

**THIRD ANNUAL REPORT**  
**OF THE**  
**Federal Communications**  
**Commission**

**FOR THE**  
**FISCAL YEAR ENDED JUNE 30**

**1937**

*Cop. 3*



**UNITED STATES**  
**GOVERNMENT PRINTING OFFICE**  
**WASHINGTON: 1937**

# FEDERAL COMMUNICATIONS COMMISSION

## *Federal Communications Commissioners—1934-37*

Name	State from which appointed	Period of service
Anning S. Prall.....	New York.....	Jan. 17, 1935-
George Henry Payne.....	New York.....	July 11, 1934-
Eugene O. Sykes.....	Mississippi.....	July 11, 1934-
Thad H. Brown.....	Ohio.....	July 11, 1934-
Paul A. Walker.....	Oklahoma.....	July 11, 1934-
Norman S. Case.....	Rhode Island.....	July 11, 1934-
Irvin Stewart.....	Texas.....	July 11, 1934-June 30, 1937.
Hampson Gary.....	Texas.....	July 11, 1934-Jan. 1, 1935.

### PRINCIPAL OFFICE

Washington, D. C.

### FIELD OFFICES

Atlanta, Ga.  
 Baltimore, Md.  
 Boston, Mass.  
 Buffalo, N. Y.  
 Chicago, Ill.  
 Dallas, Tex.  
 Denver, Colo.

Detroit, Mich.  
 Galveston, Tex.  
 Honolulu, Hawaii  
 Kansas City, Mo.  
 Los Angeles, Calif.  
 Miami, Fla.  
 New Orleans, La.

New York, N. Y.  
 Norfolk, Va.  
 Philadelphia, Pa.  
 Portland, Oreg.  
 St. Paul, Minn.  
 San Francisco, Calif.  
 Seattle, Wash.

### CENTRAL MONITORING STATION

Grand Island, Nebr.

### OTHER MONITORING STATIONS

Baltimore, Md.  
 Great Lakes, Ill.

Portland, Oreg.  
 Hingham, Mass.

San Pedro, Calif.  
 Marietta, Ga.

## LETTER OF TRANSMITTAL

WASHINGTON, D. C., *January 4, 1938.*

*To the Congress of the United States:*

There is transmitted herewith the third annual report of the Federal Communications Commission, covering the fiscal year ended June 30, 1937.

This report is presented in four parts. The matters covered by each part are summarized in the following paragraphs:

Part I deals with matters which cannot be properly allocated to any one of the three major industries that are under the jurisdiction of the Commission. Specifically, part I covers the historical background of regulation; existing legislation and treaties; organization and procedure of the Commission; international conferences; experiment, research, and technical investigation by the Commission; summary of litigation; summary of hearings; field inspections and investigations; Great Lakes and Inland Waterways Radio Survey; the Commission's participation in the Interdepartment Radio Advisory Committee; fiscal affairs; and publications.

Part II deals with the activities of the Commission which have particularly concerned the broadcast industry and which were carried on primarily by the Broadcast Division of the Commission. Specifically, part II covers the organization and jurisdiction of the Broadcast Division, the facilities under the jurisdiction of the Broadcast Division, broadcast complaints and investigations, technical developments in the broadcast art, and the Federal Radio Education Committee.

Part III deals with the activities of the Commission which have particularly concerned the telegraph industry and which were carried on primarily by the Telegraph Division of the Commission. Specifically, part III covers the organization and jurisdiction of the Telegraph Division, telegraph rates and tariffs, supervision of telegraph accounts, wire facilities under the jurisdiction of the Telegraph Division, radio facilities under the jurisdiction of the Telegraph Division, telegraph complaints and investigations, financial and other statistical data, and technical developments in the telegraph art.

Part IV deals with the activities of the Commission which have particularly concerned the telephone industry and which were carried on primarily by the Telephone Division of the Commission. Specifically, part IV covers the organization and jurisdiction of the Telephone Division, telephone rates and tariffs, supervision of telephone accounts, wire facilities under the jurisdiction of the Telephone Division, radio facilities under the jurisdiction of the Telephone Division, telephone complaints and investigations, financial and other statistical data, and technical developments in the telephone art.

Since this report covers only events occurring prior to June 30, 1937, changes in the membership of the Commission subsequent to June 30, 1937, have not been noted. Two such changes have occurred during the time that has expired since the close of the fiscal year. The undersigned has been appointed chairman to fill the vacancy occasioned by the death of Hon. Anning S. Prall. Hon. T. A. M. Craven has been appointed to fill the vacancy occasioned by the expiration of the term of Hon. Irvin Stewart.

By order of the Commission:

FRANK R. McNINCH, *Chairman.*

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**PART I**  
**THE COMMISSION**

# MEMBERS OF THE COMMISSION

AS OF JUNE 30, 1937

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ANNING S. PRALL, *Chairman.*

IRVIN STEWART, *Vice Chairman.*

GEORGE HENRY PAYNE.

EUGENE O. SYKES.

THAD H. BROWN.

PAUL A. WALKER.

NORMAN S. CASE.

## HISTORICAL BACKGROUND OF REGULATION

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As an introduction to this report it has seemed desirable to summarize briefly the historical background of Federal regulation of wire and radio communication.

*Wire communication.*—Prior to the enactment by Congress of the Communications Act of 1934, approved June 19, 1934, the regulation of wire-telegraph companies was under the jurisdiction of (1) the Post Office Department, (2) the Department of State, and (3) the Interstate Commerce Commission; and the regulation of wire-telephone companies was under the jurisdiction of the Interstate Commerce Commission.

The Postmaster General was authorized under the Post Roads Act of 1866 (14 Stat. 221) to fix rates on July 1 of each year for Government telegrams for the ensuing fiscal year. This authority was exercised continuously from July 1, 1871, to July 1, 1934. In general, the rates for Government telegrams in effect when the Federal Communications Commission was organized were 40 percent of the rates for commercial telegrams of the same length between the same points.

General regulatory powers over wire-communication carriers were vested in the Interstate Commerce Commission by the act of June 18, 1910 (36 Stat. 539). That Commission established uniform systems of accounts for telegraph and telephone carriers, made valuation studies of the properties of certain domestic wire-telegraph carriers, and required them to report extensions and improvements to the plants in order to keep the valuation studies up to date. Telegraph and telephone carriers were required to file with the Interstate Commerce Commission (1) monthly reports of operating revenues and expenses and (2) annual reports showing financial and operating statistics.

For the period from August 1, 1918, to July 31, 1919, the Federal Government took over the control of telephone and telegraph companies as a war measure.

The Department of State was authorized by Executive Order No. 3513, July 9, 1921, to receive all applications to land or operate submarine cables in the United States and to advise the President with respect to the granting or revocation of such licenses. This order was issued pursuant to an act (Public Law No. 8, 67th Cong.) which required that a license for each cable to be landed or operated in the United States be first obtained from the President. Prior to the passage of this act relating to the landing and operation of submarine cables, the Presidents since 1869 had exercised such control under their broad Executive powers. On June 30, 1934, the President issued Executive Order No. 6779, amending Executive Order No.

3513 and authorizing and directing the Federal Communications Commission to receive all applications for licenses to land or operate submarine cables in the United States, and, after obtaining approval of the Secretary of State and such assistance from any executive department or establishment of the Government as it may require, to advise the President with respect to the granting or revocation of such licenses.

*Radio communication.*—Under the act of June 18, 1910, certain regulatory powers over radiotelegraph carriers were vested in the Interstate Commerce Commission. Aside from this act the first Federal statute relating to radiotelegraph was the Wireless Ship Act of June 24, 1910 (36 Stat. 629), as amended July 23, 1912. This act required radio apparatus on certain steamers. Regulation was delegated to the Secretary of Commerce and Labor. The first treaty on radio was ratified by the United States April 3, 1912. The first law regulating the use of radio except for the control of the Interstate Commerce Commission over carriers and other than to protect life and property at sea, was enacted August 13, 1912 (37 Stat. 302). This act provided for the granting of station and operator licenses by the Secretary of Commerce and Labor. During the World War the President was authorized to take possession of any radio system for purposes of national defense (Public Res. No. 38, 65th Cong.). Pursuant thereto he issued an Executive order, reading in part as follows:

\* \* \* that such radio stations within the jurisdiction of the United States as are required by the Naval Communications shall be taken over by the Government of the United States and actually controlled by it to the exclusion of any other control or use and furthermore, that all radio stations not necessary to the Government of the United States for naval communications may be closed for radiocommunication and all radio apparatus may be removed therefrom.

By Public Resolution No. 48, Sixty-sixth Congress, approved June 5, 1920 (41 Stat. 1061), the Secretary of the Navy was authorized, at reasonable rates subject to review by the Interstate Commerce Commission, to use Government-owned radio stations for the transmission of press messages and private commercial messages between ships and between ships and shore. Public Resolution No. 47, Sixty-ninth Congress, approved December 8, 1926 (44 Stat. 917), limited the time for which radio licenses were granted to 90 days for broadcast stations and 2 years for other stations, and required the execution of a waiver of a claim to any wave lengths. As a result of an opinion rendered by the Attorney General on July 8, 1926, to the effect that under the act of 1912 the Secretary of Commerce had no power to determine or restrict the frequency, power, or hours of operation, or to withhold a radio license, regulatory control of radio communication by the Secretary of Commerce became ineffective.

The Radio Act of 1927 (44 Stat. 1162) established the Federal Radio Commission and gave that organization broad powers with respect to the issuance and refusal of licenses, the establishment of radio facilities, and the regulation thereof. No authority was given the Radio Commission over rates or over the fiscal affairs of radio operating agencies.

## PRINCIPAL LEGISLATION AND TREATIES PURSUANT TO WHICH THE COMMISSION ACTS

*Legislation.*—The Federal Communications Commission derives certain duties, powers, and functions from the following acts of Congress:

(1) The Interstate Commerce Act of August 7, 1888 (25 Stat. 382), insofar as it relates to the operation of telegraph lines by railroad and telegraph companies that have been granted Government aid in the construction of their lines.

(2) The Ship Act, June 24, 1910 (36 Stat. 629), as amended, insofar as it relates to vessels navigating the Great Lakes.

(3) All the duties, powers, and functions vested by law in the Postmaster General prior to the Communications Act of 1934, insofar as such duties, powers, and functions relate to telegraph companies and telegraph lines.

(4) The act to supplement existing laws against unlawful restraints and monopolies, and for other purposes (38 Stat. 730), approved October 15, 1914, as amended, insofar as such law is applicable to common carriers engaged in wire or radio communication for transmission of energy.

(5) The Communications Act of 1934 (48 Stat. 1064), as amended,<sup>1</sup> hereinafter referred to as "the act."

*Treaties.*—In addition to the above-mentioned acts of Congress, the Commission derives certain duties, powers, and functions from the following treaties between the United States and foreign countries:

(1) The International Telecommunication Convention and the General Radio Regulations Annexed Thereto, Madrid, 1932, ratified by the Senate May 1, 1934, approved by the President May 19, 1934, and proclaimed by the President June 27, 1934.

(2) The International Convention for the Safety of Life at Sea, London, 1929 (hereinafter referred to as the "Safety Convention"), ratified by the Senate June 19, 1936, approved by the President July 7, 1936, deposited with the British Government August 7, 1936, and proclaimed by the President September 30, 1936.

*New legislation in the fiscal year 1937.*—During the past fiscal year two acts of Congress were passed amending the Communications Act of 1934. The first was the act approved March 29, 1937 (Public Law No. 26, 75th Cong.), and the second was the act approved May 20, 1937 (Public Law No. 97, 75th Cong.). The nature and effect of these amendments are summarized on page 54 of this report.

## ORGANIZATION AND PROCEDURE

*The Divisions of the Commission.*—Pursuant to the authority granted by section 5 of the act, the Commission, on July 17, 1934, adopted General Order No. 1, which provided for the organization of the members of the Commission in three divisions, namely, Broadcast, Telegraph, and Telephone. The jurisdictional provisions of the aforesaid order are as follows:

The Broadcast Division shall have and exercise jurisdiction over all matters relating to or connected with broadcasting.

The Telegraph Division shall have and exercise jurisdiction over all matters relating to or connected with record-communication by wire, radio, or cable, and all forms and classes of fixed and mobile radiotelegraph services and amateur services.

The Telephone Division shall have and exercise jurisdiction over all matters relating to or connected with telephone communication (other than broadcasting) by wire, radio, or cable, including all forms of fixed and mobile radiotelephone service except as otherwise herein specifically provided for.

<sup>1</sup>Amendments: 49 Stat. 43, 795, 1098, 1475, and 1922; Public Laws Nos. 26 and 97, 75th Cong.

The whole Commission shall have and exercise jurisdiction over all matters not herein otherwise specifically allocated to a division; over all matters which fall within the jurisdiction of two or more of the divisions established by this order; and over the assignment of bands of frequencies to the various radio services. In any case where a conflict arises as to the jurisdiction of any division or where jurisdiction of any matter or service is not allocated to a division, the Commission shall determine whether the whole Commission or a division thereof shall have and exercise jurisdiction, and if a division, the one which shall have and exercise such jurisdiction.

As of June 30, 1937, the members of the respective Divisions were as follows:

Division No. 1—Broadcast:

Commissioners—Eugene O. Sykes, *Chairman*.  
 Norman S. Case, *Vice-Chairman*.  
 Anning S. Prall.\*

Division No. 2—Telegraph:

Commissioners—Irvin Stewart, *Chairman*.  
 George Henry Payne, *Vice-Chairman*.  
 Anning S. Prall.\*

Division No. 3—Telephone:

Commissioners—Paul A. Walker, *Chairman*.  
 Thad H. Brown, *Vice-Chairman*.  
 Anning S. Prall.\*

*Departments of the Commission.*—In addition to the above-described division of the members of the Commission, the Commission staff has been organized in the following departments for administrative purposes: The Accounting, Statistical, and Tariff Department; the Engineering Department; the Examining Department; the Law Department; and the Secretary's Office.

*Subjects covered in part I.*—For the purpose of this report the various matters presented in part I have been divided into the following sections: International Conferences; Experiment, Research, and Technical Investigations; Litigation; Hearings; Field Inspections and Investigations; Great Lakes and Inland Waterways Survey; Interdepartment Radio Advisory Committee; Fiscal Affairs; and Publications.

\* Chairman of the Commission.

## INTERNATIONAL CONFERENCES

The Commission has assisted this Government in carrying on its international relations with respect to radio, wire, and cable services by supplying experts to the United States delegations attending the various international conferences, and by constant study of the many problems arising in those relations. Further, the Commission, in the last fiscal year, adjusted 368 radio-station complaints involving international aspects and reported to various foreign administrations 848 frequency measurements, involving 170 deviations, of foreign radio stations.

A number of important conferences were held during the year and in addition preparatory work was done looking to participation in others to take place during the next 12 months.

### FIFTH MEETING OF THE INTERNATIONAL CONSULTING COMMITTEE ON TELEGRAPH (C. C. I. T.)

*Warsaw conference.*—The International Consulting Committee on Telegraph is a technical committee set up under the telegraph regulations annexed to the International Telecommunication Convention, Madrid, 1932. It meets for the purpose of considering progress and development in telegraphy and of discussing questions relating to international telegraph regulations. This Government had not participated in such meetings in the past. However, as a part of its study of the classification of international telegraph messages, rate coefficients, and related subjects and as a part of its preparation for the forthcoming Cairo International Conference, the United States sent a delegation including two representatives of the Commission to attend the meeting of the C. C. I. T. at Warsaw, Poland, October 19–26, 1936, as observers.

In preparation for this meeting international rate and traffic data were prepared. Among other things, a study was made of all international telegraph traffic between the continental United States and foreign countries during a selected 7-day period in the month of March 1936. Data relative to volume, classification, length, and routing of messages, grouped according to countries and carriers, were summarized and made available to the delegation and to other interested parties. The Commission subsequently furnished this summary on request to other governmental agencies, to libraries and other institutions, and to interested individuals.

It is felt that participation by the United States in the Warsaw conference was useful and was in the interest of the Government and the public. The conference adopted no positive recommendations for the Cairo conference, but published a table<sup>3</sup> containing a statement of position of various governments which will be considered and finally voted upon at the Cairo conference.

<sup>3</sup> See appendix B.

## THE HABANA PRELIMINARY RADIO CONFERENCE

A preliminary regional radio conference was held in Habana, Cuba, from March 15 to March 29, 1937, and was attended by technical delegates from Canada, Cuba, Mexico, and the United States. This conference was called for the purpose of discussing pending radio problems directly affecting the four countries named and also for the purpose of establishing the foundation for a general conference of the countries of the Western Hemisphere to be held in Habana, Cuba, beginning November 1, 1937.

The agenda for the conference will be found in appendix C.

The conference adopted resolutions concerning broadcasting, services other than broadcasting, and engineering standards, and made arrangements concerning the holding of the Inter-American Conference in Habana beginning November 1, 1937.

In addition, the conference gave very careful consideration to a proposal made by the Cuban Government looking toward the establishment of a Regional Radio Consulting Committee for the Americas, whose principal functions would be supervisory. Such a committee would also act as the distribution-center for the exchange of information concerning statistical data relative to the technical characteristics of stations that have been authorized by the American nations under the terms of the November agreement. This idea was unanimously supported because it was felt that through such an organization an effective means could be secured for gradually raising the standards of engineering employed in practice by the various nations that would become parties to the forthcoming November agreement. It is also essential that information with respect to the location and technical characteristics of stations authorized by each nation become known quickly.

**FOURTH MEETING OF THE INTERNATIONAL CONSULTING COMMITTEE ON RADIO  
(C. C. I. R.)**

*Nature and purpose of committee.*—The International Consulting Committee on Radio is a technical committee originally set up under the provisions of the Radiotelegraph Convention of Washington, 1927, and subsequently carried into the provisions of the International Telecommunication Convention of Madrid, 1932, and the General Radio Regulations annexed thereto, for the purpose of keeping in touch with the rapidly developing radio art during the periods between administrative conferences. The Committee meets at periodic intervals and draws up sets of recommendations in the form of opinions, which represent at the time of their adoption an appraisal of the then existing conditions in radio.

*Bucharest conference.*—The fourth meeting of the International Consulting Committee on Radio (C. C. I. R.) was held in Bucharest, Rumania, from May 21 to June 8, 1937. Two representatives of the Commission were among the six delegates representing the Government of the United States. In preparation for the conference a number of meetings were held, in which tentative opinions representing the views of the United States for presentation at the conference were formulated. Twenty technical questions were on the agenda of the conference, which was attended by the representatives of 29 governments and a number of international organizations and private operating companies.

The technical opinions adopted by the C. C. I. R. will serve as a valuable foundation for the administrative work which must be done in the revision of the International Radio Regulations at the Cairo Conference of 1938, and they are also of value as reflecting technical progress in the radio art.

#### CAIRO INTERNATIONAL TELEGRAPH AND TELEPHONE CONFERENCE

The United States is a party to the International Telecommunication Convention of Madrid, 1932, although not a party to the Annexed International Telegraph Regulations. As these regulations have an effect on the nature of and the rates for international telegraph service, the Commission determined to give serious consideration to the question whether means might be found for participation in the telegraph conference under conditions meeting the situation in the United States.

As a part of the preparatory work, observers were sent to the Warsaw C. C. I. T. Conference, discussed above, and rate and traffic studies were undertaken. Following the submission of a proposal in principle which has been included in the book of proposals for the Telegraph Conference, the study of the detailed provisions of the International Telegraph Regulations was undertaken with a view to determining what the attitude of the United States Government should be with regard to them. Following public announcements, meetings were held in which carriers, representatives of user groups, and other interested parties participated, so that all possible points of view might be reflected in these studies.

## EXPERIMENT, RESEARCH, AND TECHNICAL INVESTIGATIONS

Information on technical advances and developments in the communications art is essential to the proper exercise of the Commission's regulatory powers. With reference to engineering information, the Commission has organized, in the Engineering Department, a technical information section, whose work is primarily to keep the Commission informed as to developments due to technical research. The great mass of technical data necessary to the proper functioning of the Commission demands a classification system that will make them easily available and accessible. After considerable study of classification systems in use, both in this country and abroad, and after visiting various institutions maintaining such systems, the Commission has developed a scheme of classification of technical information in the fields of telegraphy, telephony, and radio which it is believed will meet adequately the needs of the Commission. The system that has been adopted is a modification and extension of the Dewey Decimal System.

*Research in the use of frequencies.*—Information as to the use being made of frequencies for transmission and reception by the various radio services, and as to their suitability for service in the case of new assignments, must be kept constantly available. Special problems in this regard have required considerable study and time. Such is always the case when the higher frequencies, capable of causing international or regional interference, are involved. Then careful consideration must be given to the skip distances of the frequencies, to the virtual heights of the various layers of the ionosphere under seasonal, diurnal, and sun-spot-cycle variations, and to the commitments of international treaties, regional agreements, and interdepartmental regulations. A discussion of the research in the characteristics of the ionosphere will be found in the Telegraph Division report on page 81.

A major project along this line has been the correlation of the data on the present occupancy of the high-frequency channels obtained from observations made by several organizations in cooperation with the Commission's monitoring station at Grand Island, Nebr. The project is to be completed in the near future for the use of the United States delegation to the Cairo Conference in 1938.

*Routine problems involving technical research.*—Routine problems involving technical considerations are in general of two classes: (1) Those which, through new scientific or technical developments, bear directly on the Commission's duties under the law, and therefore necessitate special studies and investigations, and (2) those which are indirectly related to such duties of the Commission. During the course of the year, the most important routine problems of the former class, in connection with which special studies have been made, have related to such matters as the potential possibilities of interference caused by diathermy apparatus, the advantages and disadvantages

of frequency- versus amplitude-modulation in ultra-high-frequency circuits, the measurement and suppression of man-made or electrical noise, carrier-current systems, picture and facsimile systems, coaxial-cable developments, the speed of average telephone conversations, the engineering requirements of the certificates of public convenience and necessity, and the historical development of the radio spectrum.

