PLANT DEPARTMENT

The plant department is responsible for the construction and maintenance of much of the physical property of the company such as cable lines, open wire lines, buildings, equipment, radio relay towers, switchboards, central office equipment, and installations in private homes and business establishments. Therefore it can be said that most workers in this department maintain buildings and use, install, and repair equipment. Some of the more common job titles are telephone (station) installer, lineman, splicer, frameman, switchman, PBX installer, repairman, and plant engineer.

Traditionally, few women have been interested in or have applied for jobs in this department. Women who do work here perform clerical duties in a plant service center—the office which has the responsibility for coordinating all the work of the plant department. The center is the focal point to and from which all work orders flow.

4

A Look to the Future

Extensive research and development stimulated the great expansion in telephone industry services and equipment. This activity is continuing, and at present a number of experimental programs are testing the feasibility of new equipment and services for wider use. Other programs still are in the planning stage and on the drawing boards.

No one can predict the extent to which the jobs of workers in the telephone industry will be affected by increased mechanization and the inauguration of new services. Automation will continue to change the nature of some jobs and the number and types of workers in jobs on which it already has made considerable impact. Introduction of complex automatic equipment to processes and activities which now are performed manually or with simplified equipment may cause reduction in employment in some places.

Yet the industry expects continued long-range increase in telecommunications employment—although perhaps at a slower rate than in the past 15 years—as a result of the introduction of new products and new services and continued expansion in some of the older segments of the industry. Thus, the future may open the door to new job opportunities for some workers and close the door for others. A few of the technological advances which can be expected to affect employment follow.

TRAFFIC SERVICE POSITION (TSP)

The Traffic Service Position (figure 9) is a new type of pushbutton console that operators throughout the country will be using soon. Instead of the familiar picture of a line of operators at the switchboard, there will be pairs of modern, streamlined positions arranged like desks in an office.

The TSP is designed to replace the switchboard. It is cordless since all calls are connected in the dial equipment. The TSP is used only when the operator has to assist a customer or must exercise control over the call. With these improved facilities, the operator's basic functions—solving the customer's problems and completing his call—remain the same. With the new equipment, she will be able to spend less time on the details of processing the call and can devote most of her time to special requests such as emergency calls, person-to-person calls, credit card calls, and collect calls.



FIGURE 9.—A telephone operator operates the traffic service position (TSP) console.

WORLDWIDE DIRECT DISTANCE DIALING

Direct distance dialing was introduced more than a decade ago, and in late 1961 it was available to about half of the telephone customers in the United States. During the next few years its application will become widespread throughout the United States and Canada. An attainable goal is worldwide direct distance dialing by customers. Today operator dialing is available between continental United States and the State of Hawaii, as well as Puerto Rico, and Mexico.

Worldwide direct distance dialing on a large scale is not expected in the near future. When it does come into existence, the number of operators handling such calls may be reduced somewhat, but many operators still will be needed to help with special types of overseas calls.

PERSON-TO-PERSON DIRECT DISTANCE DIALING

Soon customers may be able to dial their own person-to-person calls with minimum operator assistance. Successful experimentation has been carried on in two locations with this type of call, and it is planned for the Nation as a whole in the foreseeable future. Under this plan a customer first must dial a 1-digit access code, which signals an operator, who makes contact with the person being called and tells the person calling that the connection is ready. While operator participation will not be eliminated, her period of contact with each call will be reduced.

OCEAN TELEPHONE CABLE

The first transatlantic telephone cable to Europe was installed in 1956. Subsequently, several others were installed to various parts of the world and still others are planned. New ocean cables which can handle three times the current number of calls probably will be installed in the next few years. Ocean cables are not subject to the fading and atmospheric disturbances of point-to-point radio which was utilized earlier.

WIDE-AREA TELEPHONE SERVICE

A new telephone service already being offered is Wide-Area Telephone Service, which is for customers who make many long distance calls to scattered points. For a fixed charge per month, the customer obtains a special access line connected to the nationwide dialing network; over this line he can make as many calls as he chooses within a selected wide area. The widest area covers the entire country except Alaska and Hawaii. There is no charge for individual calls. The customer may choose full-time service for 24 hours a day. For a lower monthly rate he may buy 15 hours of conversation a month, with additional use charged by the hour.

COMMUNICATIONS SATELLITES

Scientists have shown, with the launching of the Telstar experimental communications satellite, that manmade satellites can be used to relay communications between widely separated points on earth. These satellites are able to provide high-quality, large-capacity, microwave channels across the ocean, enabling them to transmit telephone conversations, data, and television programs.