The subject matters of the latter class of problem mentioned above have been well diversified, such as, for example, geophysics, radio-activity, radioprospecting, methods of locating outlaw radio stations, improvements in electrical communication, developments in the telegraph and cable arts, methods of noise-reduction in various types of receiver, direction finding, hazards from storage batteries on board ship, the location of electrical interference, the ionosphere, and various phases of television.

*Commission participation in technical conferences and meetings.*—In order to keep informed on new developments and improvements in the art, arrangements have been made whenever possible for the attendance of one or more of the members of the Commission's technical staff at all important meetings or conferences at which technical matters relating to communications were under discussion.

Active work on various technical committees has also assisted materially in this direction. Through one or more of its staff members, the Commission is represented on the following technical committees:

1. Sectional Committee on Radio Electrical Coordination, American Standards Association.
2. Standards Committee, Institute of Radio Engineers.
3. Technical Committee on Transmitters and Antennas, Institute of Radio Engineers.
4. Technical Committee on Wave Propagation, Institute of Radio Engineers.
5. Subcommittee No. 5, Main Committee on Aeronautics, Studying the Ultra-High Frequencies.
6. Technical Committees, American Group, Preparing for the Fourth Meeting of the C. C. I. R., Bucharest.
7. Committee No. 1, American Group, Preparing for the Cairo Conference.
8. Technical Committees of the U. R. S. I.
9. Committee on Electrical Insulation, National Research Council.

*Information obtained from the communications industry.*—Whenever feasible and deemed necessary, the experts of the Commission have also visited the laboratories or consulted the engineers of commercial manufacturing and communication companies known to be engaged in important research work. Much of the information obtained in this way is of a confidential nature, is voluntarily offered, and is intended for the use of the Commission only. On account of the competitive conditions existing in American enterprise and business, every precaution is taken to insure that such information is not disclosed to the general public or to competing companies. Without advance knowledge of the trend of technical developments, however, the Commission would be severely handicapped in the full exercise of its regulatory powers in the public interest.

*Information obtained from the Broadcast Allocation survey.*—A great amount of technical study was carried on in connection with the Broadcast Allocation survey, which is more fully discussed under "Broadcast Allocation hearing" in part II of this report, page 40. Much of the material resulting from the study of these data is now

being incorporated in the engineering standards of the Commission, and was used as a basis for technical discussion at the regional conference held in Habana, Cuba, March 15-29, 1937.

The information to be obtained from the data of the allocation survey was not exhausted by the material presented at the Broadcast Allocation hearing (see p. 41), but it will require at least another year, in addition to the time already spent during the past year, to extract from the very large mass of available material all that can be of use to the Commission. The results so far published relate mainly to average conditions and must be used with considerable factors of safety when applied to any particular case. The data of the survey, however, when properly weighted, seem to be sufficient to fix with considerable accuracy the previously undetermined constants in the formulas expressing the radiation from antenna systems and the propagation over the earth, provided an adequately comprehensive theory on which such formulas are based can be developed. When this has been accomplished, a much more substantial engineering foundation for the solution of allocation problems and much more reliable engineering standards will have been attained.

To this end much effort has been devoted during the past year. As a result of this work and the comprehensive studies in this field made by others, it may be stated that the theory of ground-wave propagation from antenna systems on the ground or elevated above the ground appears to be now on a firm basis. Some of the results obtained have already been described in the technical press, and the rest—including an adequate formula for calculating the sky-wave propagation—will appear during the coming year.

In addition to this work, which grew out of the necessity for an adequate analysis of experimental facts, the Commission's technical staff has begun an analysis of the question of the frequency-stability of oscillators operating in the ultra-high-frequency portion of the radio spectrum. This problem has an important bearing on the feasible channel-widths available in this portion of the spectrum. It is being attacked from two angles: first, a statistical analysis of available transmitter performance, and second, an investigation of the practical limit of stability as set by unavoidable fluctuations in power supply, shot effect, and so forth. While still incomplete, the investigation has proceeded far enough to make it certain that the final results will be of value to the Commission in the solution of allocation problems in this part of the spectrum, which is of rapidly growing importance.

*Research in interference from nonradio equipment.*—Finally, considerable work has been done during the year as the result of complaints of interference received by the Commission. This interference has its origin in a great variety of nonradio equipment, such as automobile ignition systems, electric-power distribution systems, devices using high-frequency current for other than communication purposes, etc. A study of these complaints and of their sources indicates that there are two separate and distinct types of device responsible for the interference. One type generates and utilizes radio-frequency energy as an essential function to its operation. This class includes diathermy machines, induction furnaces, tube bombardiers, high-frequency carrier-current intercommunicating systems, high-frequency devices for energizing gaseous lamps, etc.

Such devices by their frequency, power, and circuits can radiate a signal of sufficient strength to be of serious interference to interstate commerce, and their radiations frequently cross State lines; hence the correction of the interference is in general a problem of interstate regulation.

Most electrical devices that are a source of local interference are distinctly different from the class discussed above, in that the generation of radio-frequency energy is entirely incidental and non-essential to the proper functioning of the device. The interference so caused is usually limited to a relatively small area, and the energy is so distributed throughout the radio-frequency spectrum that the level on any single frequency is not sufficient to cause interference at any great distance from the source.

*Research in interference from diathermy machines.*—Of the devices of the first type, two have been the subject of intensive investigation during the past year. The first was in connection with diathermy interference. As pointed out in the second annual report of the Commission, there has been, since approximately 1933, a rapid increase in the number of the high-frequency generators usually known as diathermy machines in use at clinics and by individual practitioners throughout the United States. In some cases serious interference to radio reception began to be encountered by communication companies and by radio-operating agencies of the Government during 1934 and 1935. This interference was traced in the latter months of 1935 to these electro-medical devices, and the Commission has since continued to receive reports concerning the matter.

To determine the cause and extent of the interference and the best means of correcting it, the Commission authorized the construction of a special field car equipped with the most modern devices for determining the signal strength, direction, etc., of these interfering signals. When the car was completed, members of the Engineering Department's staff conducted an investigation of the various phases of this interference problem.

Arrangements were made with a manufacturer of these devices to operate a test instrument under normal conditions such as would be encountered in the office of a doctor situated in a small urban community. The location of this instrument was several hundred miles from Washington, D. C., and the signals from the machine were heard and observed at Washington and at several of the Commission's monitoring stations at widely separated points throughout the United States. These tests, when coordinated with observations made by private commercial agencies and by other branches of the Federal Government, confirmed beyond the slightest doubt the fact that under certain conditions a diathermy machine when normally operated may cause extensive interference to radio communication at distances of 1,000 miles or more from the instrument.

To determine the best means of correcting the interference and to ascertain whether certain types of machine are less susceptible than others to the radiation of a strong interfering signal, the Commission compiled all available information concerning previous tests and then requested each of eight manufacturers of representative devices to supply a machine typical of its product that could be used in connection with an investigation of the best means of suppressing the interference.

To prevent interference, the radiation of energy from the machine must be controlled, and it has been found that this can be accomplished by the proper location and shielding of the room or space where the device is located and by the use of a properly designed filter in the power-supply circuit. The cost and impracticability of shielding in many cases make this solution very difficult of accomplishment by cooperation.

*Research in interference from interoffice communication systems.*—Another problem of this general character which has occupied the attention of the Commission during the past year is that of the interference caused by the equipment of a carrier-current system of interoffice communication. This entailed an experimental investigation of the interference value of such equipment carried out with the assistance of the staff of the monitoring stations of the Commission and the manufacturers of the apparatus the radiation from which prompted the complaints. As a result, it was determined that proper filtering sufficed to reduce the interference to a level below that caused by an average good superheterodyne radio-receiver.

## LITIGATION

*Judicial review.*—Review of the orders and decisions of the Commission is provided for by section 402 of the act in cases arising under title II of the act by application to the United States district courts to enforce, enjoin, set aside, annul, or suspend any order of the Commission, and in cases arising under title III of the act by appeal to the United States Court of Appeals for the District of Columbia.

*Litigation in fiscal year.*—During the past fiscal year six cases pending in the United States Court of Appeals for the District of Columbia were dismissed by that court on motion of the appellant prior to argument; and seven cases in which the Commission was a party or was interested were decided by the Federal courts, the Commission being sustained in each case. At the close of the fiscal year there were 13 cases pending in the Federal courts in which the Commission was a party or was interested.

*Court decisions in fiscal year.*—The following cases in which the Commission was a party or was interested were decided by the Federal courts during the last fiscal year:

(1) *American Telephone and Telegraph Co. et al. v. U. S. and F. C. C.*, United States District Court for the Southern District of New York, 14 Fed. S. 121, United States Supreme Court, 299 U. S. 232.<sup>4</sup>

(2) *The Monocacy Broadcasting Co. v. F. C. C.*, United States Court of Appeals for the District of Columbia, Appeal No. 6816, not reported.<sup>5</sup>

(3) *The Eastland Co. v. F. C. C.*, United States Court of Appeals for the District of Columbia, Appeal No. 6772, not reported.<sup>6</sup>

(4) *Congress Square Hotel Co. v. F. C. C.*, United States Court of Appeals for the District of Columbia, Appeal No. 6773, not reported.<sup>6</sup>

(5) *U. S. ex rel. David R. Crow. v. U. S. Civil Service Commission and F. C. C.*, United States District Court for the District of Columbia, affirmed, United States Court of Appeals, Appeal No. 6835, 89 Fed. (2d) 805.

(6) *William Randolph Hearst v. Prall et al.*, United States District Court for the District of Columbia, Equity No. 60937, not reported.

(7) *U. S. v. Norman Baker, E. R. Rood, and Roy Richardson*, United States District Court for the Southern District of Texas, Laredo Division, 18 Fed. Supp. 48.<sup>7</sup>

*Cases dismissed during fiscal year.*—The following cases in which the Commission was a party were dismissed before argument at the request of the appellant by the United States Court of Appeals for the District of Columbia:

(1) *Paul R. Heitmeyer* (Salt Lake City, Utah) *v. F. C. C.*, Appeal No. 6763.

(2) *KGBZ Broadcasting Co. v. F. C. C.*, Appeal No. 6770.

(3) *Palmer Broadcasting Syndicate, Inc., v. F. C. C.*, Appeal No. 6771.

(4) *G. E. Wilkinson Broadcasting Co., Inc., v. F. C. C.*, Appeal No. 6803.

(5) *W. H. Kindig v. F. C. C.*, Appeal No. 6884.

(6) *A. H. Belo Corp. v. F. C. C.*, Appeal No. 6870.

<sup>4</sup> For discussion, see p. 92.

<sup>5</sup> For discussion, see p. 31.

<sup>6</sup> For discussion, see p. 32.

<sup>7</sup> Criminal case. For discussion, see p. 33.

*Court cases pending as of June 30, 1937.*—At the close of the fiscal year there were 12 cases in which the Commission is a party pending in the United States Court of Appeals for the District of Columbia and one case pending in the United States District Court for the District of Columbia.

**IN THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA**

- (1) *Paul R. Heitmeyer* (Cheyenne, Wyo.) v. *F. C. C.*, Appeal No. 6762.
- (2) *Great Western Broadcasting Association, Inc.* (Logan, Utah), v. *F. C. C.*, Appeal No. 6852.
- (3) *Great Western Broadcasting Association, Inc.* (Provo, Utah), v. *F. C. C.*, Appeal No. 6853.
- (4) *Intermountain Broadcasting Corp.* v. *F. C. C.*, Appeal No. 6854.
- (5) *Pulitzer Publishing Co.* v. *F. C. C.*, Appeal No. 6866.
- (6) *Missouri Broadcasting Co.* v. *F. C. C.*, Appeal No. 6869.
- (7) *Red River Broadcasting Co.* v. *F. C. C.*, Appeal No. 6906.
- (8) *Continental Radio Co.* v. *F. C. C.*, Appeal No. 6911.
- (9) *Tri-State Broadcasting Co.* v. *F. C. C.*, Appeal No. 6931.
- (10) *Mackay Radio and Telegraph Co.* v. *F. C. C.*, Appeal No. 6970.<sup>8</sup>
- (11) *Saginaw Broadcasting Co.* v. *F. C. C.*, Appeal No. 6990.
- (12) *Woodmen of the World Life Insurance Association* v. *F. C. C.*, Appeal No. 6994.

**IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF COLUMBIA**

- (1) *Black River Valley Broadcasts v. Prall et al.*, Equity No. 64232.

<sup>8</sup> For discussion, see p. 66.

## HEARINGS

The following table summarizes the hearing activities of the Commission during the fiscal year:

	Commis- sion en banc	Broadcast Division	Telegraph Division	Telephone Division	Total
Matters <sup>1</sup> designated for hearing.....	7	664	61	10	742
Matters <sup>1</sup> heard before Commission or Division.....	18	2	5	1	26
Matters <sup>1</sup> heard before an Examiner.....		259	18	12	289
Oral arguments before Commission or Division.....	26	86		5	117
Matters <sup>1</sup> dismissed.....		178	10	3	191
Applications denied, as in cases of default.....		31		1	32
Applications reconsidered and granted without hearing.....		42	31		73
Final orders adopted after hearing.....	186	239	7	38	470
Petitions and motions acted upon.....	65	787	9	18	879

<sup>1</sup> The term "matters" includes not only applications for facilities and certificates, but also complaints and investigations. It includes the special telephone investigation, on which hearings, with intermissions, were held throughout the year (see pp. 103 and 104).

### APPLICATIONS FOR AUTHORITY TO HOLD POSITIONS WITH MORE THAN ONE CARRIER

Under section 212 of the act it is unlawful for any person to hold the position of officer or director of more than one carrier subject to the act, unless such holding shall have been authorized by order of the Commission, upon due showing in form and manner prescribed by the Commission that neither public nor private interest will be adversely affected thereby. During the past fiscal year the Commission disposed of 174 applications filed under this section. Of the total, hearings were had upon 152 cases, while 22 were disposed of without hearing. Four applications were denied, 80 dismissed, 61 granted, and 29 granted in part and denied in part.

## FIELD INSPECTIONS AND INVESTIGATIONS

In order to assure compliance by licensees and operators of radio stations with laws, rules, and regulations, the Commission maintains 21 inspection offices and 7 monitoring stations (5 of which are associated with inspection offices). The staffs of these offices and monitoring stations carry on this important regulatory activity with reference to all classes of stations and operators, as well as the investigation of unlicensed operation of radio stations and interference complaints. In the last fiscal year this work necessitated 414 trips by the field force, totaling 198,939 miles of travel.

*Ship inspections.*—There were 8,803 inspections of radio installation on American and foreign ships during the fiscal year. The more thorough and extended method of inspection made necessary by the safety convention which became effective on November 7, 1936, was reflected in the number of discrepancies found, and led to the serving of 3,466 notices requiring repairs, additions, or alterations in equipment, or adjustment of personnel discrepancies. As a result of these intensive inspections there has been marked improvement in the efficiency of radio installations, particularly on ships that were voluntarily equipped prior to the ratification of the safety convention.

In order to obtain a more nearly precise measurement of frequency of ship transmitters than is possible with the absorption type of frequency meter, port offices were equipped with heterodyne-frequency meters of the crystal-calibrator type, permitting measurements in the low-, intermediate-, and high-frequency bands.

*Land inspections.*—There were 3,207 inspections of stations situated on land. These inspections developed 914 discrepancies, which necessitated the serving of official notices requiring the licensee to explain to the Commission the circumstances causing the violation and the corrective action taken or proposed to be taken.

*Aircraft and aeronautical inspections.*—There are 701 aircraft and 389 aeronautical stations licensed in the United States exclusive of Alaska. In Alaska there are 33 aircraft and 42 aeronautical stations licensed. During the fiscal year 522 aircraft inspections and 387 aeronautical inspections were made.

*Frequency measurements.*—During the fiscal year 15,333 measurements were made of the frequencies of United States broadcast stations. There were 104 deviations beyond the permitted frequency-tolerance of 50 cycles (plus or minus). Of stations other than broadcast stations 31,613 measurements disclosed 1,492 frequency deviations beyond the tolerance permitted. Foreign station measurements numbered 848, with 170 deviations.

All field offices are equipped with ultra-high-frequency receivers of the super-regenerative type, thereby permitting the monitoring of stations operating on frequencies as high as 300 megacycles. These receivers aided considerably in the detection of unlicensed amateur stations operating in the 56-to-60-megacycle band.

*Unlicensed radio stations.*—During the fiscal year reports were received of the operation of 477 unlicensed radio stations. The action taken by the Commission resulted in the discontinued operation of 357 stations, leaving 120 stations under investigation at the close of the fiscal year.

*Interference complaints.*—During the fiscal year 3,796 complaints of interference with radio reception were received by the Commission. In addition, 430 cases were carried over from the previous fiscal year. As a result of investigations, remedial action was taken in 3,995 cases. The remaining 231 cases were under investigation at the close of the fiscal year.

Table I, appendix D, shows the number of ship stations inspected by each field office. Table II, appendix D, shows the same information with reference to land stations and frequency measurements.

## GREAT LAKES AND INLAND WATERWAYS RADIO SURVEY

The Commission at its "en banc" session on May 26, 1937, designated Commissioner Thad H. Brown to have charge of organizing and carrying forward the work incident to the "special study of the radio requirements necessary or desirable for safety purposes for ships navigating the Great Lakes and the inland waters of the United States" provided for in section 15 of Public Law No. 97, approved May 20, 1937.

Section 15 of Public Law No. 97 states as follows:

Section 602 of the Communications Act of 1934 is hereby amended by adding at the end thereof a new subsection to read as follows:

"(e) Such part or parts of the Act entitled 'An Act to require apparatus and operators for radio communication on certain ocean steamers,' approved June 24, 1910, as amended, as relate to the ocean and to steamers navigating thereon, are hereby repealed. In all other respects said Act shall continue in full force and effect. The Commission is requested and directed to make a special study of the radio requirements necessary or desirable for safety purposes for ships navigating the Great Lakes and the inland waters of the United States, and to report its recommendations, and the reasons therefor, to the Congress not later than December 31, 1939."

This law amends the act for the purpose of promoting safety of life and property at sea through the use of wire and radio communication to make more effective "the international conference for safety of life at sea, and for other purposes." Intensive study of the preliminary plans for carrying out the purposes of the amendment has already been started by Commissioner Brown, and the work of selecting competent personnel is now under way. It is planned to have only a small staff, headed by a chief administrative officer, for the purpose of carrying on this special study.

The duties of this chief administrative officer will involve making a special study of the unique transportation and communication problems of the Great Lakes; studying the comparative advantages of radiotelephony and radiotelegraphy; making a study of the radio-frequency-allocation problems with a view to the selection of suitable frequencies for the distances involved on the Great Lakes; formulating plans for coordinating radio tests between ship and shore and between ship and ship; making a study of radio-interference conditions on the Great Lakes, particularly with respect to the separation required between maritime frequencies and those of other services; collecting data and doing liaison work between the Federal Communications Commission and the Department of Transport, Dominion of Canada, pertaining to Great Lakes maritime affairs; assisting in the preparation for and conduct of special public hearings to be held in the principal cities surrounding the Great Lakes, including Buffalo, Cleveland, Detroit, Chicago, and Duluth; coordinating the study of the communication needs of the Federal Government departments, including the United States Coast Guard, the United States Bureau of Lighthouses, the Bureau of Air Commerce,

and the United States Weather Bureau; investigating problems incident to the use of automatic distress-alarm apparatus and direction-finding equipment for safety purposes; investigating the availability of wire facilities at remote points along the Great Lakes, from the standpoint of locating shore radio stations at points where rapid and efficient communication may be carried on; surveying the transportation lanes and the nature of both freight and passenger traffic; making special studies with reference to radio needs during the navigation season, as distinguished from such needs during winter operations, when shipping is greatly curtailed; investigating radio needs from the standpoint of dangers to navigation; making special studies with reference to the history of past disasters on the Great Lakes to determine whether radio would have played an important part as a means of preventing such disasters; preparing regulations applicable to ships bearing tonnage to determine whether the provisions of Public Law No. 97 should also be made applicable on the Great Lakes; making special studies with respect to the type of equipment for operation of ship work, including the present installed transmitting and receiving apparatus, as well as the improved type of apparatus that might be made available on the market; determining what qualifications should apply to radio operators on the Great Lakes, depending upon class of ship (passenger or cargo), tonnage, nature of voyage, and type of emission; and preparing the final report and recommendations to the Commission preliminary to the submission of the Commission's report to Congress pursuant to section 602 of the act. The special study, together with the report of the Commission's recommendation and the reasons therefor, will be submitted to the Congress not later than December 31, 1939.

## THE COMMISSION'S PARTICIPATION IN THE INTERDEPARTMENT RADIO ADVISORY COMMITTEE

The Commission has devoted a great deal of time and effort during the fiscal year to the work of the Interdepartment Radio Advisory Committee. This Committee is the Government Committee established for the purpose of advising the President with reference to the assignment of frequencies to Government radio stations under the Communications Act of 1934, as amended. The Committee has had frequent meetings and has approved the assignment of 318 frequencies for Government radio stations during the past year. At the present time there are 2,913 active assignments to the Government radio stations, all of which have been recommended by the Committee since its establishment. The minutes of these meetings and all records of the Committee are made and maintained in the Commission.

The Committee participated actively in the hearing in the offices of the Commission from June 15 to 26, 1936, with particular reference to determining the present and future needs of the Government for radio services in the frequencies above 30 megacycles. Since the time of this hearing the Committee has been actively engaged in the allocation to the Government services of frequencies in the radio spectrum from 25 to 300 megacycles. Definite recommendations for these allocations are being made.

Due to the greatly increased volume of work during the past year and the constantly increasing requirements for Government radio service, it has been necessary to revise completely the files of the Committee and to provide a comprehensive history of all radio frequencies assigned to Government operation. This work has been accomplished during the past fiscal year.

## FISCAL AFFAIRS

*Appropriations.*—The Independent Offices Appropriation Act, 1937 (Public Law No. 479), approved March 19, 1936, provides funds for the fiscal year 1937 for the Federal Communications Commission as follows:

For seven commissioners, and for all other authorized expenditures of the Federal Communications Commission in performing its duties, including personal services, contract stenographic reporting services, rental of quarters, newspapers, periodicals, reference books, law books, special counsel fees, supplies and equipment, including purchase and exchange of instruments, which may be purchased without regard to section 3709 of the Revised Statutes (U. S. C., title 41, sec. 5) when the aggregate amount involved does not exceed \$25, improvement and care of grounds and repairs to building, not to exceed \$5,000, traveling expenses, including expenses of attendance at meetings which in the discretion of the Commission are necessary for the efficient discharge of its responsibilities, and other necessary expenses, \$1,450,000, of which amount not to exceed \$1,030,000 may be expended for personal services in the District of Columbia.

For all printing and binding for the Federal Communications Commission, \$24,000.

The Second Deficiency Appropriation Act, fiscal year 1937 (Public Law No. 121, 75th Cong.), approved May 28, 1937, provides as follows:

Salaries and expenses: For an additional amount for salaries and expenses of the Federal Communications Commission, fiscal year 1937, including the same objects specified under this head in the Independent Offices Appropriation Act, 1937, \$60,000.

### *Salaries and expenses, F. C. C., fiscal year 1937*

	Allotments	Expended and obligated	Unobligated
Personal services (D. C.).....	\$1,005,000	\$1,003,996.21	\$1,003.79
Personal services (field).....	340,000	339,098.58	901.42
Supplies and materials.....	23,200	20,766.16	2,433.84
Gasoline and oil.....	3,000	2,610.51	389.49
Storage and care of vehicles.....	5,000	3,571.04	1,428.96
Communication services.....	16,700	15,657.62	1,042.38
Travel expenses.....	25,700	23,610.62	2,089.38
Transportation of things.....	1,500	1,209.74	290.26
Carfare.....	1,000	775.37	224.63
Stenographic reporting.....	5,300	4,491.50	808.50
Heat, light, power, and water.....	4,000	3,993.34	6.66
Rents.....	13,500	11,627.79	1,872.21
Repairs and alterations.....	3,300	3,061.28	238.72
Special and miscellaneous.....	2,800	1,381.64	1,418.36
Furniture, fixtures, and equipment.....	60,000	54,537.07	5,462.93
<b>Total.....</b>	<b>1,510,000</b>	<b>1,490,388.47</b>	<b>19,611.53</b>
Printing and binding.....	24,000	22,739.03	1,260.97

## PUBLICATIONS

The following material has been printed and placed on sale by the Government Printing Office:

Federal Communications Act of 1934 with Amendments and Index Thereto (Revised June 5, 1936).

First Annual Report of the Federal Communications Commission to the Congress of the United States, for the Fiscal Year 1935.

Second Annual Report of the Federal Communications Commission to the Congress of the United States, for the Fiscal Year 1936.

Federal Communications Commission Practice and Procedure Promulgated Pursuant to the Communications Act of 1934.

Federal Communications Commission Reports—Volume I: Decisions, Reports, and Orders of the Federal Communications Commission of the United States, July 1934 to July 1935.

Federal Communications Commission Reports—Volume II: Decisions, Reports, and Orders of the Federal Communications Commission of the United States, July 1, 1935, to June 30, 1936.

Uniform System of Accounts for Telephone Companies, Issue of June 19, 1935, Effective January 1, 1936.

Tariff Circular No. 1, Issue of July 31, 1935—Rules Governing the Construction, Filing, and Posting of Tariffs Relating to Interstate and Foreign Wire or Radio Communications, by Carriers Subject to the Communications Act of 1934, Excepting Connecting Carriers as Defined in Section 3 (u) of the Act and Excepting Carriers Operating in Alaska.

*Mimeographed material.*—The following material has been prepared in mimeographed form and is available at the offices of the Commission:

Rules and Regulations of the Federal Communications Commission governing the various radio services.

Radio Station Lists, arranged by services (not all services included).

Radio Service Bulletin.

Descriptive list of Berne Publications (World lists of radio stations are published by the Bureau of the International Telecommunication Union, Berne, Switzerland).

Selected financial and operating data from annual reports of telephone carriers for the year ended December 31, 1935.

Selected financial and operating data from annual reports of telegraph, cable, and radiotelegraph carriers for the year ended December 31, 1935.

Salary report of telephone and telegraph carriers, 1935.

Summary of monthly reports of large telephone carriers.

Selected financial and operating data from monthly reports of telegraph carriers.

*Public reference rooms.*—The Commission maintains public reference rooms for the purpose of opening to public inspection such records and material as are made public under the act and under the regulations of the Commission. This service to the public includes the annual and monthly reports and the schedules of charges filed by telephone and telegraph carriers; the annual reports filed by holding companies; formal dockets; and applications for radio or wire facilities.

Information of interest is made available to the public by means of frequent press releases.

**PART II**  
**THE COMMISSION**  
**BROADCAST DIVISION**

**MEMBERS OF THE BROADCAST DIVISION**

**AS OF JUNE 30, 1937**

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EUGENE O. SYKES, *Chairman.*

NORMAN S. CASE, *Vice Chairman.*

ANNING S. PRALL.

## BROADCAST DIVISION

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In the fiscal year 1937 the continued growth of the broadcast industry was evidenced by the fact that the Commission received 295 applications for new broadcast stations and granted authority for the construction of 51 new stations. During the same period 7 existing stations were deleted. At the close of the fiscal year 704 regular broadcast stations held licenses granted by the Commission, representing an increase of 44 over the number of such stations at the close of the previous fiscal year.

With the view of continuing to progress toward the solution of allocation problems, the Commission proceeded with its intensive study of information gathered through the broadcast-allocation surveys and hearings. In order to better fit itself to pass judgment on the comparative needs of various communities for broadcast facilities, the Division conducted a study in the distribution of broadcast facilities to cities and towns of various populations and to the States.

The year witnessed improvement in television picture detail transmission. Likewise progress has been made in the advancement of facsimile transmission of news flashes, market reports, weather maps, etc.

### ORGANIZATION AND JURISDICTION OF THE BROADCAST DIVISION

By virtue of General Order No. 1, adopted by the Commission on July 17, 1934, the Broadcast Division of the Commission has jurisdiction over all matters relating to or connected with broadcasting.

During the year formal hearings were held upon 261 applications, of which 86 were the subject of oral argument before the Broadcast Division. Hearings in a number of the more important cases were conducted in the first instance by the Division.

*Subjects covered by this report.*—For the purpose of this report the material is presented under the following topics: Facilities Under the Jurisdiction of the Broadcast Division, Complaints and Investigations, and Technical Developments in the Broadcast Art. The report of the Federal Radio Education Committee is added at the close of this Division's report. (See p. 45.)

## FACILITIES UNDER THE JURISDICTION OF THE BROADCAST DIVISION

The facilities under the jurisdiction of the Broadcast Division have been classified under six different services, as follows: regular broadcast, international broadcast, relay broadcast, visual broadcast, high-frequency broadcast, and experimental broadcast. These various services are treated separately in the following sections of this report.

### REGULAR BROADCAST SERVICE

*Allocation plan.*—The basic plan of allocation of regular broadcast facilities in the band between 550 and 1600 kilocycles has continued unchanged insofar as the general plan of allocation of stations by frequency, power, and hours of operation is concerned. Individual changes in assignments have occurred, however, as a result of the granting of applications, in the majority of cases after a hearing.

In accordance with the allocation of frequencies under rule 229, the band between 1510 and 1600 kilocycles is now treated as a part of the regular broadcast band, and special broadcast stations operating on frequencies of 1530, 1550, and 1570 kilocycles are considered as regular broadcast stations. The rules governing these stations are now included in the regular broadcast rules as well as in the rules governing broadcast stations other than those of the regular class. Frequencies other than those of 1530, 1550, and 1570 kilocycles in the band between 1510 and 1600 kilocycles have not been actually assigned to any broadcast station. (Certain of these frequencies have been used temporarily for short periods of time for test purposes.)

*Amendment to the act.*—Section 307 (b) of the Communications Act of 1934, as amended June 5, 1936, has permitted the granting of new and additional facilities where interference would not result and when the need therefor has been established.

*Number of stations.*—As of June 30, 1937, there were 704 broadcast stations licensed or under construction in the United States. Chart 1 of appendix E shows the total number of regular broadcast stations licensed or under construction, as well as the total number operating simultaneously during night-time hours, at the close of each of the fiscal years 1927 to 1937, inclusive.

*Distribution of broadcast facilities.*—Considering the broadcast assignments as they existed on June 8, 1937, the Engineering Department made a study for the purpose of determining the distribution of broadcast facilities to cities of various populations and to the various States. According to the 1930 census of the United States, there are 16,598 cities and towns in this country. Of this total, 982 have a population in excess of 10,000 and 376 have a population in excess of 25,000. Many of the towns and cities of 10,000 or more inhabitants are in the metropolitan districts, as described by the Bureau of the Census, or are adjacent to other larger cities not included in any of the metropolitan districts. Of the 606 cities having a population in

excess of 10,000 and less than 25,000, 471 have no radio station, and of the 376 cities having a population in excess of 25,000, 143 have no radio station. However, of the total of 614 cities having no radio station, all but 111 receive primary service from at least one radio station, as shown in the following paragraphs:

(1) Three hundred and twenty-nine cities (53.6 percent) are within one of the 96 metropolitan districts specified by the Bureau of the Census. Each district has one or more radio stations.

(2) Eight cities (1.3 percent) are adjacent to larger cities which have a radio station.

(3) One hundred and sixty-six cities (27.0 percent), not included in (1) and (2) above, are within the primary service area of an existing station. In this case the limit of primary service was considered as 2 mv/m, the minimum signal normally required to render a satisfactory service in the residential area of the average city.

(4) The remaining 111 cities (18.1 percent) do not come within any of the foregoing categories.

The study indicates that there are 359 cities in the continental United States which have only one radio station. Of these, 88 have a population in excess of 25,000 and are not located within one of the 96 metropolitan districts.

The distribution of broadcast facilities to cities having various populations is summarized in appendix E, table II.

In order to ascertain the distribution of broadcast facilities to the several States, a study was made of the assignments together with their hours of operation and their location. This distribution is set forth in tabular form in appendix E, table III.

The distribution of facilities throughout the United States, with class of service, was found to be as follows:

	Total	Unlimited time	Limited time	Shared time and specified hours	Daytime
Clear.....	52	32		20	
Regional.....	343	202	25	63	53
Local.....	305	196		64	45
Grand total.....	700	430	25	147	98

Of significance is the fact that 270 stations share time or operate only in daytime or during limited time or specified hours. A study of the assignments was made to determine the number of stations that share time in the same city, or in different cities, the number of limited-time stations, etc.<sup>11</sup>

Of the existing facilities—

- (1) 48 stations (6.9 percent) share time in the same city.
- (2) 77 stations (11.0 percent) share time with stations in other cities.
- (3) 119 stations (17.0 percent) are limited or daytime stations.
- (4) 26 stations (3.7 percent) are specified-hours stations.
- (5) 430 stations (61.4 percent) are unlimited-time stations.

The total of part-time assignments is 38.6 percent of the total facilities licensed.

*Directional antennas.*—The following table shows the number of directional antenna systems in use or authorized to be installed at the close of each fiscal year (from 1932 to 1937). This type of antenna

<sup>11</sup> Four stations included under daytime or limited time operation in the preceding table are, for the purpose of the following analysis, classified as sharing-time or specified-hours stations.

has proven very useful in reducing interference and in directing the signals to desired areas, thus improving the service. The present policy of the Commission does not permit the use of directional antennas on local-channel frequencies since such use is not feasible from an allocation standpoint due to the large number of stations on these frequencies.

*Number of directional antennas in use or authorized for use*

	Fiscal year ended June 30—					
	1932	1933	1934	1935	1936	1937
Stations on clear channels.....	0	2	4	7	8	9
Stations on regional channels.....	2	4	11	20	25	39
Total.....	2	6	15	27	33	48

*New rules for regular broadcast service.*—On January 19, 1937, the Commission amended rule 175 so as to provide that a single, continuous, uninterrupted speech, play, symphony concert, or operatic production of longer duration than thirty minutes need not be interrupted in order to announce the call letters and location of the station. However, in such instances it is required that the announcement of the call letters and location be made as soon as possible. This modification of the rule has proven helpful in the production of programs of this character and beneficial to the listening public.

On September 29, 1936, rule 177 and that portion of rule 321 affecting broadcast stations were amended and superseded by rules 177, 177.1, and 177.2, clarifying the requirements relative to the rebroadcasting of the programs of domestic stations in the various services and to the transmission of programs to be rebroadcast by foreign stations.

*Applications received.*—In the fiscal year, there were received 295 applications for new broadcast stations—approximately double the number of applications received during the last fiscal year of the Federal Radio Commission. The number of broadcast applications received each fiscal year since 1931 is set out in chart 2, appendix E.

*Applications granted.*—Fifty-one new regular broadcast stations were authorized by the Commission in the last fiscal year. The following table shows the class and the hours of operation of these newly authorized stations.

Class of station	Hours of operation	Number
Local channel.....	Unlimited.....	18
Do.....	Daytime, sharing, and specified hours.....	21
Regional channel.....	Unlimited.....	3
Do.....	Daytime.....	4
Clear channel.....	Unlimited.....	0
Do.....	Daytime.....	5
Total.....		51

*The Brooklyn cases.*—Among the many applications receiving the consideration of the Commission in the last fiscal year were the so-called *Brooklyn cases*, which ultimately presented approximately 18 conflicting applications by existing licensees and by applicants for new broadcast facilities, each of which was located in the same general area. The original applications were first heard before an examiner, appointed by the Federal Radio Commission, during August and September 1933. After the Examiner had submitted his report, the applications were remanded to the hearing docket to be further heard. When the Communications Act of 1934 became law, jurisdiction over these cases was transferred to the Federal Communications Commission. Additional applications having been filed, the Commission designated each of them, together with those pending, for hearing before an examiner. This hearing was held during December 1934. The Commission, by the Broadcast Division, made its decision in these cases on December 15, 1935 (vol. 2, F. C. C. Reports, p. 208). The Commission, en banc, upon consideration of several petitions for rehearing, filed under section 405 of the act, ordered that all the applications involved be heard in a *de novo* proceeding before the full Commission. That hearing began March 18, 1937, and was concluded with oral argument April 13, 1937. On June 29, 1937, the Commission made its decision (vol. 3, F. C. C. Reports, not yet published), deleting two of the four existing stations and granting the facilities thus deleted to one of the two remaining stations.

*"1570-kilocycle cases."*—During the year hearings were conducted before an examiner in the so-called *1570-kilocycle cases*, involving several applications for special broadcast stations to operate on the frequency of 1570 kilocycles. The cases presented interesting aspects of a technical nature which will hereinafter be discussed. The examiner had submitted his report but no decision had been made thereon at the close of the fiscal year.

Of the broadcast cases that were appealed from the Commission to the Federal courts, the *Monocacy case* and the *Eastland-Congress Square Hotel cases* are of particular interest.

*The Monocacy case.*—The *Monocacy Broadcasting Co. case* arose from a decree of the District Court of the United States for the District of Columbia granting a motion by the Commission to dismiss a bill of complaint filed by the Monocacy Broadcasting Co. (Appeal 6818). The Monocacy Broadcasting Co., a corporation, filed an application with the Federal Communications Commission for a permit to construct a new broadcast station near Rockville, Md. Thereafter the Commission considered the application and granted it without a hearing, pursuant to its rules. A protest was filed to this grant by WCAU Broadcasting Co., Philadelphia, Pa., on the ground that the proposed station would cause objectionable interference with its station. Within the time prescribed by the rules the American Broadcasting Co. (Station WOL) filed a protest, which failed to meet the requirements of the Commission's rules and was therefore denied.

The Monocacy application was set for hearing upon the protest of Station WCAU, Philadelphia, and thereafter the American Broad-

casting Co. (WOL) filed a petition for leave to intervene. Still later, Station WCAU withdrew its protest and the hearing was canceled. It was then the contention of the Monocacy Co. that under the Commission's rules no further action was necessary to make final a formal grant of its application, since no protest remained before the Commission. Nevertheless, the Division, upon its own motion, reconsidered the Monocacy application and designated it for hearing. Whereupon the Monocacy Co. filed a bill of complaint for injunction in the United States District Court seeking to enjoin the Commission from holding said hearing. The Commission filed a motion to dismiss the bill on the grounds that the plaintiff had a plain, speedy, and adequate remedy at law under section 402 (b) of the Communications Act, 1934, which provides for appeals to the United States Court of Appeals for the District of Columbia, that the bill of complaint did not show that plaintiff had exhausted its legal remedy, and that the Commission did not violate its rules but had the legal authority to designate plaintiff's application for hearing. The District Court sustained that motion and dismissed the plaintiff's bill on the ground that plaintiff possessed a plain, speedy, and adequate remedy at law under section 402 (b). On appeal to the United States Court of Appeals for the District of Columbia, the decree of the lower court was affirmed. It cited with approval *United States v. American Bond & Mortgage Co.*, 31 F. (2d) 448; *White v. Federal Radio Commission*, 29 F. (2d) 113; *Sykes v. Jenny Wren Co.*, 64 App. D. C. 379; 78 F. (2d) 720.<sup>12</sup>

*The Eastland Co. and Congress Square Hotel Co. cases.*—The Eastland Co. and Congress Square Hotel Co. appeals (appeals 6772 and 6773) arose from a decision of the Commission granting an application of Portland Broadcasting System, Inc., for a new station at Portland, Maine, and denying the application of the Eastland Co. for a new station at the same place. Congress Square Hotel Co. is the owner and licensee of radio station WCSH located at Portland, Maine, and had been an intervenor in the proceedings before the Commission on economic ground. Both applicants, Portland Broadcasting System, Inc., and the Eastland Co., requested the use of the frequency of 640 kilocycles. At the time the hearings on these applications were held the Broadcast Division of the Commission was composed of Commissioners Gary (chairman), Brown, and Sykes. At the time the case was decided, the Broadcast Division was composed of Commissioners Sykes (chairman), Case, and Prall. Because of these changes in membership, it was contended by the appellants that the decision of the Broadcast Division was invalid. The United States Court of Appeals for the District of Columbia (Mr. Justice Stephens dissenting) overruled this contention. After a discussion of the various sections of the act, the court considered the fact that oral testimony had been followed by the filing of written briefs and the fact that stenographic reports had been made of the oral testimony, copies of which were in the possession of the Broadcast Division as it was composed when the matter was decided. It was pointed out that no question was raised by the appellants as to lack of notice, and the fact was also noted that they were all accorded ample and timely notice and a full opportunity to be heard. The court further

<sup>12</sup> See last Annual Report, pp. 30 and 31.

noted that the Commissioners who entered the decision reported that they had fully considered the evidence and the entire record of the case. The court further said:

In our opinion the partial change in the personnel of the Division which decided the case did not invalidate its decision, for it was nevertheless the decision of the Division which acted upon the evidence.

The remaining contentions of the appellants challenged the findings of the Commission upon the facts as disclosed by the evidence, but as to those findings the court found them not "arbitrary or capricious." A further contention in this appeal was that "the denial of the application of the Eastland Co. and the granting of that of the Portland Broadcasting System, Inc., violated the facilities-distribution section of the Communications Act of 1934 and the quota regulations of the Commission." The court pointed out, however, that the statute and the rules of the Commission provide equalization "as nearly as possible," and that while the increase in night quota occasioned by the grant of the Portland System's application was slightly over that due, it was justified in view of the need shown and was consistent with the terms of section 307 (b) of the act.

Appellants have requested a stay of mandate under rule 24 of the Supreme Court, pending the filing of a petition for a writ of certiorari.

*The Baker Case.*—The first criminal case involving violation of section 325 (b) of the Communications Act of 1934 (48 Stat. 1091),<sup>13</sup> (*United States v. Norman Baker, E. R. Rood, and Roy Richardson*), was tried in the United States District Court for the Southern District of Texas, Laredo Division, during April 1937 (18 Fed. Supp. 48).<sup>14</sup> The indictment charged the defendants with the maintenance of apparatus in Laredo, Tex., for the manufacture of mechanical reproductions or phonograph records for transportation to Mexican Radio Station XENT, owned by Norman Baker, and their subsequent broadcast by that station. Conviction of all three defendants was obtained, Norman Baker was sentenced to 4 months in jail and was fined \$2,000, E. R. Rood was sentenced to 4 months in jail and was fined \$500, and Roy Richardson was sentenced to 1 day in jail, it appearing that prior to the trial Richardson had been in custody for approximately 90 days. An appeal was taken by the defendants to the Fifth Circuit Court of Appeals and was pending at the close of the fiscal year.

The principal question raised by the defense in this case, by means of demurrer to the indictment, was that the offense charged in the indictment was not covered by section 325 (b) of the act in that an electrical transcription or phonograph record was not "a mechanical reproduction of sound waves produced." In overruling the demurrer to the indictment, the trial court held that the offense charged was included within the meaning of the aforementioned section of the law and that the offense was sufficiently described in the indictment.

<sup>13</sup> Section 325 (b) of the Communications Act of 1934 provides: "No person shall be permitted to locate, use, or maintain a radio broadcast studio or other place or apparatus from which or whereby sound waves are converted into electrical energy, or mechanical or physical reproduction of sound waves produced, and caused to be transmitted or delivered to a radio station in a foreign country for the purpose of being broadcast from any radio station there having a power output of sufficient intensity and/or being so located geographically that its emission may be received consistently in the United States, without first obtaining a permit from the Commission upon proper application therefor."

<sup>14</sup> Since the close of the fiscal year a petition for a writ of certiorari in the United State Supreme Court has been filed.

*Other appeals.*—During the year six appeals in broadcast cases previously taken to the United States Court of Appeals for the District of Columbia from decisions of the Federal Communications Commission were dismissed<sup>15</sup> at the request of the applicants prior to argument, and 11 appeals are now pending<sup>16</sup> in that court.