In the years to come, communication by satellite will become necessary in order to expedite the rapidly increasing overseas communications. About 20 percent growth is expected each year. Satellites will be used to supplement radio-telephone communications and underseas cables. In the final system, three specially designed satellites would be able to carry much of the international communication traffic of the world.

ELECTRONIC CENTRAL OFFICE (ECO)

The world's first electronic central office (ECO), a likely forerunner of all future switching systems, has been tested successfully in Morris, Ill. As a result, it will be introduced elsewhere to meet the growing needs of the industry.

Some of the advanced services provided by ECO are:

1. Use of home extension telephones as an intercommunication system (intercoms) by dialing a 2-digit code.
2. Ability to reach frequently called numbers by dialing 2-digit codes.
3. Automatic transfer of call to another line when the original line is busy, by first dialing a particular code.
4. Connection of a third telephone with an existing telephone conversation.
5. Automatic connection of a call to a busy line when it becomes free.

ECO will enable telephone companies to give better service, reduce maintenance time and expense, reduce space required for equipment, and simplify some of the engineering problems. In places where it is determined feasible to install an ECO, central office personnel will be reduced. However, in many areas installation of ECO would not be practical for some time because existing equipment is still in good condition.

"PACKAGED" CENTRAL OFFICE COMPONENTS

Two basic sizes of "packaged" central office installations have been developed. Each "package" provides all the machinery, apparatus, and equipment needed to build an office. These packages can be used to establish offices where none has existed before or as replacements for obsolescent switching equipment. They provide for direct distance dialing and for expansion of lines in the future.

These offices can be ordered on a single requisition form. This cuts paperwork and reduces equipment engineering and drafting effort, because it eliminates the need for the custom designing and custom building of each office, and simplifies manufacturing and installation procedures.

ELECTRONIC DATA PROCESSING

In recent years a number of companies have installed computer equipment to handle certain accounting operations, such as billing and payroll. The notable example of this type of operation is the Electronic Data Processing Center in Conshohocken, Pa.

For several years, the nationwide telephone system has been using electronic data processing for several processes, in addition to the experimental customer billing and payment system in Conshohocken.

The computer equipment serves also:

1. To maintain shareowners' accounts and to mail dividend payments (about 2 million quarterly);
2. To calculate construction requirements and summarize maintenance performance; and
3. To prepare financial reports.

The major system also is planning to use computers to handle routine service orders, which will affect the work of the business representative. In addition, the computers will be able to prepare telephone directories which will affect clerical workers in this field.

Wider installation of this type of equipment will eliminate many of the jobs which call for repetitive computing, sorting, and summarizing, now done manually or by simple machines. As these computers take over the complete billing operation, the jobs of almost all service order clerks, senior accounting clerks, and record clerks will be eliminated. Thus, a fully converted computer office will be staffed with data processing clerks who operate the computer, the satellite equipment, the inquiry desk associated with the computer, and the tape library. Therefore, in offices where there is extensive use of computers, most payroll, statistical, and line assignment clerks will not be needed.

CONVERSATIONS BETWEEN MACHINES

A new telephone service enables business machines to be interconnected by dialing a regular telephone call. With this service, two businesses can send recorded information (data) to each other through placing the appropriate local or long distance call. In the foreseeable future, machine-to-machine "conversations" over regular telephone lines may equal or exceed the number of voice communications. This is an added service to business customers and has little effect on the employment of operators.

By 1965 an estimated 100,000 of these sets of communicating machines are expected to be in use. Customers of this service may be engaged in such activities as accounting, administration, credit and

collections, finance, insurance premiums, payrolls, marketing, and shipping.

Unattended operation of the set is possible. A customer may make a call to an unattended distant set which automatically answers and connects the business machine. After the call has been made, the machines are able to complete the transmission of data unattended and "hang up" when the call has been completed. In the near future it will be possible to originate and complete calls entirely automatically.

WIDE-AREA DATA SERVICE

This new service is similar to the wide-area telephone service, except that it is used by persons who send a large number of teletypewriter and data communications rather than make many long-distance calls. A customer is given an access line, over which he is able to send messages to any of several designated areas in the United States, except Alaska and Hawaii. Full-time service (24 hours a day) or part-time service (10 hours per month with an extra charge for each additional hour) is available to customers.

5

Summary

The telephone industry is growing in volume of business and in kinds of services rendered. In 1961 it employed more than 600,000 persons. Although it has been and continues to be a large employer of women, the *proportion* of women to total employment has dropped significantly over the survey period (1945-60).

A number of important shifts have occurred in the composition of the work force during the past 15 years, as indicated by Federal Communications Commission statistics (tables 1 through A-3). These changes appear to have taken place primarily because more efficient equipment was used.