There is one case pending in the United States District Court for the District of Columbia.<sup>17</sup>

#### BROADCAST SERVICES OTHER THAN REGULAR BROADCAST SERVICE

*New rules for services other than broadcast.*—As a result of the informal engineering conference of June 8, 1936, and written suggestions filed prior to July 20, 1936, the proposed new rules governing the following services were changed in a few particulars, as announced in the various press releases prior to the effective date of September 15, 1936:

1. International broadcast stations.
2. Relay broadcast stations.
3. Visual broadcast service:
  - (a) Television broadcast stations.
  - (b) Facsimile broadcast stations.
4. High frequency broadcast stations.
5. Experimental broadcast stations.

In operation, the new regulations as adopted, have been simple, clear, and easy of application to these various services. At the close of the fiscal year 1937, 342 stations were licensed for these services and 76 construction permits were outstanding. At the close of the fiscal year 1936, only 287 stations were licensed for these services.

#### INTERNATIONAL BROADCAST SERVICE

*Definition of service.*—The term "international broadcast station" means a station licensed for the transmission of broadcast programs for international public reception. Frequencies for these stations are allocated from bands (between 6000 and 26000 kilocycles) assigned for broadcasting by article 7 of the General Radio Regulations Annexed to the International Telecommunication Convention of Madrid, 1932.

*Allocation and interference problems.*—During the fiscal year the correspondence on the increasing interference to international broadcasting indicated that the conditions previously reported had not improved. The international broadcast frequencies are world-wide in range and a small station in any country may cause interference in any other country. All the frequencies suitable for the various international services were allocated at the Madrid Conference in 1932 and a few bands have been set aside for international broad-

<sup>15</sup> See p. 15.

<sup>16</sup> No. 6762, filed 6-29-36, *Paul R. Heitmeyer* (Cheyenne, Wyo.) v. F. C. C.; No. 6852, filed 10-1-36, *Great Western Broadcasting Association, Inc.*, a corporation (Logan, Utah), v. F. C. C.; No. 6853, filed 10-1-36, *Great Western Broadcasting Association, Inc.*, a corporation (Provo, Utah), v. F. C. C.; No. 6854, filed 10-1-36, *Intermountain Broadcasting Corporation*, a corporation, v. F. C. C.; No. 6866 filed 10-20-36, *Pulitzer Publishing Company*, a corporation, v. F. C. C.; No. 6869, filed 10-23-36, *Missouri Broadcasting Company* v. F. C. C.; No. 6909, filed 2-2-37, *Red River Broadcasting Company* v. F. C. C.; No. 6911, filed 2-15-37, *Continental Radio Company* v. F. C. C.; No. 6931, filed 3-16-37, *Tri-State Broadcasting Company* (Licensee of Radio Station KTSM) v. F. C. C.; No. 6990, filed 6-18-37, *Saginaw Broadcasting Company*, a corporation, v. F. C. C.; No. 6994, filed 6-28-37, *Woodmen of the World Life Insurance Association* v. F. C. C.

<sup>17</sup> No. 64232, filed 4-21-37, *Black River Valley Broadcasts, Inc.*, v. *Anning S. Prall*, et al.

casting. As the sun-spot cycle progresses to its maximum, generally predicted to occur about 1939, it appears that the distance coverage of the higher frequencies will develop to a more reliable state. The frequencies listed under group H of rule 1013 have therefore been made available for international broadcast stations by the adoption of the new rules and regulations. Although group H represents additional frequencies for this service, they are far from being adequate for the needs.

The increasing demand for and the use of the limited international channels have caused increased congestion in and interference to international broadcast reception. The channel separation necessary for reasonably good quality reproduction has been disregarded still further by several foreign administrations. In order to transmit through this increased interference, the use of additional power together with directional antennas directed toward the countries of the world desired to be served has become necessary.

The Commission has consistently followed the policy of 20-kilocycle separation between frequency assignments, and the records show that all United States international broadcast stations are maintained with no frequency deviation of any consequence.

European stations have materially increased the strength of their signals for better foreign reception, resulting in the loss of listeners to the weaker signals of stations of the United States that have not increased their power. This condition is present throughout the world, but is particularly true with reference to South America and the Orient. The only solution appears to be higher power and beam transmission for stations in this country. It is hoped that through proper negotiations a time-sharing basis or an engineering solution of some type can be found to cover the interference problem, but such negotiations between sovereign powers require time and patience.

*Stations and applications.*—No new international broadcast stations have been authorized during the fiscal year. Twelve existing stations located principally in the eastern part of the United States are licensed to operate on a total of 21 frequencies. Two pending applications for new high-power international broadcast stations to be located in the West were in the files at the close of the year.

*The General Electric Co. application.*—Of particular interest is the application of the General Electric Co. for a construction permit to authorize the establishment of an international broadcast station in the city of Belmont, Calif., to be operated on the frequencies of 9530 kilocycles and 15330 kilocycles, with power of 20 kilowatts, unlimited time. It is proposed that the applicant shall provide broadcast service to several foreign countries, particularly those in the Orient. As required by the rules, it was necessary for this applicant to present evidence relative to the experimentation which it proposed to conduct. During the hearing conducted before an examiner, such evidence was presented. The record of the proceedings is now before the Commission, Broadcast Division, for decision.

#### RELAY BROADCAST SERVICE

*Definition of service.*—The term "relay broadcast station" means a station licensed to transmit, from points where wire facilities are not available, programs for broadcast by one or more broadcast stations or orders concerning such programs.

The activity of the licensees of regular broadcast stations in relaying programs from remote localities, boats, airplanes, etc., for broadcast over regular broadcast stations, has demonstrated the real need and increasing demand for stations of this class.

*"Pack sets."*—Small low-power relay broadcast transmitters, carried complete by the operator, commonly referred to as "pack sets," are very useful for relaying accounts of golf matches, floor events, etc., over short distances to a receiver, where the program is placed on wire lines and broadcast over a regular broadcast station. On June 30, 1937, the following authorizations were in effect in this service: 38 authorizations of 1-watt power or less, 42 authorizations from 1 to 2 watts, and 37 authorizations from 2 to 5 watts. The popularity of this type of station is shown by the figures, which indicate that they constitute 54 percent of the experimental relay authorizations, and 37 percent of the total number of relay broadcast stations authorized.

*Frequencies.*—When relay broadcast stations were originally authorized, there were few frequencies available on a share basis with other services. Permission for each instance of operation of relay stations was found necessary to avoid interference from simultaneous operation by more than one on the same frequency. Since that time the number of frequencies available has been increased to 24 regular and certain others under special circumstances.

*Number of stations.*—At the close of the fiscal year there were 330 authorizations in effect in the relay broadcast service. These consisted of the following: 81 station licenses for operation on the low frequencies, 188 station licenses for operation on the experimental high frequencies, and 61 construction permits.

*Rule 1004.*—On June 15, 1937, the Broadcast Division deleted the requirements of a 2-day notice and permission from the Commission to operate relay broadcast stations (rule 1002). Only rule 1004 requiring the licensees to agree among themselves to insure interference-free operation has been retained. In the case where such an agreement cannot be reached among the licensees, it must be referred to the Commission and a final decision made. It is believed that operation under the provisions of rule 1004 will be more satisfactory.

#### VISUAL BROADCAST SERVICE

*Definition of service.*—The term "visual broadcast service" means a service rendered by stations broadcasting images for general public reception. There are two classes of stations recognized in the visual broadcast service: namely, television broadcast stations and facsimile broadcast stations.

The term "television broadcast station" means a station licensed for transmission of transient visual images of moving or fixed objects for simultaneous reception and reproduction by the general public. The transmission of the synchronized sound (aural broadcast) is considered an essential phase of television broadcasting, and one license will be issued for both visual and aural broadcast, as hereinafter set out.

The term "facsimile broadcast station" means a station licensed to transmit images of still objects for record reception by the general public.

Considerable development has taken place in both television and facsimile broadcasting during the fiscal year. Yet it is still generally conceded that neither has reached the stage of development that will permit standardization and commercialized operation. No applications were received during the fiscal year for commercial authorizations. However, all evidence indicates satisfactory technical progress.

*Television frequencies.*—There is a great demand for frequencies for this service. Considerable information was presented at the informal engineering conference on June 8, 1936, indicating that, because of the progress in higher definition, television pictures of the detail now possible could not be successfully transmitted within the limits of the two lower-frequency television bands of 2000–2100 kilocycles and 2750–2850 kilocycles, and that these frequency bands could be used to better advantage by other services. Accordingly, after considerable investigation, the higher band was deleted from television service and was made available for police assignments. However, the band of 2000–2100 kilocycles was retained for those desiring to carry on research work in the secondary or rural-service area. Three television stations were active on this band at the close of the fiscal year. These stations are investigating the possibilities that rural listeners can be supplied with television pictures of necessarily less detail. The only available space where there is room for high-definition television pictures is among the high frequencies (above 40000 kilocycles), which under the present state of development will not serve much beyond the limits of the average metropolitan area and would not give satisfactory coverage for television service in large rural areas.

*Improvements in television picture detail.*—One television station in New York City broadcast for public reception, using a high picture definition of 343 lines, until December 1936, when operations were discontinued in order to alter the equipment to transmit definition of 441 lines. Demonstrations of this definition in April 1937 were successful, and the improvement in the picture detail was very noticeable.

*Television broadcast stations and applications.*—One construction permit was authorized for the erection of a new television broadcast station in Philadelphia, Pa. There were 17 licensed stations and 3 outstanding applications for construction permits for new television stations at the close of the fiscal year. Under the new regulations a single license authorizes both the aural and the visual transmitters.

*The National Television Corporation application.*—Of especial interest is the application of the National Television Corporation, New York City, for a special temporary experimental authorization to operate a television broadcast station. During July 1935 this application was heard before an examiner, who recommended that it be denied. Upon petition for reconsideration filed by the applicant, the Commission, sitting en banc, ordered that the application be reheard by the full Commission. Subsequent to this rehearing the Commission, on July 28, 1936, granted the requested experimental authorization for a period of 2 months ending September 15, 1936. By appropriate action this authorization was extended to December 15, 1936. Thereafter, the applicant filed with the Commission a petition for the issuance of a regular license to operate a

television broadcast station. This petition was denied (vol. 3, F. C. C. Reports, not yet published).

*Facsimile broadcast stations.*—There is considerable evidence that facsimile broadcast service will render an important contribution to the art of broadcasting. Facsimile signals can be transmitted at a low rate compared with the rate required for television signals, and can therefore be broadcast within the narrow limits of the low-frequency bands available. The latest news flashes, market reports, weather maps, etc., can be broadcast hundreds of miles and automatically recorded in the home ready for the rural observer or the residents of small communities to read at their leisure. The most popular suggestion is that regular broadcast stations be used for facsimile service between midnight and 6 a. m. to supply the citizen with a complete record of the latest news for perusal during his breakfast. The principal questions are: What will be the public reaction, and will the cost of maintaining this new service be prohibitive?

There were four facsimile broadcast stations licensed on general experimental frequencies and one construction permit authorized at the close of the fiscal year.

#### HIGH-FREQUENCY BROADCAST SERVICE

*Definition of service.*—The term "high-frequency broadcast station" means a station licensed on frequencies above 25000 kilocycles for the transmission of aural programs for general public reception. The frequencies for these stations are allocated on an experimental basis.

*Stations and applications.*—At the close of the fiscal year there were 40 authorizations in effect in the high-frequency broadcast service. These authorizations consisted of 28 station licenses and 12 construction permits. Only 10 applications were in the files awaiting consideration by the Commission. The interest in stations of this class has not continued to develop, a fact which may be attributed to the lack of receivers in the hands of the public that can be tuned to these frequencies (26000 to 42000 kilocycles). These stations are licensed on an experimental basis with the proposed program of research as the primary object. The simultaneous rebroadcasting of programs of regular broadcast stations is incidental to the research and is used only as a source of desirable modulation. While some information has been submitted on the propagation characteristics of these high frequencies and indications are favorable for a good broadcast service on them, nevertheless more engineering data are desired before a definite allocation can be attempted.

#### EXPERIMENTAL BROADCAST SERVICE

*Definition of service.*—The term "experimental broadcast station" means a station licensed to carry on development and research for the advancement of broadcast services along lines other than those prescribed by other broadcast rules.

*Stations and applications.*—There were 12 station licenses and 1 construction permit in effect at the close of the fiscal year. One pending application for a construction permit has not received consideration by the Commission.

*Experiments in synchronization.*—One experimental station of this class was authorized to conduct experiments in synchronizing a low powered transmitter operating on the same frequency as a regular broadcast station. It is proposed to locate the transmitter of the booster station on the edge of the primary service area of the parent station. The radio-frequency signal for synchronizing would be received from an antenna directed for reception from the parent station but only a short distance from the booster (a few hundred feet or less). This is a new scheme in synchronization and if it is successful it will materially reduce the cost of synchronization by eliminating the connecting landlines.

#### THE USE OF BROADCAST FACILITIES IN EMERGENCIES

Broadcast stations in coordination with other services have figured very prominently in rescue and rehabilitation work during disasters. The wide use of broadcast receiver sets, particularly battery operating sets, including automobile sets (since secondary power lines often fail at such times), in the rural areas, places broadcast stations in a unique position for giving warnings and directing rescue work during emergency periods, especially where the broadcast stations are equipped with an auxiliary power supply.

*Ohio flood.*—A notable example of the use of broadcast facilities for this purpose was the Ohio flood of last February. The broadcast station licensees in afflicted and adjacent areas willingly loaned the use of their facilities wherever needed. This voluntary action on the part of these licensees materially aided in the preservation of life and property. Stations outside the afflicted area generously donated broadcast time for aiding in the work of rehabilitation. Millions of dollars' worth of money, food, clothing, medical supplies, and other necessities were collected. The Commission is now studying methods of organizing all communication facilities, including all broadcast, telephone, and telegraph services, for the purpose of providing an immediate and more efficient use of these facilities in future emergencies of this kind.

## COMPLAINTS AND INVESTIGATIONS

*General nature of complaints.*—The majority of the investigations conducted with regard to complaints received concerning the program service of broadcast stations have resulted in informal adjustments. Other complaints involving possible violations of the act and the rules and regulations of the Commission, including the broadcasting of lotteries, medical programs, and fortune-telling programs, and the illegal assignments of licenses and transfers of the control of licensee corporations, have been investigated, and appropriate action has followed either by way of adjustment or by the designation of applications for renewal of licenses for hearing.

The Commission maintains complete records showing the information required by Order No. 2 of the Broadcast Division, which include copies of all contracts entered into by licensees that may in any way affect the conduct or control of a broadcast station. These records show the corporate structure of each licensee corporation and a complete list of all the stockholders thereof.

Each application, particularly one for the renewal of station license, is compared with these records to determine whether a change in ownership or a transfer of the control of a licensee corporation has occurred and also to determine what interests the licensees or stockholders may have in other stations.

*Number of investigations.*—At the beginning of the fiscal year, investigations were pending against 39 stations, and during the year investigations against 52 stations were instituted. Investigations were closed against 61 stations, leaving a total of 30 stations under investigation at the close of the fiscal year. Of the number closed, 57 were adjusted informally and 4 were considered by the Commission after a formal hearing thereon.

*Political broadcasts.*—Section 315 of the Communications Act requires that equal opportunity for broadcast be consistently afforded by stations to all regularly qualified candidates for public office. Many complaints were received during the fall of 1936, an election year, involving the requirements of this section and in every instance they were adjusted by calling the attention of the station licensee to section 315 of the act.

## BROADCAST ALLOCATION SURVEYS AND HEARINGS

*Reasons for surveys and hearings.*—The increase in demand for broadcast facilities, the need for local broadcast service in many communities which do not now have local broadcast stations, and the technical improvements and the development of greater knowledge of the propagation of waves in the broadcast band which have taken place since the broadcast allocation plan now in use was established in 1932, have convinced many in the industry that improvements and changes in allocation could and should be made. The Commission,

in consideration of these conditions, conducted the extensive technical survey of broadcasting described in its second annual report and called an informal engineering hearing to discuss the numerous phases of broadcast allocation.

*Broadcast allocation survey.*—A great mass of data was obtained by the Commission in the Broadcast Allocation Survey, to which the technical staff of the Commission has devoted much time in interpretation and study. These data were the result of measurements on 40 stations made by 58 records at 11 different locations throughout the United States. The material to be analyzed consisted of 4,000 continuous 24-hour field-intensity records made over a period of 3 months, and was supplemented by ground-wave-attenuation measurements made during the same period. It contained perhaps the largest amount of potential information on radio broadcast transmission ever assembled in any single investigation. Because of the great mass of data and the wide variability of many of the factors requiring proper weighting, the extraction of this information from the data required the development of special methods of statistical analysis. A description of some of these methods has been prepared and will shortly appear in one of the periodicals devoted to statistical matters.

*Results of analysis of survey.*—A considerable portion of the results derived from the Commission's analysis of the allocation-survey data was presented in a comprehensive report at the October 5 broadcast-allocation hearing. The essential parts of this report were graphical charts showing:

1. The fading characteristics of radio waves received in the secondary service areas of broadcast stations.
2. The radio-frequency conductivity of the ground in various sections of the country.
3. The variation of the intensity of radio waves during the twilight hours.
4. The period of fading for the various broadcast frequencies.
5. The field intensity in the secondary service areas of broadcast stations, at various distances throughout the United States, as affected by fading; i. e., the field intensities exceeded 5, 10, 30, 50, 70, 90, and 95 percent of the time throughout the entire range of distances encountered in practice in the United States.

*Broadcast allocation hearing.*—All of the five different kinds of data obtained from this analysis were of inestimable value in the hearing held at the offices of the Commission in Washington, D. C., from October 5 to 21, 1936. In the notice of hearing the Commission stated that the hearing would be held "for the purpose of determining what principles should guide the Commission in matters relating to or affecting the allocation of frequencies and the prevention of interference in the band 550-1500 kc, and, in particular, what changes, if any, should be made in the Commission's regulations or in the standards heretofore applied by its Engineering Department in order to give effect to these principles."

*Subjects discussed and interests represented at the hearing.*—Specifically, the major phases of the industry that were discussed were as follows:

1. Classification of broadcast stations: The desirability of changes, the number of frequencies to be allocated to each class, the protection from interference to be afforded each class, and the amount of power to be assigned to stations of each class.

2. Standards to be applied in determining coverage and the presence or absence of objectionable interference: Nighttime propagation characteristics, attenuation in various sections of the country, ratios of desired to undesired signal for various frequency differences, signals necessary to render satisfactory service in different areas, noise levels encountered, blanket area, etc.

3. Geographical distribution of broadcast facilities: Weight to be given various factors, such as population to be served, area, economic support, engineering considerations, etc.

4. Standards and methods of measurement: In determining power, field intensity, service, and interference.

5. Apparatus performance requirements to be imposed on broadcast stations: With respect to antenna, efficiency, percentage of modulation, fidelity, etc.

6. Effect of any proposals regarding the foregoing subjects: Socially and economically upon the public and the industry as a whole and the various branches of the industry individually.

Intense interest was manifested in the hearing by all persons associated with the broadcast industry and by numerous individuals engaged in other phases of radioactivity. Approximately 45 persons appeared and gave testimony concerning the subjects set forth in the notice of hearing and other matters relating to broadcasting. The transcript of the testimony comprises 1,741 pages of material concerning all angles of the broadcast problem. Practically every group of broadcast stations having a particular problem that is separate and distinct from the problems facing the industry as a whole was represented and presented testimony. These included the clear channel stations, the regional channel stations, and the local stations, the part-time and the limited-time stations, the chain stations, the nonchain stations, etc.

There were also represented the chain broadcasting organizations, groups interested in education by radio, manufacturers of broadcast receivers, and the Institute of Radio Engineers.

Witnesses discussed much detailed engineering data, and many recommendations were presented to the Commission by the leading radio engineers of the United States. Each of the empirical standards previously in use in the allocation of broadcast stations was discussed at length, and specific recommendations were received for changes in those standards. Specifically, the mileage-frequency-power separation tables, which were published in July 1932, were discussed, and it was proposed that those tables be modified in accordance with the data contained in the allocation survey report and that, in any case, such tables be used only as a guide in the absence of more nearly accurate information on a particular case.

The engineers presenting testimony to the Commission were asked to state their opinion regarding the accuracy of the data graphically portrayed in a series of curves (showing distances to ground-wave field-intensity contours versus frequency, ground conductivity, and power), which was published by the Commission in May 1936. Those engineers stated that they were in general agreement with the data so shown and had not found them to be incorrect in practice.

The analysis of night sky-wave recordings as contained in the allocation survey report (figs. 9 and 10) was accepted as being the most nearly complete data available upon this subject, although a few engineers were of the opinion that the data could well be supplemented by studies in other years or at other seasons of the year.

There were various specific proposals regarding the reclassification of broadcast stations into additional groups other than those provided for in the present plan of allocation.

The present standard of field intensity, which is taken as the limit of the blanket area, should, in the opinion of most of the engineers presenting testimony, be modified to provide for a higher permissible signal intensity. Values as high as 1 volt per meter were recommended for use as such a standard.

Other recommendations, with detailed studies in support thereof, were made by various engineers concerning the permissible value of undesired signal that may exist, without the production of objectionable interference to a desired station, when the undesired station operates on the same frequency, or on a frequency 10, 20, 30, or 40 kilocycles removed.

*Further conference on January 18, 1937.*—The Commission was not satisfied that sufficient study had been given to certain factors in connection with the study of blanket field intensity standards and to the problem of the ratio of desired to undesired signal when two stations are 10 kilocycles removed in frequency, and a further conference on these two subjects was called for January 18, 1937. This conference was well attended by various consulting engineers, laboratory representatives, receiver manufacturers' representatives, in addition to various broadcast station engineers.

*Preliminary engineering report to the Broadcast Division.*—All the data and the recommendations presented at the hearing of October 5, 1936, and the conference of January 18, 1937, are being carefully studied. The Engineering Department made a report, dated January 11, 1937, entitled "Preliminary Engineering Report to the Broadcast Division Concerning the October 5, 1936, Hearing—Docket 4063." This report covers 43 pages and gives a summary of the engineering presentation and conclusions.

*Further survey of rural radio reception conditions.*—The data compiled from the postcard questionnaire survey conducted in connection with the allocation survey, as reported in the previous annual report, were very helpful in determining general reception conditions in the rural areas and the types of stations upon which the average rural resident is dependent for his broadcast service. These data were, however, silent as to any differentiation between daytime and nighttime reception conditions, and the Commission was of the opinion that due to differences in propagation conditions, etc., there might be a material change in the results of the survey if an attempt were made to separate the data concerning daytime and nighttime reception conditions. The Commission therefore authorized a second questionnaire survey, which was conducted during April 1937. Approximately 31,000 questionnaire cards were mailed to the fourth-class postmasters throughout the United States. The Commission received in reply approximately 16,000 cards. The questionnaire card requested specific information concerning daytime receiving conditions and nighttime receiving conditions in the community where the postmaster resided. The analysis of these data has not yet been completed.

## TECHNICAL DEVELOPMENTS IN THE BROADCAST ART

There have been several new technical developments in the broadcast industry. Although some of these have been known or in limited use before, they have only recently been used to any extent by broadcast stations.

A number of broadcast stations have installed shunt-excited (grounded) antenna systems, which are designed to reduce costs and minimize the effect of lightning. The latter is very troublesome to broadcast stations located in areas subject to frequent and severe electrical storms.

A new high-efficiency linear-power amplifier for modulated waves has been developed to reduce the consumption of power, the size of the high-voltage transformer and rectifier and the cooling system, which are important items in the operating costs of stations, particularly of those stations operating with high power.

The use of "reverse feedback" to reduce distortion and noise in the transmitted signals has been incorporated in a number of transmitters with very satisfactory results.

Automatic overmodulation limiters have been placed on the market, which permit maintaining a high average level of modulation without causing undesirable overmodulation.

Phase indicators have been developed which are invaluable not only in the first adjustment of directional arrays but in maintaining the proper adjustment.

There have also been several developments in broadcast-receiver design (directed mainly to improve the ease of manipulation or the fidelity in reproduction), two of which are automatic-tuning and volume-expansion circuits. Receivers so equipped have improved the quality of reproduction by the elimination of the distortion and interference due to improper tuning and by an increased extension of the volume range. None of the receiver developments has any substantial effect on the allocation of broadcast stations.

## FEDERAL RADIO EDUCATION COMMITTEE

*Origin and purpose.*—The Federal Radio Education Committee was sponsored and appointed by the Commission with the cooperation of other Government departments as a result of the Commission's study pursuant to section 307 (c) of the Communications Act of 1934 and the conferences held pursuant thereto.<sup>18</sup>

The Communications Act of 1934, section 307 (c), provides:

The Commission shall study the proposal that Congress by statute allocate fixed percentages of radio broadcasting facilities to particular types or kinds of non-profit radio programs, or to persons identified with particular types or kinds of non-profit activities, and shall report to Congress, not later than February 1, 1935, its recommendations together with the reasons for the same.

In accordance with this mandate, the Commission held a public hearing in its offices during October and November 1934, at which voluminous information was supplied. On the basis of this information and of other information in the files of the Commission, a report was made to the Congress dated January 22, 1935. The Commission proposed in that report (p. 7) to hold a national conference at an early date in Washington, at which time plans for mutual cooperation between broadcasters and nonprofit organizations could be made to the end that the educational experience of the educators be combined with the program technique of the broadcasters, thereby better to serve the public interest.

This conference was held on May 15, 1935, in Washington, D. C. Due notice was given to all broadcast licensees of the Commission, the National Association of Broadcasters, all chain broadcasting companies, all educational, religious, and eleemosynary institutions, and all persons, groups, and associations of every character interested in the subject to be present and to participate in this conference. The cooperation and participation of all Governmental agencies, particularly of the United States Bureau of Education, were especially requested. It was expected that at this hearing definite plans would be presented for consideration and study.

As a result of this conference it was decided to appoint a committee to be known as the Federal Radio Education Committee. Dr. John W. Studebaker, United States Commissioner of Education, accepted the chairmanship of the committee, and invitations for membership to the committee, were sent to persons prominent in the fields of education and broadcasting. On December 18, 1935, the Commission announced the names of the members on this committee as follows:

Mr. Waldo Abbott, University of Michigan.

Mr. Merlin Aylesworth, president, National Broadcasting Co.

Mr. James W. Baldwin, managing director, National Association of Broadcasters.

<sup>18</sup> There is here given a brief outline of the activities of the Commission relative to this section of the act prior to the formation of the Federal Radio Education Committee and prior to the last fiscal year. This outline is given at this time as no previous mention of this work has been made in an annual report to Congress. A separate report was made as required.

- Mr. Edgar Bill, Radio Station WMBD.  
 Dr. S. Parks Cadman, Federal Council of Churches of Christ in America.  
 Dr. Morse A. Cartwright, director, American Association for Adult Education.  
 Dr. W. W. Charters, director, Bureau of Educational Research, Ohio State University.  
 Dr. Harry W. Chase, chancellor, New York University.  
 Mr. Gardner Cowles, Jr., Des Moines Register.  
 Mr. Lester E. Cox, Radio Station KWTO.  
 Mr. Edwin Craig, Radio Station WSM.  
 Dr. A. G. Crane, president, University of Wyoming.  
 Dr. Walter Damrosch, National Broadcasting Co.  
 Mr. Milton S. Eisenhower, Director of Information, Department of Agriculture.  
 Mr. John Elmer, Radio Station WCBM.  
 Mr. O. D. Fisher, Station KOMO.  
 Mr. Leo J. Fitzpatrick, president, National Association of Broadcasters.  
 Mr. Willard Givens, secretary, National Educational Association.  
 Mr. Tom C. Gooch, Daily Times Herald.  
 Mr. William Green, president, American Federation of Labor.  
 Mrs. Rose Jacobs, president, Hadassah Women's Zionist Organization.  
 Rev. Geo. W. Johnson, Catholic University of America.  
 Dr. C. B. Jolliffe, Radio Corporation of America.  
 Mr. Laudin Kay, Station WSB.  
 Mr. John F. Killeen, Director of Broadcast Division, Federal Communications Commission.  
 Dr. Cline M. Koon, Office of Education, Department of Interior.  
 Mrs. B. F. Langworthy, president, National Congress of Parents and Teachers.  
 Miss Luella S. Laudin, Women's National Radio Committee.  
 Mr. H. B. McCarty, president, National Association of Educational Broadcasters, University of Wisconsin.  
 Mr. A. J. McCosker, president, Bamberger Broadcasting Service, Inc.  
 Mrs. Harold V. Milligan, president, Women's National Radio Committee.  
 Dr. Robert A. Millikan, president, California Institute of Technology.  
 Mr. William S. Paley, president, Columbia Broadcasting System.  
 Mr. A. D. Ring, assistant chief engineer, Federal Communications Commission.  
 Mr. John Shepard, III, president, The Yankee Network.  
 Dr. Levering Tyson, director, National Advisory Council on Radio in Education.  
 Miss Judith C. Waller, Mid-West Educational Director, National Broadcasting Co.  
 Mr. Frederick A. Willis, Columbia Broadcasting System.  
 Mr. Geo. F. Zook, president, American Council on Education.

*Activities of the committee.*—After the formation of this committee, an agenda was prepared for the first meeting, which was called by Chairman Studebaker, in February 1936. The primary objectives of the Federal Radio Education Committee, under the chairmanship of the Commissioner of Education, were as follows:

1. Eliminate controversy and misunderstanding between groups of educators and between the industry and educators.
2. Promote actual cooperative arrangements between educators and broadcasters on national, regional, and local bases.

Since the formation of this committee it has carried forward the study pursuant to section 307 (c) of the act with the full cooperation of the Commission. The report of the chairman, Dr. John W. Studebaker, for the last fiscal year follows:

By J. W. STUDEBAKER, *Chairman*

Following the appointment of the Federal Radio Education Committee by the Federal Communications Commission, in December 1935, J. W. Studebaker, chairman of the committee, organized a small planning committee consisting of a half-dozen members—Messrs. James W. Baldwin, Levering Tyson, A. D. Ring, C. M. Koon, C. F. Klinefelter, with J. W. Studebaker as chairman and Mrs. Gertrude Broderick as secretary. The purpose of the planning committee was to survey the possibilities for collecting and correlating data on which the main committee might base its deliberations when it came together for a meeting.

Since this was the first attempt that had been made for broadcasters and educators to meet together around the same table to discuss their various problems and to try to solve them cooperatively, the planning committee, in trying to arrive at some mode of action, soon discovered an almost total lack of factual material on which the committee might proceed to make recommendations to the Federal Communications Commission. It was agreed in the planning committee that before anything could be accomplished the necessary factual material would have to be compiled. It was agreed finally that the committee might well undertake a program of studies.

As a means of getting started, the planning committee designed a number of studies for purposes of consideration and discussion by the general committee. These studies were briefly outlined in an agenda and the general committee was called together for a meeting in Washington in February 1936. The general committee agreed that the study program was the proper procedure for the committee to adopt and each committee member was invited by the chairman to submit additional studies which might be incorporated in the program. As a result of that invitation, outlines of some 18 studies were developed.

The general committee voted to appoint subcommittees which would be charged with the responsibility of getting the program under way. The newly appointed committees were as follows:

An executive committee—replacing the old planning committee:

J. W. Studebaker, <i>Chairman.</i>	Willard Givens.
C. F. Klinefelter, <i>Vice Chairman.</i>	R. C. Higgy.
Gertrude G. Broderick, <i>Secretary.</i>	Rev. George Johnson.
J. W. Baldwin.	A. D. Ring.
John Elmer.	Levering Tyson.

A technical subcommittee to revise the outline of each project, to estimate the probable cost, and recommend to the executive committee:

W. W. Charters, <i>Chairman.</i>	C. M. Koon.
Gertrude G. Broderick, <i>Secretary.</i>	Henry C. Link.
Hadley Cantril.	Robert S. Lynd.
John Karol.	Edward S. Robinson.

A subcommittee on conflicts and cooperation, to study the problem of conflicts and to determine what it considered to be the responsi-

bility of the Federal Radio Education Committee with regard to them:

A. G. Crane, *Chairman*.  
 Gertrude G. Broderick, *Secretary*.  
 Harry C. Butcher.  
 William B. Dolph.  
 M. S. Eisenhower.

H. B. McCarty.  
 George B. Porter.  
 Thomas Reed.  
 Frank M. Russell.

An intensive 2-day meeting in Washington developed a report by the technical committee to the executive committee, recommending 16 studies at an estimated cost of \$187,800. An additional study was proposed but it was felt that because of its highly technical nature, it should be scrutinized carefully by specialists in the field of research in psychology and sociology. The project was labeled "The Influence of Radio on Children and Adults" and Dr. Hadley Cantril, of the technical subcommittee, was appointed to head an extra committee which would design in detail the kind of study that was being proposed.

Dr. Cantril met with some dozen men and a study was proposed at an estimated cost of \$54,000. This amount was added to the above-mentioned \$187,800.

The conflicts committee also held a meeting in Washington, at which time it reviewed the proposed program of studies as set up and accepted by the technical and executive committees. It was felt that for their purposes it would be necessary for additional studies to be made to bring out information which would be necessary for the successful operation of the conflicts committee. Two additional studies which this committee proposed were accepted by the executive committee and added to the original proposal, making a total of \$257,800 to cover the entire immediate research program of the committee.

The proposal was placed in the hands of the chairman, J. W. Studebaker, whose next responsibility was to find ways and means of financing the program. Since the results of these studies would be shared in by broadcasters and educators alike, it was believed that the broadcasting industry might be called upon to contribute part of the fund if educators—through some of the foundations—could contribute the other part.

On January 8th of this year, Judge E. O. Sykes and J. W. Studebaker extended a joint invitation to representatives of the broadcasting networks, the National Association of Broadcasters, the presidents of the Carnegie and the Rockefeller Foundations, and the director of the National Advisory Council of Radio in Education, to meet at the Federal Communications Commission to discuss in a closed, informal session just what could be done to finance the program. Following is a list of those who attended:

James W. Baldwin, National Association of Broadcasters.  
 Harry C. Butcher, Columbia Broadcasting System.  
 Commissioner Norman S. Case, Federal Communications Commission.  
 Dr. F. P. Keppel, president, Carnegie Corporation.  
 C. F. Klinefelter, Office of Education.  
 Lenox R. Lohr, National Broadcasting Co.  
 A. J. McCosker, Mutual Broadcasting Co.  
 John Marshall, The Rockefeller Foundation.  
 William S. Paley, Columbia Broadcasting System.  
 Anning S. Prall, Federal Communications Commission.

A. D. Ring, Federal Communications Commission.

John F. Royal, National Broadcasting Co.

Frank M. Russell, National Broadcasting Co.

David H. Stevens, The Rockefeller Foundation.

J. W. Studebaker, Commissioner of Education.

Levering Tyson, National Advisory Council on Radio in Education.

Frederick A. Willis, Columbia Broadcasting System.

Judge E. O. Sykes, presiding, Federal Communications Commission.

Gertrude G. Broderick, secretary, Federal Radio Education Committee.

Before making actual commitments it was suggested by some of the men in the industry that it might be possible to reduce the amount of money involved, by reworking the study outlines, combining some with others. It was agreed to select out of the attending group a small committee composed of three educators and three broadcasters, to undertake the revamping of the study program. That committee consists of the following members:

Levering Tyson, *Chairman*.  
W. W. Charters.  
Hadley Cantril.

John F. Royal.  
Frederick A. Willis.  
James W. Baldwin.

The committee agreed to report to the same group in about 6 weeks.

On March 12, at a meeting in Washington of the group which met on January 8, the revised program was presented by Chairman Tyson and further discussion followed. The informal "Committee of Six"—as it was referred to—reduced the original amount requested from \$257,800 to \$250,500. In so doing, certain studies were eliminated and others were combined. It is expected that the entire program can be completed within a period of 2 years.

There was unanimous agreement that the Committee of Six had done so well with their first assignment that they should be given the further responsibility of canvassing the potential financial sources. It is expected that the results of this canvass will be available soon.

In addition to the exploratory work of the subcommittee up to date, the Office of Education launched an experiment in genuine cooperative effort, the results of which are significant and should be useful to the committee in some of its future deliberations.

From the discussions which took place in the meetings of the original planning committee, the general committee, and the various subcommittees, it became quite evident that one large category of problems was concerned with difficulties relative to local and regional broadcasting. Local station managers, for example, reported that they had available time which they would be glad to have utilized by educational agencies if satisfactory programs could be provided. Many of the local school superintendents and officials of colleges and universities freely commented on the cooperative attitude of local station managers, but confessed their lack of experience in building and producing suitable educational programs. While none of the studies proposed by the subcommittees dealt with a direct attack on the situation I, as chairman of the Federal Radio Education Committee, felt justified in launching some experimental work designed to bring about a gradual improvement in what is essentially a local problem.

The Office of Education has been operating an experimental educational broadcast program for the past year and a half, financed with emergency relief funds. In connection with this activity, after consultations with J. W. Baldwin, of the National Association of

Broadcasters, and Levering Tyson, of the National Advisory Council on Radio in Education, we established a script writing, editing, and exchange service as a joint enterprise between the Radio Project and the Federal Radio Education Committee. An initial series of scripts was written, designed expressly for local station production. Station managers and the local educational agencies were circularized with a view to encouraging educational groups to engage in the actual production of this series over local stations. The success of this initial step was so pronounced that an exchange service was started whereby educational scripts which had been produced at one time or another were edited and made available for local purposes. Scripts broadcast over networks chains by the radio project were also made available.

Following are a few significant figures indicating the success of this undertaking:

Within the year programs furnished by the script exchange have been carried by 108 radio stations located in 41 States.

One hundred and eight stations have carried 161 programs series furnished by the exchange.

Each series has averaged 6 scripts (or 6 programs), making a total in the 161 series of 966 programs carried by 108 stations.

More than 1,700 local groups, including high schools, colleges and universities, theater guilds, C. C. C. camps, radio stations, and many others, have been served by this script exchange.

These groups have received 50,000 copies of radio scripts, 10,000 copies of the Radio Manual, Glossary of Radio Terms, and Music Arrangements.

It is believed that the study program, as it has been designed, will make it possible to carry out the charter given to the committee by the Federal Communications Commission—namely, to combine forces which will:

1. Eliminate controversy and misunderstanding between groups of educators and between the industry and educators.
2. Promote actual cooperative arrangements between educators and broadcasters on national, regional, and local bases.

There is reason to feel that sufficient funds will be available within the next few months to get the program under way. A complete detailed report on the proposed program will be sent to you within the next 2 or 3 months.

**PART III**

**THE COMMISSION**

**TELEGRAPH DIVISION**

**MEMBERS OF THE TELEGRAPH DIVISION**

**AS OF JUNE 30, 1937**

---

IRVIN STEWART, *Chairman.*

GEORGE HENRY PAYNE, *Vice Chairman.*

ANNING S. PRALL.

# TELEGRAPH DIVISION

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For the purpose of this report the material has been presented under the following topics: Organization and Jurisdiction of the Telegraph Division, Rates and Tariffs, Supervision of Accounts, Wire Facilities, Radio Facilities, Complaints and Investigations, Financial and Other Statistical Data, and Technical Developments in the Telegraph Art.

## ORGANIZATION AND JURISDICTION OF THE TELEGRAPH DIVISION

Under the terms of Commission General Order No. 1 the Telegraph Division exercises jurisdiction over matters connected with and relating to the licensing of radiotelegraph and certain other classes of radio stations and licenses of radio operators; over matters relating to the promotion of safety of life and property through the use of radio communication; and over the regulation of interstate and foreign communication by telegraph originating or received in the United States, whether by wire, radio, or cable. All stations located in Alaska, other than broadcast stations, are placed under the jurisdiction of the Telegraph Division because of the unique situation in regard to communication existing in that Territory, as discussed more fully on page 70.

The responsibilities of the Telegraph Division are carried out in part through the exercise of its power to determine and prescribe just and reasonable rates, maximum or minimum rates, or maximum and minimum rates for interstate and foreign telegraph communication, to approve or disapprove classifications of messages, to suspend and make determinations with regard to tariffs, and to issue on certain conditions or to refuse or revoke various classes of authorizations covering the operation of radio stations. Carriers, both radio and wire, are required to file schedules of charges with the Commission, to maintain their accounts in accordance with regulations promulgated by the Commission, and to render specific reports with respect to their operation. Further regulation of wire-telegraphy is attained through the granting or denying of certificates of public convenience and necessity for the construction, extension, acquisition, or operation of additional lines. In general, the Division has power to exercise functions so as to make available so far as possible to all the people of the United States a rapid, efficient, Nation-wide, and world-wide wire- and radio-communication service with adequate facilities at reasonable charges and to serve purposes of the national defense.

## NEW LEGISLATION

During the fiscal year, two acts of Congress were passed amending the Communications Act of 1934, which greatly extended the duties of the Telegraph Division.

*Amendment of section 318.*—An act approved March 29, 1937 (Public Law No. 26, 75th Cong.), amended section 318 of the act for the purpose of permitting the Commission to waive the requirement, in the case of certain classes of radio stations, that the actual operation of transmitting apparatus be carried on only by a person holding an operator's license, where it finds that the waiver or modification of that requirement is in the public interest. The primary object of the amendment is to permit the use of automatic radio devices under regulations to be formulated by the Commission, and the amendment is in keeping with progress in the radio art. For the effect of this amendment see page 73.

*Public Law No. 97, 75th Congress.*—The act of Congress approved May 20, 1937 (Public Law No. 97, 75th Cong.), amended the act in several important particulars, the principal purpose being to add a new type of jurisdiction and to impose new duties on the Commission in connection with the promotion of safety of life and property through the use of wire- and radio-communication. A new part was added to the provisions of the act relating to radio, providing for the compulsory equipment of ships with radio installations; conferring power on the Commission to make exemptions in certain classes of cases; providing for the maintenance of watches by operators and for the use of automatic alarms; setting forth detailed technical requirements for ship radio transmitters and direction-finding apparatus, including radio equipment for lifeboats; authorizing the Commission to approve the installations; providing for the transmission of distress messages and information relating to hazards to navigation; requiring the carrying by ships, to which the act applies, of appropriate certificates or certifications as to compliance; making provision for suitable inspections; and adding new provisions relating to forfeitures, and to remissions or mitigations thereof by the Commission. The new law repeals the Ship Act of 1910, as amended, except as it relates to vessels navigating the Great Lakes, and directs that a special study be made by the Commission with regard to radio requirements for safety purposes for ships navigating the Great Lakes and the inland waters of the United States. The matter of jurisdiction of and preparation for this special study is referred to on page 20. Other provisions of Public Law No. 97 authorize the Commission to make rules and regulations pursuant to the act for the carrying out of the Safety Convention, and substantial changes have been made in the provisions of the act with regard to the suspension of radio operators' licenses. For the effect of this amendment see page 73.

## RATES AND TARIFFS

### RATE SCHEDULES

*Filing of tariffs; rules and regulations relating thereto.*—Pursuant to section 203 of the act, telegraph and other communication carriers are required to file with the Commission and keep open for public inspection schedules showing all charges for interstate and foreign communication, including in such schedules all classifications, practices, and regulations affecting such charges. Accordingly, a total of 10,888 rate schedules or tariff publications relating to telegraph rates and services have been filed since the organization of the Commission, to and including June 30, 1937. Of this number, 8,518 related exclusively to telegraph rates and 2,370 related to both telegraph and telephone rates. During the fiscal year, a total of 5,489 tariff publications relating to telegraph rates and services were filed with the Commission, of which number 3,620 related exclusively to telegraph rates and 1,869 related to both telegraph and telephone rates.

During the fiscal year, much progress was made in requiring telegraph tariff publications to be brought in compliance, as to both form and content, with statutory requirements and with the rules and regulations promulgated by the Commission, and to be modified in such manner as to remove objectionable provisions therein.

These requirements have resulted in the orderly publication and filing of rate schedules showing charges for interstate telegraph services and describing all classifications, regulations, and practices relating thereto. This condition contrasts favorably with the one existing prior to the passage of the act, when many rates or regulations affecting interstate communication service were not published or fully described in tariffs made available to the public.