Automatic equipment and other technical improvements have been introduced to improve the quality and usefulness of telephone service, to satisfy the expanded demand for service, and to keep the cost of service relatively low. The introduction of dial equipment for local calls probably has been the most significant technological factor affecting the jobs of operators.

There were few if any large layoffs due to the conversion. Generally operators were offered transfers or reassignments to positions left vacant by normal turnover. Even though the number of operator jobs has not changed markedly in recent years, job duties have varied somewhat, and there has been some shift in emphasis. The job of the operator shows a decrease in routine and an increase in public relations aspects.

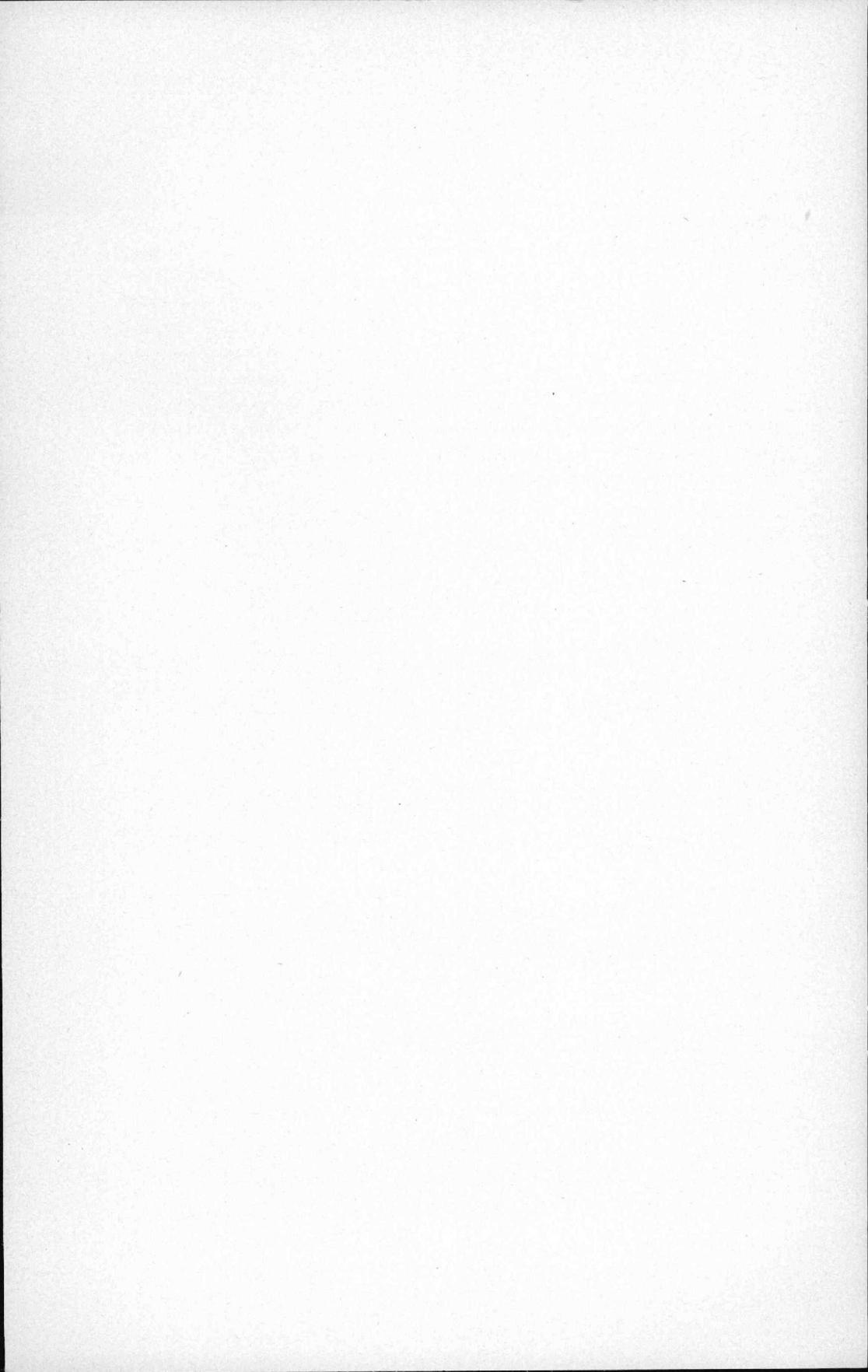
Representatives of the industry expect that further technological advances probably will have considerably less impact on operators in the future than they have had in the past. Operators will continue to handle calls that need special attention, such as emergency calls, information calls, and certain person-to-person calls. Since they still form a large group of workers among whom there is considerable turnover, the industry will continue to offer many job opportunities to young women interested in becoming operators.