*Public reference room.*—The many rate schedules mentioned above are made conveniently available to the public through the medium of a public reference room at the offices of the Commission. By this means the public has access to an official file of all charges for interstate telegraph service, all international telegraph rates (insofar as such rates are required to be filed with the Commission), and all classifications, regulations, and practices relating to such telegraph services and charges. Many persons availed themselves of the opportunity to use the public reference room during the fiscal year. In several instances, photostatic copies of tariff material were obtained for the public at cost.

*Reports to the public.*—The many tariff publications pertaining to telegraph rates and regulations received during the fiscal year and mentioned above were reported to the public by means of press releases, issued upon their receipt by the Commission. These notices to the public described briefly the dates of receipt, the dates the new schedules were to become effective, and the general nature of such schedules. This information is released to the public in order that

all interested parties may be informed of, and be enabled to file protests relating to, all changes in telegraph charges or services or in the classifications, regulations, and practices pertaining thereto.

*Examination and correction of tariffs.*—Each of the several thousand tariff publications relating to telegraph rates received during the fiscal year was carefully examined to determine whether it conformed to the requirements of the act and to the regulations prescribed by the Commission relative to the filing of tariffs, and particularly to discover any rates, regulations, or provisions that appeared unreasonable, unjustly discriminatory, unduly prejudicial or preferential, or otherwise unlawful. In many instances, corrections and modifications were required to be made in these tariff schedules.

*Rejection and suspension of tariffs.*—During the fiscal year, certain tariff schedules of five telegraph carriers were suspended by the Telegraph Division pending investigation and public hearing regarding the lawfulness of the rates, classifications, or regulations contained therein. In six instances, tariffs offered for filing by telegraph carriers were rejected because of failure to give lawful notice of their effective dates.

*Special tariff applications.*—Section 203 (b) of the act prohibits any change in the charges of communication carriers or in the classifications, regulations, and practices relating thereto, except after 30 days' notice to the Commission and to the public, unless the Commission, in its discretion and for good cause shown, modifies this requirement. During the fiscal year, 136 applications were received from telegraph carriers for special permission to publish schedules of charges on less than 30 days' notice or without regard to certain other regulations relative to the publication of tariffs. Of this number, the Division granted 122 applications and denied 13. One application was withdrawn prior to action thereon. Those that were granted pertained generally to reductions in charges, the establishment of new or extended services, or other modifications or changes clearly in the public interest.

#### RATE REDUCTIONS

During the fiscal year the Division continued its investigation of the existing classifications of telegraph service commenced under Telegraph Division Order No. 12 during a prior fiscal year.

*Night-rate reduction.*—The important reduction in night telegraph rates, effective June 1, 1937, resulted from the above-mentioned investigation and from conferences relating thereto. It is estimated that, based on the present volume of traffic, the saving to the American public will be \$3,000,000 annually; and with increase in traffic the saving to the public will be proportionately greater. These reduced night rates constitute the lowest in the history of American telegraphy and introduce for the first time the principle of decreasing rates as the length of the message increases. Combined with the reduction, there was brought about a simplification of the night-rate structure in that the old night-message and night-letter classifications were replaced by a single new night-letter service. Corresponding reductions and modifications were made in the rates and classifications offered by the radiotelegraph carriers in the domestic field, preserving their existing word differential.

Illustrations of the reductions effected by the new night rates are shown in the following tables:

*Wire telegraph rates for overnight messages*

Between Washington and—	25 words		100 words	
	Old rate	New rate	Old rate	New rate
Richmond, Va.....	\$0.30	\$0.24	\$0.60	\$0.39
Philadelphia, Pa.....	.30	.24	.60	.39
Norfolk, Va.....	.36	.28	.72	.46
New York, N. Y.....	.36	.28	.72	.46
Pittsburgh, Pa.....	.42	.30	.84	.55
Boston, Mass.....	.48	.35	.96	.68
Chicago, Ill.....	.60	.42	1.20	.90
Omaha, Nebr.....	.66	.48	1.44	1.11
Minneapolis, Minn.....	.66	.48	1.44	1.11
Denver, Colo.....	.90	.50	1.80	1.40
Salt Lake City, Utah.....	.90	.50	1.80	1.40
San Francisco, Calif.....	.96	.50	2.40	1.70

*Radiotelegraph rates for overnight messages*

Between Washington and—	30 words		120 words	
	Old rate	New rate	Old rate	New rate
Baltimore, Md.....	\$0.30	\$0.24	\$0.60	\$0.39
Camden, N. J.....	.30	.24	.60	.39
Philadelphia, Pa.....	.30	.24	.60	.39
New York, N. Y.....	.36	.28	.72	.46
Detroit, Mich.....	.48	.35	.96	.68
Boston, Mass.....	.48	.35	.96	.68
Chicago, Ill.....	.60	.42	1.20	.90
New Orleans, La.....	.60	.42	1.20	.90
Los Angeles, Calif.....	.96	.50	2.40	1.70
San Francisco, Calif.....	.96	.50	2.40	1.70
Seattle, Wash.....	.96	.50	2.40	1.70

*Reduced word-count for groups of figures and marks.*—Another rate reduction of major importance, which became effective during the fiscal year, resulted from the change in regulations applicable to the counting of words in domestic telegraph messages whereby, among other things, groups of figures and groups of figures and marks are counted at the rate of five characters or fraction thereof per word, instead of one word for each character as formerly. Also, when figures and marks are grouped with the letters, the figures and marks are counted in a similar manner when they appear in uninterrupted sequence within such groups. The letters within such groups are also counted in a similar manner when appearing in uninterrupted sequence, which was the former rule in regard to letters.

*List of important reductions.*—Among the reductions in telegraph rates that became effective during the fiscal year are the following, listed according to their effective dates. While estimates have not been made, except in the case of the new night rates mentioned above, it is evident that these rate reductions resulted in large savings to the public.

Effective July 1, 1936, the press rates of Postal Telegraph-Cable Co., Mackay Radio & Telegraph Co., Commercial Pacific Cable Co., the Western Union Tele-

graph Co., and R. C. A. Communications, Inc., were reduced from the United States to the Philippine Islands, and the press rates of the Commercial Pacific Cable Co., Mackay Radio & Telegraph Co., and R. C. A. Communications, Inc., were reduced from Honolulu (Hawaii) to the Philippine Islands.

Effective July 1, 1936, the timed-wire-service rates of The Western Union Telegraph Co. were reduced over a large number of routes.

Effective August 1, 1936, the night letter rates of R. C. A. Communications, Inc., All America Cables, Inc., Mackay Radio & Telegraph Co., Postal Telegraph-Cable Co., The Western Union Telegraph Co., and Tropical Radio Telegraph Co., were reduced to Habana (Cuba).

Effective August 21, 1936, the telegraph rates of the Public Utilities California Corporation, a telegraph carrier serving parts of California, Oregon, and Nevada, were reduced over many of its routes upon its establishment of so-called square-to-square rates for message telegraph service.

Effective January 1, 1937, the rates of the Pacific Telephone & Telegraph Co. were reduced over many of its routes by the establishment of a square-to-square basis of telegraph rates.

Effective January 7, 1937, the rates of the Mackay Radio & Telegraph Co., Postal Telegraph-Cable Co., Commercial Pacific Cable Co., The Western Union Telegraph Co., and R. C. A. Communications, Inc., were reduced from the United States to Guam, Midway, Hawaiian Islands, and Philippine Islands.

Effective June 1, 1937, new "night letter" rates applicable between points in the United States, canceling the then existing "night message" rates, were filed by the Western Union Telegraph Co., Postal Telegraph-Cable Co., Continental Telegraph Co., Pacific Telephone & Telegraph Co., Tropical Radio Telegraph Co., Mackay Radio & Telegraph Co., and R. C. A. Communications, Inc.

Effective June 22, 1937, regulations applicable to messages between points in the United States, providing for the counting of figures, groups of figures and marks, and groups of figures and letters, at the rate of five characters per word when used in their normal sense and not as a cipher or code, instead of one figure per word, were established by R. C. A. Communications, Inc.

Effective June 23, 1937, regulations similar to those described in the paragraph immediately above were established by the Western Union Telegraph Co.

Effective June 23, 1937, regulations similar to those described in the second paragraph above were established by Postal Telegraph-Cable Co. and Mackay Radio & Telegraph Co. except that the new word-count is applicable to code and cipher messages as well as to plain-language messages.

In addition to the foregoing, there were many other reductions of less importance to the public affecting both interstate and foreign rates, and miscellaneous changes such as reduced rates for telegraph service effective on special occasions or in connection with extraordinary events such as the Olympics, and the establishment from time to time of commercial news service rates applicable to certain cities.

The Division will give particular attention to the effect of these rate reductions upon the revenues of the telegraph carriers and to the extent to which traffic is stimulated by such reductions.

*Adjustment of State and square rates.*—Surveys were made with reference to existing telegraph-rate structures, resulting in the discovery of inconsistencies and irregularities in the so-called State and square rates. Progress was made by the Division in its efforts toward the correction or elimination of these irregularities.

#### NEW AND EXTENDED SERVICES

Many new and extended telegraph services which were established during the fiscal year 1937 were tantamount to rate reductions, inasmuch as they made available to the public cheaper telegraph services. It is apparent that the establishment of new types of service and the extension of existing services are of paramount importance to the public.

*List of new and extended services.*—All the new and extended services that became effective during the fiscal year 1937 are briefly described below, arranged in the order of their effective dates.

Effective August 15, 1936, Globe Wireless, Ltd., established "radiomail" service between Chicago (Ill.) and Guam, Hawaiian Islands, and Philippine Islands, and established coastal radio-telegraph service from Chicago to ships at sea.

Effective September 19, 1936, the Western Union Telegraph Co. established bulletin service for football games.

Effective September 21, 1936, the Western Union Telegraph Co. established "telcimeter" service between New York and Chicago.

Effective September 24, 1936, Radiomarine Corporation established new night radiotelegram service from ships at sea to points in the United States.

Effective September 26, 1936, Mackay Radio & Telegraph Co. established night radiotelegram service from ships at sea to points in the United States.

Effective October 15, 1936, Tropical Radio Telegraph Co. established night radiotelegram service from ships at sea to points in the United States.

Effective November 14, 1936, Tropical Radio Telegraph Co. established stock-quotation service between Miami (Fla.) and Nassau (Bahamas).

Effective November 26, 1936, Globe Wireless, Ltd., established telegraph service from Honolulu, Guam, San Francisco, Los Angeles, and Seattle to points in Europe and Africa, through connection at New York with the French Telegraph Cable Co.

Effective December 7, 1936, the Western Union Telegraph Co. established special rates for messages requesting hotel reservations and replies thereto.

Effective December 29, 1936, the Western Union Telegraph Co. established facsimile service between New York and Chicago.

Effective January 1, 1937, All America Cables, Inc., established "drop-copy press" service at all points served by the company between New York and Buenos Aires (Argentina).

Effective May 26, 1937, Hearst Radio, Inc., established a new "reception" service.

Effective on various dates during the fiscal year 1937, 358 cities were added to the list of those to which American Telephone & Telegraph Co. offered teletypewriter exchange service.

Effective on various dates during the fiscal year 1937, 290 cities were added to the list of those to which the Western Union Telegraph Co. offered some class of commercial news service.

#### GOVERNMENT RATES

The Telegraph Division issued its Order No. 15-C, prescribing rates of pay for Government communications by telegraph during the period from July 1, 1937, to June 30, 1938. In general, this order provides that Government communications shall have priority over all other business and shall be sent at rates not to exceed 40 percent of the rates applicable to commercial communications of the same class, of the same length, and between the same points in the United States, subject to certain minimum charges. Certain exceptions are made in the case of serial messages, timed-wire service, and communications between the continental United States and its possessions, between the United States and foreign countries, and between the United States and ships at sea, for which other provisions are prescribed.

#### INTERNATIONAL RATES

Special attention has been given to the relationship of the American carriers with the foreign government administrations which normally operate foreign telegraph service, with special emphasis on the competitive problems resulting from foreign contracts, the division of tolls between the carriers sharing in the charges for the

handling of international messages, and the settlement of accounts involving fluctuating foreign currencies.

*International traffic studies; international conventions; review of international regulations.*—International rate and traffic data were prepared for use by the American Delegation at the meeting of the International Consulting Committee on Telegraph at Warsaw, Poland, in October, 1936. At the end of the fiscal year, preparation was also being made for the meeting of the International Telephone and Telegraph Conference at Cairo, Egypt, in February 1938. These matters are discussed under the title "International Conferences" on pages 7 to 9 of this report.

*Special studies of international traffic and division of tolls.*—A study was made of foreign telegraph rates from points in the United States to points in certain foreign countries reached via routes across the Pacific Ocean. The results of this study were made available to the interested parties, together with an explanation of rate conditions. Other studies were also made of international telegraph rates and their effect upon American communication carriers and American users of international service.

An order was issued during the fiscal year requiring carriers to submit information relative to the division of tolls on foreign traffic. A study will be made of the information obtained under this order.

The necessity for making studies such as those mentioned above will continue. Experience indicates that this type of information is of vital importance in effective rate regulation.

*Cooperation with the Berne Bureau.*—During the fiscal year, the Division cooperated with the Bureau of the International Telecommunication Union at Berne, Switzerland, by furnishing information relative to American telegraph services, and particularly by securing information for this Bureau with reference to the volume of traffic and with respect to land-line charges for radiotelegrams exchanged between mobile stations and points in the United States, Alaska, Canada, and Mexico, via coastal stations in the United States and Alaska.

## SUPERVISION OF ACCOUNTS

The regulation, including the examination, of the accounts of communication carriers is necessary in the effective administration of the act. It is considered fundamental in effective rate regulation and is an indispensable means of fact finding by the Commission.

### UNIFORM SYSTEMS OF ACCOUNTS

*Revised system of accounts for wire-telegraph carriers.*—A uniform system of accounts was prescribed for telegraph and cable companies (exclusive of wireless telegraph companies) by the Interstate Commerce Commission, effective on January 1, 1914. This system is continued in effect by the act until it is modified by this Commission. No uniform system of accounts has been prescribed for, or adopted by, radiotelegraph carriers, which now represent an important group in the telegraph industry.

During the fiscal year 1937, there was under preparation a new uniform system of accounts for telegraph and cable carriers (exclusive of radiotelegraph carriers). It is contemplated that this new system will be the subject of conferences with representatives of State commissions and the telegraph carriers during the early part of the fiscal year 1938.

This revision of the uniform system of accounts for telegraph and cable carriers engaged in wire communication is considered necessary in order to meet present conditions in the industry and to cope with present problems of regulation.

*Uniform system of accounts for radiotelegraph carriers.*—At the close of the fiscal year 1937, there was nearing completion a uniform system of accounts for radiotelegraph carriers. As stated above, no uniform system of accounts has previously been prescribed for, or adopted by, such carriers.

This proposed uniform system of accounts for radiotelegraph carriers will be the subject of conferences with representatives of State commissions and other interested parties as in the case of the revised system of accounts for wire-telegraph carriers.

The formulation and prescription of a uniform system of accounts for radiotelegraph carriers will be an important step forward in the regulation of these carriers.

### EXAMINATIONS OF ACCOUNTS

General examinations of the accounts of two large radiotelegraph carriers and an examination of certain accounts of one of the largest holding companies were completed during the fiscal year 1937. The examination of the accounts of the holding company, which controls an international communications system, had for its purpose the development of information with respect to the intercorporate relations existing between that company and its several American subsidiaries. The other examinations mentioned above concerned the operations and activities of two major radiotelegraph carriers. In addition to a

general analytical review of their accounts, the objectives of these latter examinations included analyses of (1) license and management contracts, (2) investment in plant and equipment, and (3) traffic development and traffic interchange. This information was of particular value in the preparation of the uniform system of accounts for radiotelegraph carriers.

In addition to the examinations of accounts mentioned above, several special examinations of lesser magnitude were conducted during the year. At the close of the fiscal year an examination of the accounts and records of a third major radiotelegraph company was nearing completion.

As a result of these or similar examinations, carriers have been or will be called upon to make appropriate corrections and modifications in their accounts.

#### DEPRECIATION STUDIES

Depreciation studies during the year centered chiefly upon the practices of wire-telegraph (including cable) carriers. Extensive data were compiled from reports on examinations conducted in the field, from responses to questionnaires, and from the annual reports submitted by the carriers to the Interstate Commerce Commission and the Federal Communications Commission. From the information thus obtained and from other data to be developed hereafter, a definite program will be devised, having for its ultimate objective the prescription of percentages of depreciation to be charged by telegraph carriers, pursuant to section 220 of the act. Among other things, consideration is to be given to the history of various classes of telegraph plant and the actual experience of the carriers relative to such plant, the methods of accounting for depreciation, the adequacy and correctness of existing reserves, and the results of various rates of depreciation and of the divergent practices of the carriers in the past with reference to depreciation.

It is recognized that depreciation constitutes a very large and important item in operating expense and also has a vital effect on the book valuation of operating properties. As such, depreciation-accounting practices have a very potent effect, over a long period, upon rates charged the public for various telegraph services.

#### OTHER ACCOUNTING ACTIVITIES

*Interpretation of accounts.*—All inquiries received from carriers or other interested persons relative to the interpretation of existing accounting regulations and with reference to the manner of accounting for specific transactions were answered promptly during the fiscal year.

*Accounting for bankruptcies and receiverships.*—Consideration was given to the necessity for special accounting regulations with respect to bankruptcies, receiverships, and other proceedings resulting from insolvency.

*Social Security taxes and pension funds.*—A special accounting bulletin was issued by the Division containing regulations relative to the accounting for social security taxes by telegraph carriers; and special attention is being given to the matter of accounting for funds accumulated under employees' pension and benefit plans.

*Accounting for extension of lines.*—During the fiscal year, attention was also given to the accounting considerations involved in the applications received from telegraph carriers relating to extension of lines.

# WIRE FACILITIES UNDER JURISDICTION OF TELEGRAPH DIVISION

## EXTENSIONS OF LINES OF WIRE-TELEGRAPH CARRIERS

*Applications under section 214.*—Applications, under the requirements of section 214 of the act, for certificates or authorizations for the construction, extension, acquisition, or operation of lines of telegraph carriers, handled by the Division, were as follows:

Pending July 1, 1936.....	2
Received July 1, 1936, to June 30, 1937.....	57
Total.....	<u>59</u>
Granted July 1, 1936, to June 30, 1937.....	54
Withdrawn.....	1
Pending June 30, 1937.....	4
Total.....	<u>59</u>

*Mileage of extensions.*—The Western Union Telegraph Co. was granted the authority requested in 36 applications (included above) to lease a total of 1,443 miles of circuit for temporary operation and the authority requested in 15 applications to lease a total of 380 miles of circuit for permanent use. R. C. A. Communications, Inc., was granted the authority requested in two applications (included above) to lease a total of 214 miles of circuit from the Western Union Telegraph Co.

The Chesapeake & Potomac Telephone Co. of West Virginia was granted authority for the construction of a two-wire circuit, 17 miles long, to be used for telegraph operation.

# RADIO FACILITIES AND OPERATORS UNDER JURISDICTION OF TELEGRAPH DIVISION

## FIXED SERVICES

*Number of point-to-point radio stations licensed for fixed service.*— On June 30, 1937, there were 439 point-to-point radiotelegraph stations licensed for fixed public service (an increase of 19 during the past year), 75 licensed for fixed public press service, and 7 licensed for agriculture service in the United States and its Territories (except Alaska) and possessions, subject to the jurisdiction of the Commission. Although the majority of these stations are licensed for, and operate primarily in, the international and overseas service, the figures include 129 stations that conduct domestic communications. Of this number, 50 operate exclusively in the domestic service, on the condition<sup>19</sup> that the use of frequencies above 6,000 kilocycles for domestic service shall not interfere with international service. With the exception of those licensed for agriculture service, each licensee may transmit only public correspondence pursuant to tariffs filed with the Commission and the necessary service messages incidental to the expeditious movement of this traffic. Addressed-program material to overseas points and press service to two or more fixed points and to ships at sea are among the classes of traffic handled as public correspondence in conformity with established tariffs.

*Names of countries to which direct communication is available.*— Stations are licensed for direct communication with many foreign countries and United States possessions, as shown by the following tabulation:

Points of communication authorized by licenses	Licensees									
	Globe Wireless, Ltd.	Hearst Radio, Inc.	MacKay Radio & Telegraph Co.	Press Wireless Inc.	Government of Puerto Rico	R. C. A. Com- munications, Inc.	South Puerto Rico Sugar Co.	Southern Radio Co.	Tropical Radio Telegraph Co.	United States- Liberia Radio Corporation
Argentina.....			X	X		X				
Australia.....						X				
Austria.....			X	X		X				
Bahama Islands.....									X	
Belgium.....				X		X				
Bolivia.....							X			
Brazil.....			X	X		X				
British Honduras.....									X	
Canada.....				X		X				
Chile.....			X	X		X				
China.....	X		X	X		X				
Colombia.....			X			X			X	
Costa Rica.....						X			X	
Cuba.....		X	X	X		X			X	
Curacao, Dutch West Indies.....					X	X	X			
Czechoslovakia.....			X			X				
Denmark.....			X			X				

<sup>19</sup> Pursuant to art. 7, par. 19, of the General Radio Regulations Annexed to the International Telecommunication Convention of Madrid, 1932.