Introduction of additional and different types of automatic equipment may produce another realignment in telephone job structure and opportunities. Innovations in equipment now being introduced or on the drawing boards may make it possible for women to perform some jobs in the industry formerly held almost entirely by men. However, no large-scale shift is expected in traditional hiring and promotional patterns in the jobs in which men now predominate. A substantial

expansion is expected in business and sales offices, especially in public relations activities which are filled mainly by women.

Automatic data processing systems are beginning to perform customer billing, payroll, and internal line assignment functions. Some workers still will be needed in these areas, but an increasing proportion may be skilled technicians rather than clerks. In addition, it is possible that clerical departments may turn to shift operation, for costly automatic data processing installations usually are operated around the clock. This also may adversely affect the employment of women.

The immediate outlook for clerical occupations in the telephone industry is good. However, over the long run the outlook is uncertain and depends on the rapidity with which billing operations are converted to data processing, and on the opportunities extended to women to be hired and trained for new jobs created as a result of automation.



Appendix

EMPLOYMENT, HOURS, AND EARNINGS IN 1961

Employees in class A telephone carriers totaled more than 605,000 at the end of 1961 (table A-1). Over half the workers were women, most of whom were operators.

The largest groups of employees were telephone operators and construction, installation, and maintenance workers, each representing over one-fourth of total workers in the industry. Clerical workers accounted for approximately one-fifth of the total personnel.

Table A-1.—EMPLOYMENT IN CLASS A TELEPHONE CARRIERS, BY MAJOR OCCUPATIONAL GROUP, 1961¹

Major occupational group	Total employees		Women	
	Number	Percent distribution	Number	Percent distribution
Total employees.....	605, 165	100	340, 771	100
Officials and managerial assistants....	6, 057	1	168	(²)
Professional and semiprofessional employees.....	48, 765	8	7, 319	2
Business office and sales employees....	46, 649	8	31, 264	9
Clerical employees.....	131, 608	22	120, 289	36
Telephone operators.....	174, 014	29	173, 986	51
Construction, installation, and maintenance employees.....	172, 396	28	375	(²)
Building, supplies, and motor vehicle employees.....	24, 893	4	7, 335	2
Other employees.....	783	(²)	35	(²)

¹ See tables 1 and 2 and charts A and B for earlier data.

² Less than 1 percent.

Source: Data are based on annual reports (form M) of class A telephone carriers to the Federal Communications Commission and compiled by the Bureau of Labor Statistics, U.S. Department of Labor.

Average weekly earnings were highest for professional and semi-professional employees, and construction, installation, and maintenance workers.

Women Telephone Workers

nance workers—groups in which men predominate (table A-2). The lowest earnings were found in occupational groups in which women predominate—operators and clerical workers.

Scheduled weekly hours were lowest for operators, which probably reflects the prevalence of part-time work.

Table A-2.—AVERAGE WEEKLY EARNINGS AND AVERAGE NUMBER OF SCHEDULED WEEKLY HOURS FOR WORKERS OF CLASS A TELEPHONE CARRIERS, BY MAJOR OCCUPATIONAL GROUP, 1961 ¹

<i>Occupational group</i>	<i>Average weekly earnings</i>	<i>Average weekly hours</i>
Professional and semiprofessional employees.....	\$186.35	37.8
Business office and sales employees.....	104.98	37.9
Clerical employees.....	82.62	37.9
Telephone operators.....	72.89	37.0
Construction, installation, and maintenance employees..	124.49	39.9
Building, supplies, and motor vehicle employees.....	84.67	37.8

¹ See tables 4 and 5 for earlier data.

Source: Data are based on annual reports (form M) of class A telephone carriers to the Federal Communications Commission and compiled by the Bureau of Labor Statistics, U.S. Department of Labor.

The 1961 figures, though not exactly comparable with earlier figures, indicate that the proportion of chief operators, service assistants and instructors, and other switchboard employees has remained relatively constant in recent years (table A-3).

Table A-3.—TELEPHONE OPERATORS OF CLASS A CARRIERS, BY CLASSIFICATION 1961 ¹

	<i>Number</i>	<i>Percent distribution</i>
Telephone operators.....	174,014	100
Chief operators.....	10,912	6
Service assistants and instructors.....	11,649	7
Experienced switchboard operators.....	129,609	75
Operators in training.....	19,846	11
Others.....	1,998	1

¹ See table 3 for earlier data.

Source: Data are based on annual reports (form M) of class A telephone carriers to the Federal Communications Commission and compiled by the Bureau of Labor Statistics, U.S. Department of Labor.