Points of communication authorized by licenses	Licensees									
	Globe Wireless, Ltd.	Hearst Radio, Inc.	Mackay Radio & Telegraph Co.	Press Wireless, Inc.	Government of Puerto Rico	R. C. A. Communications, Inc.	South Puerto Rico Sugar Co.	Southern Radio Co.	Tropical Radio Telegraph Co.	United States-Liberia Radio Corporation
Dominican Republic.....						X	X			
El Salvador.....			X							
England.....				X		X				
Fiji Islands.....				X		X				
France.....			X	X		X				
French Indo-China.....						X				
Germany.....			X	X		X				
Guadaloupe, French West Indies.....							X			
Guam.....	X									
Guatemala.....						X				
Haiti.....			X			X			X	
Hawaii.....	X		X	X		X	X			
Holland.....				X		X				
Honduras.....									X	
Hungary.....			X							
Italy.....				X		X				
Japan.....			X	X		X				
Java.....				X		X				
Liberia.....						X				X
Manchuria.....				X		X				
Mexico.....		X		X		X			X	
Nicaragua.....						X			X	
Norway.....						X			X	
Panama.....						X			X	
Persia.....						X				
Peru.....			X			X				
Philippines.....	X		X	X		X				
Poland.....						X				
Portugal.....						X				
Puerto Rico.....						X	X		X	
Siam.....						X				
Spain.....			X	X		X				
Surinam.....						X	X			
Sweden.....						X				
Switzerland.....						X				
Syria.....						X				
Tahiti.....						X				
Turkey.....						X				
Union of Soviet Socialist Republics.....				X		X				
Vatican City.....			X			X				
Venezuela.....						X	X			

With the exception of Australia, Persia, Siam, Fiji Islands, and Tahiti, direct radiotelegraph service between the United States and each of the countries and possessions listed is available through the facilities of one or more of these communication companies. Communication with Australia is available via stations at Montreal, Canada; with Tahiti and the Fiji Islands via Hawaii; and with Siam via the Philippines. Direct service between the United States and Persia has not been inaugurated.

*Growth of multiple-address service.*—During the period from July 1, 1936, to June 30, 1937, multiple-address message service in accordance with the provisions of rule 241 (a), which was adopted as a result of the hearing discussed on page 76, has been established by Press Wireless, Inc., to the following points: La Paz (Bolivia), Recife and Rio de Janeiro (Brazil), Santiago (Chile), Barranquilla and Bogota (Colombia), San Jose (Costa Rica), Habana (Cuba), Guayaquil (Ecuador), Panama City (Panama), Lima (Peru), San Juan (Puerto Rico), Johannesburg (Union of South Africa), and Caracas (Venezuela). The station licenses for Hearst Radio, Inc., which also

operates stations in the fixed public-press service, were modified to bring them into conformity with the provisions of this rule, but no notification of the establishment of service has been received.

Applications of particular interest upon which formal hearings were held are discussed in the following paragraphs.

*Mackay application to add Oslo, Norway, as point of communication.*—A rehearing limited to oral argument was had before the Commission, and the decision of the Telegraph Division entered during the previous year, denying the applications of Mackay Radio & Telegraph Co. to add Oslo, Norway, as a point of communication, was affirmed. The opinion of the Telegraph Division was adopted as the opinion of the Commission en banc. The Commission found that radio and cable facilities between the United States and Norway were adequate, competition was keen, and there was no complaint of the service rendered; that the proposed new circuit, while increasing the revenues of applicant, would decrease the revenues of all other established competing carriers and would decrease the total revenues of the American-owned companies; that the increase in applicant's revenue was not shown to be necessary for the continued operation of applicant or of its associated companies comprising the International System; that the proposed circuit would result in the practical withdrawal of an associated cable company from competition; and that public interest, convenience, and necessity would not be served by the granting of the application. This applicant appealed from the Commission's decision to the United States Court of Appeals for the District of Columbia, which appeal was pending at the end of the fiscal year.

*Applications of R. C. A. C., Mackay Radio, Press Wireless, and Hearst Radio for additional frequencies.*—Hearings were held before an examiner upon the applications of R. C. A. Communications, Inc., Mackay Radio & Telegraph Co., Press Wireless, Inc., and Hearst Radio, Inc., for additional frequencies for use in public point-to-point radiotelegraph service. The primary consideration involved was whether the additional frequencies were needed in order to maintain an adequate radio service to the points of communication already authorized to the applicant companies. The examiner's reports were published, but the matters have not proceeded to the point of final decision by the Division at the close of the fiscal year.

*Applications of Mackay to add Rome (Italy) and Warsaw (Poland) as primary points of communication.*—Near the close of the year hearings were designated before an examiner upon applications to add Rome (Italy) and Warsaw (Poland) as primary points of radiotelegraph communication for the extension of its existing international service. The protracted hearings necessary in these cases will extend into the fiscal year 1938.

#### MARINE RADIO SERVICE

*Importance and scope of marine radio service.*—The only telegraphic communication available between ship and shore is that offered by the various classes of station in the maritime service licensed by the Division. Ship radiotelegraph stations are used for communication with other ships and with coastal radiotelegraph

having access to a public telegraph office to correspond by telegram stations. By means of these stations it is possible for any one on land with any one on board a vessel carrying a licensed ship radiotelegraph station. In addition to the handling of ordinary public communications, the maritime radiotelegraph service provides daily press bulletins, weather reports, and hydrographic reports for the benefit of the passengers and operators of ships at sea. In addition, medical advice may be obtained from surgeons of the Public Health Service and others with respect to the treatment of persons injured or becoming ill at sea. In cases of distress, the safety of a vessel and the lives of its passengers may depend in a major degree upon the efficient functioning of the maritime radiotelegraph service.

*Ratification of International Convention for the Safety of Life at Sea, London, 1929.*—The International Convention for the Safety of Life at Sea, London, 1929, was ratified by the United States and became effective November 7, 1936. From this effective date to the end of the fiscal year, seven ships previously having no means of radio communication were equipped with radio transmitting and receiving apparatus including emergency transmitters and power supplies. In addition, there were installed on other vessels subject to the Safety Convention the following-named apparatus:

264 emergency transmitters,  
333 emergency power supplies,  
117 emergency receivers, and  
6 direction-finders on passenger vessels.

Three motor-propelled lifeboats on passenger vessels were equipped with transmitters and receivers.

*Approval of automatic alarms.*—During the year the final decision of the Division was entered approving the two types of alarm submitted subject to certain conditions and with requirements for the modifications of the apparatus to increase the efficiency thereof.

*Radio direction-finders.*—Among the responsibilities placed upon the Commission in Public Law No. 97, 75th Congress, and exercised by the Telegraph Division, is the approval of radio direction-finders or goniometers for use on board certain ocean-going vessels. Apparatus of this kind has been manufactured and has been installed on ships of United States registry for many years. No type approval has yet been given for direction-finder apparatus. Installations have been inspected in place, and, if found to be in proper operating condition and sufficiently accurate, have been tentatively approved. In some cases, repair or recalibration was required before approval was given.

*No major sea disasters during fiscal year.*—The part radio plays in marine operation is too well known to need amplification. Fortunately there have been no major sea disasters in the past fiscal year, although there have been many cases of distress in which radio has again, as in the past, played its important part.

*Changes in rules and regulations.*—During the fiscal year several changes in the existing rules and regulations covering the Maritime Service were made, due to the ratification by the United States of the Safety Convention, and made necessary by the terms of Public Law No. 97, approved May 20, 1937. These rules, known as the Ship Radiotelegraph Safety Rules, May 21, 1937, were placed in effect

as required by Public Law No. 97 immediately upon the enactment of the law, which became effective on the date of approval. They were formulated pursuant to the duties imposed upon the Commission under the new law to make substantive rules and regulations to carry out the purpose of the Congress, to make detailed requirements with regard to the minimum-performance standards of equipment, to provide the conditions under which various forms of application may be considered, and in general to provide for the administration of the act and for the carrying into effect of the radio provisions of the Safety Convention and other international agreements affecting ship radio to which the United States is a party.

With the development of apparatus, changes in economic conditions, and experience in enforcement, modifications may be expected to the end that the best radio service may be available in the interest of safety of life at sea and for the conduct of public message traffic with a minimum of regulation and expense.

*Disposition of complaints in Marine Service.*—Upon complaint by members of the public, or upon the Commission's own motion, usually based on reports received from its field inspectors, a large number of informal investigations were conducted during the year, which led (through correspondence, conference, or subsequent formal proceedings) to elimination of interference, to correction of improper operation, to compliance with the rules regarding the keeping of records, and in general to compliance by licensees with their legal obligations. The majority of these violations occurred in the operation of ship radiotelegraph stations. In view of this method of rectification of discrepancies, in very few instances was it necessary to take serious disciplinary action. In a few cases, hearings were held with regard to the practices of licensees. In every case undesirable conditions were corrected without the need for further action. In several cases equipment was replaced at the insistence of the Commission without the necessity for formal procedure.

#### AVIATION RADIO SERVICE <sup>20</sup>

Without the aid of radio facilities authorized by the Commission, high-speed passenger and air-mail service would be impracticable. New aircraft are now in the process of construction which will be operated at such speeds and at such altitudes as will require the use of radio equipment with several times the power of that now in general use. These aircraft will also increase the power required to be installed at the associated aeronautical stations located along the airways. The extent of the communications system now licensed by the Commission is shown by the map, Commercial Aviation Communication System, contained in appendix G.

*International aviation radio facilities.*—The position of the United States with respect to international aviation is increasing in importance with the establishment of regular air service to Hong-Kong and Bermuda, as well as the initiation of survey flights across the North Atlantic to London. Many difficulties were encountered in providing the facilities necessary for adequate communication along these new routes, and although those now pro-

<sup>20</sup> See Appendix F.

vided are not entirely adequate, they are affording safe operation. This measure of efficiency could not have been achieved without the cooperation of foreign administrations.

*Responsibility for the installation of radio equipment.*—Responsibility for the installation of aids to air navigation along the airways is vested in the Secretary of Commerce. However, radio aids to aircraft in the vicinity of airports must be provided by private operating agencies. The Commission regularly licenses stations for airport control, and, under authorization of the Commission, great strides have been made for providing facilities for the blind landing of aircraft. This work has progressed to such an extent that there is a possibility that regular installations may be made within the next fiscal year. Such apparatus would eliminate conditions which in the past have been contributory causes of air-line disasters. As in the marine radio service, radio in aviation has daily played its part. Although there have been serious disasters during the past fiscal year, in no case was there any indication that failure of the communications system licensed by the Commission was in any way contributory to the conditions resulting in the disaster.

Only one major change has been made in the rules and regulations governing the aviation service. That was to permit an increase in the power which may be authorized at terminal airports. Other changes have merely involved additions of frequencies and other similar modifications of the facilities available to meet the needs attending the growth of this service.

#### POLICE SERVICE <sup>21</sup>

*Purposes for which authorizations are made.*—The Commission authorizes the use of radio by police departments for the following purposes:

By municipalities for one-way communication to mobile units and remote police stations;

By municipalities for two-way communication with mobile units;

By States in the general dispatching of State police units;

By States and municipalities for the radiotelegraphic exchange of police information;

By harbor police in connection with the dispatching of harbor police boats and the general policing of shipping; and

By States for emergency radiotelegraphic use in the event of interruption of the private-wire teletypewriter network.

*Growth of this service.*—The use of radio by police departments is perhaps the fastest growing of any of the various uses to which radio has been put. This service has been of inestimable value to the public in the prevention of crime, the capture of criminals, and the recovery of stolen property. Radio was first used by police departments in 1916, when a private coastal station was established by the city of New York for communication with harbor police boats and for the general policing of shipping in New York Harbor. The city of Detroit was the first municipality to make use of radio for communication with police cars in the manner now well known. The State of Michigan in 1931 was the first State to provide for com-

<sup>21</sup> See Appendix F.

munication between State police headquarters and police officers on their assignments. Bayonne, N. J., in 1932, was granted the first authorization for two-way police communication.

*New police services.*—The newest of the services operated by the police departments is the police radiotelegraph system, authorized by the Commission in September 1936. Although this service is new and only a small number of stations have been established, it has already proven its worth and steps are now in progress which may lead to its extension on an international basis.

*Rules and regulations changed to establish police radiotelegraph system.*—The only major changes in the rules and regulations covering the police service were those necessary to establish the police radiotelegraph system. In connection with the establishment of this system, the relay of messages by radiotelephone stations will be prohibited after January 1, 1938. This prohibition has been found necessary because of the congestion of the radio-frequency channels. Since these channels are assigned primarily for voice communication with local mobile police units, subordination of such use to point-to-point communication cannot well be justified.

*Disputes settled by cooperation.*—Disputes between various stations in the Police Radio Service as they arose have been amicably settled through conferences by requiring cooperation in the use of police frequencies by stations located within close proximity to each other.

#### ALASKA STATIONS

*Telegraph Division jurisdiction.*—As mentioned on page 53, all classes of radio stations (other than broadcast) in Alaska, whether public or private, and whether telegraph or telephone, have been placed under the jurisdiction of the Telegraph Division. The only means of communication between Alaska and the United States proper is through facilities operated by the Alaska Communications System (formerly designated as the Washington-Alaska Military Cable and Telegraph System), an organization under the jurisdiction of and operated by the Signal Corps, United States Army. In addition, the backbone of the communication system within Alaska is operated by this same organization. Aside from a private-wire system operated by the Alaska Railway for its own purpose, and communication between aeronautical point-to-point stations on aviation chains in Alaska, no private organization operates any long-distance communication system within Alaska. For the most part, the facilities authorized, while licensed as public facilities, are operated primarily for safety purposes and for reaching points where wire facilities are not available. In these cases, the public at the location of the licensed station usually comprises only the licensee and employees. This licensing policy was adopted by the Federal Radio Commission after consultation with the Signal Corps, and has been continued by this Commission.

*Development of radio in Alaska.*—During the past year there has been a great deal of development in the use of radio in Alaska, particularly with respect to its use in connection with aviation. As a result of this growth a need was felt for a revision of the Commission's rules and regulations. In this regard a series of conferences was held, participated in by those interested in this subject.

As a result of these conferences it was decided to send representatives to Alaska to confer with the Alaska Aeronautics and Communications Commission, established by the Alaska Legislature in May 1937, and with others interested in Alaska communications. This conference is to be held at Juneau beginning August 2, 1937.

#### AMATEUR SERVICE <sup>22</sup>

*Value of amateur stations.*—During the past year amateur stations were of inestimable value to the public in furnishing radio-communication facilities in emergencies. Noteworthy service was rendered during the Ohio River valley flood, when amateur stations aided the American Red Cross and other organizations in providing radio-communication between stricken areas and outside aid. In numerous cases amateur stations were located in the midst of the affected areas and served as the sole means of communication with rescue organizations.

In recognition of the assistance that many amateurs were giving in flood relief, the Commission ordered amateur stations not engaged in handling emergency and relief communications to discontinue operation on amateur frequencies below 4000 kilocycles during the flood-emergency period in order to enable those amateur stations engaged in active relief work to expedite communications with a minimum of interference.

*Activities to test the skill of amateurs.*—On Navy Day, October 27, 1936, many amateur operators were successful in copying a message addressed to them from the Secretary of the Navy, transmitted from the naval radio stations NAA (Arlington, Va.) and NPC (San Francisco, Calif.).

A message from the Chief Signal Officer, United States Army, was transmitted to members of the Army Amateur Radio System on November 11, 1936.

On January 20, 1937, many amateurs took part in a Governor-to-President Relay when amateurs in Washington delivered to President Roosevelt messages that had been transmitted by amateur stations from the Governors of the several States.

These yearly events stimulate interest, encourage accuracy in receiving, and enable amateurs to test their skill and proficiency in the International Morse Code.

*Study made of rules and regulations.*—No major changes have been made in the rules governing amateur stations and operators during the year; however, a study has been undertaken with a view of revising some of the rules to cope with the changing aspects of this service, from the standpoint of technical progress and administration.

*Request by amateurs for reallocation of frequencies.*—A request submitted by an organization representing a large group of amateurs for a reallocation of frequencies for radiotelephony in the amateur 3500-to-4000-kilocycle band was designated for hearing to determine whether the granting of the request would meet the statutory requirement of public interest, convenience, and necessity. The request was later withdrawn by this organization and the hearing was accordingly canceled.

<sup>22</sup> See appendixes F and H.

At the close of the fiscal year pending before the Commission a request from this same organization that the Commission amend a number of the amateur-service rules. This request includes a proposal to reallocate frequencies for radiotelephony in the 28000-to-30000-kilocycle band and to require additional qualifications for operators desiring to use radiotelephony on frequencies below 56000 kilocycles, and a plan for emergency and relief communication during floods, hurricanes, and similar disasters that would require the allocation of specific frequency subbands within the present amateur frequency assignments.

No action has been taken upon these requests; however, the Commission is studying these proposals in connection with other changes that are being considered with respect to the amateur service.

*Complaints and violations, amateur service.*—With nearly 47,000 amateur operators licensed by the Commission it is obvious that a large number of alleged violations of the Commission's rules and regulations would be reported. During the past fiscal year three orders for revocation of amateur-station licenses and four orders for suspension of amateur-operator licenses were issued. A considerable number of other investigations resulted in findings disclosing no violations of the rules and regulations or violations of such character as not to warrant formal proceedings. In one case, as a result of a formal complaint, a hearing was held with respect to the operation of an amateur station.

#### OTHER SERVICES <sup>22</sup>

*Special emergency stations.*—Special emergency stations, while authorized originally for use by public utilities such as electric-power systems in the event of wire failure, are now in general use for emergency communication of all kinds. A number of organizations such as American Legion posts and amateur radio societies have constructed trucks elaborately equipped with supplies, first-aid medical equipment, and tentage, together with a complete self-contained special emergency station. Stations of this class rendered excellent service during the recent flood in the Ohio River Valley.

*Forest protection.*—This class of station has been authorized for use also by organizations interested in the protection of forests.

*Geophysical stations.*—Geophysical stations <sup>23</sup> are used by oil companies and others primarily in connection with the determination of the character of the underground strata of the earth in order that the location of possible oil deposits may be ascertained. One case involving stations of this class has been designated for hearing to investigate the method of operation as conducted by the applicant.

*Marine fire stations.*—Marine fire stations <sup>23</sup> were authorized for the purpose of permitting communication between fire headquarters and fireboats in order that closer coordination of activities might be achieved with consequent better protection of the water front. Only one frequency is assigned for this service on a shared basis.

*Motion-picture stations.*—Motion-picture stations <sup>23</sup> were provided for by the Federal Radio Commission, after hearing, for use in the motion-picture industry in connection with the production of major

<sup>22</sup> See appendix F.

motion-pictures. These stations are not to be used to replace wire lines, but may be authorized for operation when pictures are to be taken at sea, in the desert, or under circumstances where the operation of large groups of personnel must be coordinated or aircraft directed. Considerable use has been made of these facilities, and the success of many major motion-pictures may be attributed in part to the existence of this class of station.

*Howton burglar alarm.*—A hearing was held before the Telegraph Division upon the application of the Howton Radio Alarm Co. for the use of radio frequencies in connection with the operation of an automatic burglar-alarm system. The issues included the question whether an adequate burglar-alarm service was available through the use of communication facilities other than radio, the question whether interference would be caused by the use of radio for burglar-alarm purposes, and also the question of competition with existing wire burglar-alarm systems. As a part of the proceedings in the case, a special temporary authorization providing for experimentation with the Howton system was issued, with the expectation that further proceedings in the case would follow, based on the results of the experiments and the data thereby obtained.

#### RADIO OPERATORS <sup>23</sup>

In the regulation of radio operators under the provisions of section 303 of the act the Commission has continued in force without substantial change during the year its rules and regulations governing professional radio operators.

*Examinations now conducted in Territories and possessions.*—Through the procedure authorized by section 329 of the act the Commission extended its activities with respect to examining operators at remote locations in the Territories and possessions of the United States through the cooperation of the Army, the Navy, and the Coast Guard. In Alaska, examinations are supervised by the Army and the Coast Guard, while the Navy performs this service for the Commission in Puerto Rico, Canal Zone, Guam, and other remote points beyond the reach of the Commission's field force. This arrangement has been adopted in order that licensed operators may be made available for the operation of radio stations which have been licensed by the Commission for use in many isolated places.

*Effect of Public Law No. 26 (75th Cong.).*—During the year the Congress amended section 318 of the act, heretofore discussed more fully on page 54. One of the purposes of this amendment was to authorize the Commission to determine whether licensed operators are required for the operation of certain classes of radio stations. Thus far, only the experimental radio station licensed to Harvard University has been authorized to operate without licensed operators in attendance at all times. This station, which is engaged in ionosphere-measurement research, operates automatically, and it has been determined that to require licensed operators on duty at all times would be impracticable as well as unnecessary.

*Effect of Public Law No. 97 (75th Cong.).*—Legislation has also been enacted having for its purpose the promotion of safety of life and property at sea (Public Law No. 97, 75th Cong.), heretofore discussed

<sup>23</sup> See appendix J.

on page 54. A number of provisions of this new law pertain to radio operators. For example, additional grounds for which operator licenses may be suspended have been established, and provision has been made for taking appeals in operator cases to the United States Court of Appeals for the District of Columbia.

*Rules and regulations.*—In view of these developments, there has been undertaken a revision of the rules and regulations governing professional operators with a view to raising the standards of operators, simplifying licensing procedure, and facilitating the handling of radio-operator examinations. This study was still in progress at the close of the fiscal year.

*Violations and complaints—radio operators.*—With approximately 30,000 professional operators licensed in the various grades it is obvious that a number of alleged violations would be reported. During the past fiscal year orders were issued barring eight persons from examination for operator privileges.

## COMPLAINTS AND INVESTIGATIONS

The regulatory activities of the Telegraph Division are, in a large part, reflected by the formal and informal hearings conducted both upon complaints and upon the Commission's own motion. There follows a summary of the more important complaints and investigations and the decisions entered during the year.

*Complaint of Aeronautical Radio, Inc., v. A. T. & T. Co.*—During the previous fiscal year a complaint was filed with the Division by Aeronautical Radio, Inc., asking that the Commission require the American Telephone & Telegraph Co. to furnish private-line telegraph service to it under its existing tariffs, or to establish at reduced rates a separate classification for wire service in connection with aircraft operation. A decision was rendered holding that the complainant was entitled to private-line teletypewriter service under existing tariffs of the defendant, and an order was entered dismissing the complaint upon the ground that a reasonable request for service had not been made as required by section 201 (a) of the act, without prejudice to complainant's right to institute further proceedings if service should be refused after reasonable request. The decision further held that complainant was not entitled to a special classification.

*Complaint against Globe Wireless, Ltd.; investigation of "LTR."*—Hearings were held upon the joint complaint of the several radio and cable companies operating telegraph systems in the Pacific against Globe Wireless, Ltd., alleging that the classification of service known as Radiomail offered by the latter was an unlawful classification under the provisions of sections 201–205 of the act. There was designated for hearing at the same time an investigation based on the protest of Globe Wireless, Ltd., against tariffs filed by the competing carriers offering a new "LTR" service at greatly reduced rates which, it was alleged, produced unfair competition to the Globe Wireless service. The filing carriers failed to offer evidence in justification of the "LTR" service and withdrew the proposed service from the United States to the islands of the Pacific. To an important degree these issues affect the service to the public and the rates for the service between the United States and various points in the Pacific (including points in Hawaii, Midway, Guam, and the Philippines) and indirectly other transpacific communication service. Protracted hearings were held in the *Radiomail case*, and the matter was pending at the close of the fiscal year.

*Complaint of Lobo & Co. v. A. T. & T. Co.*—A formal complaint was filed by Lobo & Co. against the American Telephone & Telegraph Co., alleging that the charges made in connection with private-line telegraph communication service from New York to Habana were unjustly or unreasonably discriminatory. This complaint was set for hearing, and remained pending on the hearing calendar at the end of the year.

*Telegraph Division Order No. 12.*—During the year further progress was made in the carrying out of the Commission's investigation

instituted pursuant to Telegraph Division Order No. 12 with regard to the justness and reasonableness of the message classifications and of the ratio between the charges for the various classifications and with regard to the rules, regulations, and practices of the carriers concerning telegraph service. A number of adjustments were made through correspondence and conference, resulting in the removal of certain discriminatory tariff provisions and the elimination of certain unlawful classifications and practices. (See "Rates and tariffs", p. 55.) The record of the hearing held pursuant to Telegraph Division Order No. 12 was closed insofar as it related to the justness and reasonableness of the ratio between the charges for international ordinary and urgent messages (except press urgents), the justness and reasonableness of the carrier's practice of imposing artificial delay upon the handling, transmission, and delivery of ordinary messages, and the existence of discriminations, prejudices, or disadvantages resulting from such ratio and from such practice.

A report was entered with respect to the Western Union Telegraph Co. finding the practice of imposing artificial delay on ordinary messages and the prescribed ratio between the charges for ordinary messages and the urgent messages (except press urgents) to be unjust and unreasonable, and unreasonably discriminatory and prejudicial. A cease and desist order was issued, on June 14, 1937, against this company, pursuant to the report, and it was ordered to establish, within 180 days, rates for urgent messages which will bear a just and reasonable ratio to the rates for ordinary messages and prevent the unlawful discriminations, prejudices, and disadvantages found to exist.

Reports and orders have not yet been made with respect to the other carriers involved, insofar as this practice and this ratio are concerned. The report in the Western Union case stated, however, that since the facts and evidence upon these questions may vary as to the respective carriers, separate reports and orders applicable to each of them may subsequently issue as may be found necessary or proper.

*Other matters pending Telegraph Division Order No. 12.*—Certain matters still under investigation pursuant to Telegraph Division Order No. 12 remained open at the close of the year; and the record of the proceedings as a whole has not yet been closed pending final adjustments of rate ratios and telegraph practices in both domestic and international fields.

*Multiple-address press service authorized by adoption of rule 241 (a).*—Early in the fiscal year an informal hearing was held before an individual Commissioner upon the request of Press Wireless, Inc., to be permitted to engage in multiple-address press communication to unnamed receiving points in various parts of the world. This hearing, in which the various carriers engaged in handling press traffic participated, resulted in the adoption of a rule permitting the carrying on of a multiple-address service on a secondary basis to any point where a market might be found for the news service of the customers of the carrier. The addition of new receiving points is subject to the condition that prompt notification be made to the Commission of the points to which transmissions are made and specifically subject to the condition that the Commission may

require the suspension of transmission to any given point upon finding that the national or public interest has been or is being adversely affected.

*Auto-alarm receivers.*—A hearing was held before the Telegraph Division, in which manufacturers of automatic radio-alarm apparatus, numerous representatives of the shipping industry, and representatives of the radio operators' associations participated. This hearing was held for the purpose of considering the type approval of automatic devices for the reception of distress messages, as contemplated by the Safety Convention and the General Radio Regulations Annexed to the International Telecommunication Convention of Madrid, 1932. The principal purpose of the alarm is to make possible the reception of distress messages while operators are off watch; however, an operator is required to stand at least 8 hours' watch on vessels so equipped. The hearing resulted in a final decision by the Division approving the two types of alarm submitted, subject to certain conditions, and with requirements for the modification of the apparatus to increase the efficiency thereof.

*Complaint of Ransom v. Western Union Telegraph Co. et al.*—A formal complaint was filed by Albert W. Ransom, a user of cable service, for the purpose of contesting the reasonableness of the charge made by the carriers in the international telegraph field for the registration of cable code addresses with a central registration bureau. Hearings have been held in the matter before an examiner, but the case has not yet proceeded to final decision.

## FINANCIAL AND OTHER STATISTICAL DATA

### ANNUAL AND MONTHLY REPORTS

*Basis and purpose of reports.*—In accordance with authority contained in section 219 of the act, telegraph carriers are required to submit annual and monthly reports to the Commission, under oath, on forms prescribed by the Division. These reports are an important means of obtaining financial and other statistical data relating to individual carriers and to the telegraph industry as a whole. The factual data obtained in this manner are considered necessary for the guidance of the Commission and are utilized to a very large extent by the general public.

*Content of reports.*—Both the monthly and the annual report forms are similar to those prescribed in previous years, in order to attain comparability of statistical data, but have been expanded or modified from time to time as occasion has arisen.

During the fiscal year, the Division expanded somewhat the annual report form on which telegraph carriers were required to make returns for the calendar year 1936. Among other changes, the carriers were required to disclose the beneficial owners of their capital stock so far as known, additional information was called for with respect to pensions and other benefits to employees and with respect to taxes, a schedule relating to telegraph franks and franked messages was provided for in the report form, and an analysis of advertising expense was required.

*Number of carriers filing reports.*—During the fiscal year, annual reports were received from 35 telegraph carriers for the calendar year 1936. Of this number, 20 were radiotelegraph carriers and 15 were telegraph and cable carriers engaged in wire communication.

*Examination and correction of reports.*—All accounting schedules and other data contained in the reports filed by telegraph carriers were carefully examined and corrections were made wherever necessary, after correspondence with the carriers concerned.

*Holding-company reports.*—Annual reports are also required from holding companies controlling communication carriers. Two forms of report are prescribed, one designed for holding companies owning large interests in communication carriers and the other, a less comprehensive form, for holding companies owning only minor interests in communication carriers. During the fiscal year, 24 holding companies owning interests in telegraph companies filed reports with the Commission for the calendar year 1936.

*Public reference room.*—The foregoing reports are made available to the public through the medium of a public reference room, as mentioned on page 24 of this report.

### STATISTICAL COMPILATIONS

*Publications.*—The following publications containing financial and statistical information relating to telegraph, cable, and radiotelegraph carriers were issued during the fiscal year :

Selected financial and operating data from the annual reports of telegraph, cable, and radiotelegraph carriers for the year ended December 31, 1935.

Operating data from monthly reports of telegraph carriers.

Salary report of telephone and telegraph carriers, 1935.

These publications are called for by many persons and institutions throughout the country.

*Inquiries answered.*—Many special compilations of statistical data relative to telegraph carriers were furnished in response to letters of inquiry from other governmental agencies, from Members of Congress, and from various institutions and persons throughout the country.

*Financial and other statistical data contained in appendix.*—There are contained in the appendix to this report tables and charts showing financial and other statistical data relative to communication carriers and one table showing intercorporate relations between communication carriers and holding companies. As shown in the appendix, the tables and charts, with some exceptions, are separated into (1) those relating exclusively to telephone carriers, (2) those relating exclusively to telegraph carriers, and (3) those relating to both telephone and telegraph carriers. Appropriate explanation concerning these statistical tables and charts is contained in the appendix.

## WIRE TELEGRAPHY

The following pages describe briefly the major technical developments in wire telegraphy and radiotelegraphy.

Several additional varioplex circuits have been installed during the past year.

*Description of the varioplex.*—The varioplex is an automatic system which permits the division of a multiplex telegraph circuit into as many two-way communication channels as are desired. Only those channels that are actually in use consume line-time on the circuit. The individual channels are automatically connected to the circuit when transmission starts and automatically disconnected when transmission stops. When a number of channels are working, the capacity of the circuit in words per minute is divided equally between them. Since the above-mentioned division of circuit capacity takes place each time a channel is started or stopped, the speed of all operating channels will be subject to an irregular variation. Varioplex channels may be terminated in the main office at standard multiplex operating positions or may be extended through suitable character-storing devices to teletype positions in the main office, distant branch offices, or offices of private customers. Varioplex channels may be "repeated" through to other varioplex systems or to multiplex channels on other circuits.

*Telemeter service.*—The development of the varioplex system enabled the telegraph company to offer what is known as telemeter service. In this service, a varioplex channel is leased to a customer for its sole use or leased to two customers at different points for their joint use. The charges for such circuits are based on the total number of words transmitted.

*Facsimile.*—Additional facsimile circuits have been made available to the public.

*Miscellaneous technical developments.*—Although there have been few outstanding developments in wire telegraphy during the past 5 years, the telegraph carriers are continually increasing their efficiency of operation by improvements in equipment and operating procedure. Some of these improvements are listed below:

Relay contacts that require only a fraction of the maintenance required by those previously used.

Improved facsimile equipment.

More efficient carrier-current telegraph systems, by means of which more telegraph channels can be obtained.

Improved synchronization systems.

Higher speed terminal equipment, such as printers, reperforators, and transmitters.

Improved central office equipment, such as switchboards and concentrators.

Relaying equipment for automatically connecting multiplex circuits that do not operate at the same signaling speed.

Extended channel equipment, by means of which any channel of a multiplex circuit may be extended to any desired branch office or private customer.

Portable carrier-current equipment, for increasing the number of available telegraph channels in an emergency.

More efficient rectifiers for converting alternating current to direct current for providing telegraph power.

Improved amplifiers for ocean cable operation.

More efficient printers for use on ocean cables.

Improvements in anti-induction networks to eliminate interference on telegraph wires from power lines and other sources.

#### RADIOTELEGRAPHY

*Increasing demand for radio facilities.*—With the rapid technical advances in all lines of activity, there is an ever-increasing demand for radio facilities, both for direct experimental observation of physical phenomena and as a necessary adjunct for the safety of life and property.

*Notable technical advances.*—Among the technical advances in the radio art have been the design and development of new apparatus for the study of the ionized regions of the upper atmosphere.

*Nature of radio propagation.*—The propagation of radio waves for long-distance communication is not only affected by their natural spreading in their spherical mode of propagation, but by repeated refractions or reflections between the ground and the ionized regions of the upper atmosphere, and by absorption during their passage through these regions. The height and the intensity of the ionization of the upper atmosphere have, therefore, a direct effect upon the propagation of radio waves.

*Experimentation essential to radio regulation.*—A comprehensive knowledge of the manner in which the ionization changes during the day, the seasons, from year to year, and over long periods such as sun-spot cycles, is an invaluable aid in the regulation of radio services to make possible an adjustment of the services to conform to the optimum conditions of each service. The Commission has, therefore, authorized experimental stations for the purpose of recording a continually changing state of ionization of the regions of the upper atmosphere.

*Development of equipment useful in the location of tropical storms.*—Licenses for experimental stations have been granted for the purpose of conducting research in the development of equipment to determine the location of tropical storms by the associated static. Such authority has been granted to the University of Florida and the University of Puerto Rico. The theory of operation of this equipment is based upon the determination of the direction of atmospherics emanating from storms. If the approximate position of the storm is known with reference to the observing station, it is possible to select radiation coming from that general direction. From similar observations made at other stations, it is hoped that the probable positions of the storms may be determined by the method of triangulation. In order for such a system to be effective,

it is essential that rapid intercommunication between the several stations be established for the purpose of insuring simultaneous observations.

*Development of aids to aviation.*—In the past year considerable experimentation has been made in connection with the development of aids to aviation. Foremost among these is the continued development of blind landing devices, as mentioned above, in connection with the aviation service. Although there are a number of types of systems under experimentation, these systems all provide for the following:

A transmitter to provide a path, generally called the "glide path," along which an aircraft may be guided to insure a proper descent through the overcast to the runway;

A transmitter to localize the runway that also provides a path along which an aircraft may be navigated with the assurance that upon touching the ground the aircraft will be on an established runway;

Two or more local transmitters to advise the pilot of his location and to signal changes in flying procedure; and

A transmitter to provide a communication channel between the aircraft and the airport in order that instructions may be given to the pilot.

The duties of these various transmitters may under certain circumstances be combined in single units. For instance, the "glide path" and runway-localizer path transmitters may be combined in a single unit. This equipment when perfected will permit aircraft to land at suitably equipped airports irrespective of visibility at the airport.

Other developments in the field of aviation authorized to be investigated by the Commission are the reaction-type altimeter and the airplane flight recorder, the former to determine the altitude of the aircraft and the latter its location relative to the airport.

*Need for experimental data on use of ultra-high frequencies.*—There is still a need for experimental data on the use of the ultra-high frequencies that will eventually be allocated to commercial service. Commercial companies are intensely interested in this work and are providing a large amount of technical data relative to the transmission characteristics of the frequencies used over their circuits. Coordination of these data on the actual use being made of the experimental frequencies will be extremely valuable from the standpoint of eventually making an equitable distribution of the frequencies to the various services and in obtaining the maximum use of the radio spectrum. The Commission has therefore authorized the use of the ultra-high frequencies on an experimental basis for such services as public press and point-to-point forestry service.

*General research.*—In addition to the typical projects mentioned above, research is continually being conducted by various organizations leading to the development of more efficient reliable equipment. As a result of the activities of the radio engineers of this country, the equipment developed and in use in the United States is unexcelled.

**PART IV**  
**THE COMMISSION**  
**TELEPHONE DIVISION**

**MEMBERS OF THE TELEPHONE DIVISION**

**AS OF JUNE 30, 1937**

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PAUL A. WALKER, *Chairman*

THAD H. BROWN, *Vice Chairman*

ANNING S. PRALL

## TELEPHONE DIVISION

The telephone industry, ranking as the third largest public utility in the United States, represents an investment in excess of \$5,000,000,000, of which the greater amount is in operating facilities. The American public pays an annual telephone bill in excess of \$1,000,000,000 for services rendered through 18,000,000 telephones and by more than 300,000 employees.

There are approximately 7,000 operating telephone companies in this country. The American Telephone & Telegraph Co., which with its associated companies is the largest private business organization in the world, operates 85 percent (15,000,000) of the telephones in service in the United States and handles nearly 98 percent of all interstate wire-telephone service.

The telephone systems operating in the United States have made available to this Nation the finest telephone service offered the citizens of any nation on the globe. Approximately one-half of the world's 36,000,000 telephones are in the United States. By means of land lines, cables, and radio circuits, any person having a connection with the Nation-wide wire facilities of this country may communicate with 70 foreign countries and with 95 percent of all the telephones in the world.

During the last year, floods of almost unprecedented severity occurred in sections of the United States. Telephone offices were flooded, telephone lines were broken, and service was disrupted. Even under such conditions, telephone service was maintained wherever possible and repairs were made and service renewed as soon as possible.

The maintenance of telephone service during flood periods constituted, as a rule, the principal means of communication by which radio stations in the flood area received information to be broadcast to the public. The broadcasting of warnings, location of marooned persons, etc., by various radio stations within the flooded area resulted in the saving of many lives.

The art of telephony is advancing. Many new inventions are making possible improvements in the service now available. A number of these developments are touched upon at page 108 of this report.

The Commission is pleased to report that during the fiscal year reductions in interstate and foreign rates were effected which will result in an estimated saving to the users of interstate and foreign telephone service in excess of \$21,000,000 per annum. A discussion of these rate reductions may be found in this report, commencing on page 88.

*Subjects covered by this report.*—For the purpose of this report the material is presented under the following topics: Organization and Jurisdiction of the Telephone Division; Rates and Tariffs, Supervision of Accounts, Wire Facilities, Radio Facilities, Complaints and

Investigations, Financial and Statistical Data, and Technical Developments in the Telephone Art.

#### ORGANIZATION AND JURISDICTION OF THE TELEPHONE DIVISION

By virtue of General Order No. 1, adopted by the Commission on July 17, 1934, the Telephone Division of the Commission "has jurisdiction over all matters relating to, or connected with, interstate and foreign telephone communication (other than broadcasting) by wire, radio, or cable, including all forms of fixed and mobile radiotelephone service, except as otherwise herein specifically provided for."

The members of the Telephone Division meet each week and at such other times as may be necessary to consider and formally dispose of the various matters under the jurisdiction of the Division. Public hearings are also held from time to time.

*Jurisdiction over telephone carriers.*—As a preliminary step to the exercise of regulatory power over telephone carriers, it has been necessary for the Commission to determine what carriers are subject to its jurisdiction under the Communications Act of 1934, as amended. Under section 2 (b) (2) of the act, wire-telephone carriers are divided into two classes: (1) Carriers subject to all provisions of the act, and (2) connecting carriers subject only to the provisions of sections 201-205 of the act. Connecting carriers are not required to file tariffs, to make annual and other reports, or to respond to many of the orders of the Telephone Division.

During the year the Commission continued its work of classifying telephone companies. As of June 30, 1936, approximately 2,200 telephone companies had been informed of their classification. As of June 30, 1937, approximately 6,250 companies had been classified. In a number of instances, it was necessary to conduct hearings in order to determine the jurisdiction of the Commission over a particular carrier.

## RATES AND TARIFFS

*Basis and purpose of rate and tariff regulation.*—Rate and tariff regulation is provided for principally by sections 201-205 of the act. Regulation, as authorized by the act, extends to all rates and charges of telephone carriers for interstate and foreign service, and to all classifications, regulations, and practices in connection therewith. The elimination or correction of rates, regulations, and practices that are unreasonable, unjustly discriminatory, or unduly prejudicial or preferential will be of benefit both to the public and to the telephone carriers.

Telephone-rate reductions effected during the fiscal year 1937, hereinafter discussed, are of far-reaching importance to the public. It is believed that a wider use of telephone service can be attained by proper rate adjustments and that the efficiency and growth of American telephone systems will be enhanced thereby.

### RATE SCHEDULES

*Filing of tariffs—rules and regulations relating thereto.*—Telephone carriers are required to file tariff schedules with the Commission containing all charges in connection with interstate and foreign telephone service, and describing all classifications, regulations, and practices in connection therewith. This requirement is imposed by section 203 of the act. Tariff regulations were promulgated by the Commission under authority of this section.

The formulation and enforcement of appropriate regulations governing the filing of these numerous tariff schedules have resulted in the orderly publication and filing of telephone charges for interstate and foreign services and of the classifications, regulations, and practices relating thereto, in a manner convenient, uniform, and understandable to the public.

*Number of tariffs filed.*—A total of 15,997 tariff publications dealing with telephone rates and services were filed with the Commission during the fiscal year 1937. Of this number, 14,128 pertained exclusively to telephone rates and services and 1,869 pertained to both telephone and telegraph rates and services.

Of the total of 41,892 tariff schedules filed with the Commission from its organization to and including June 30, 1937, 31,004 pertained exclusively to telephone rates and services, 2,370 to both telephone and telegraph rates and services, and 8,518 exclusively to telegraph rates and services.

*Examination and correction of tariffs.*—Each telephone-rate schedule received during the fiscal year was carefully examined to determine whether it conformed to the requirements of the act and to the rules prescribed by the Commission relative to the filing of tariffs.

Particular attention was given to the elimination or modification of provisions that appeared to be unreasonable, unjustly discriminatory, or otherwise unlawful, or that were objectionable in form of publication or ambiguous as to possible interpretation and operation.

As a result either of correspondence with the carriers or of informal conferences held between representatives of the Commission and representatives of the carriers, many such discrepancies or irregularities in the tariffs were corrected.

*Rejection of tariffs.*—In four instances, telephone-rate schedules offered for filing with the Commission were rejected because of failure to give lawful notice to the Commission and the public of the effective date thereof.

*Special applications.*—During the fiscal year, 37 applications were received from telephone carriers for special permission to publish tariffs on less than 30 days' notice to the Commission and the public or for relief from other regulations governing the filing of tariffs. These applications were granted, inasmuch as they pertained generally to reductions in charges, establishment of new or extended services, or other modifications or changes clearly in the public interest.

*Public reference room.*—The many tariffs mentioned above are made conveniently available to the public through the medium of a public reference room, mentioned on page 124 of this report. Many persons availed themselves of the use of this room during the last fiscal year and numerous inquiries were answered regarding telephone rates and services. When requested, photostatic copies of tariff material were furnished to the public at cost.

*Reports to the public.*—During the fiscal year 1937, the public was informed of the filing of all new telephone-rate schedules through press releases describing briefly the date of the receipt of each tariff publication by the Commission, the date the new tariff was to become effective, and the general nature or effect of the new tariff publication.

#### RATE REDUCTIONS

The Telephone Division, during the fiscal year, directed its efforts particularly to securing rate reductions and other changes in tariff regulations appearing to be in the public interest. Many reductions in interstate and foreign rates were made effective which, it is believed, will tend to expand and increase the use of telephone services in this country to the benefit of both users and the carriers.

*Savings to the public.*—The estimated combined saving to the public during the fiscal year from certain of these reductions (hereinafter specifically described) will exceed \$21,000,000 per annum. However, the saving resulting from many of the reductions has not been estimated and is not included in the figure mentioned above. The actual saving to the public appears to be substantially in excess of \$21,000,000 per annum and may be still further increased as a result of the stimulation of telephone traffic incident to the lowering of charges.

The most important rate reduction during the fiscal year was the general revision of telephone rates for interstate service effective on January 15, 1937, which will result in a saving to the public estimated at \$12,000,000 annually. Illustrations of the reductions in telephone rates effective on the above-mentioned date are shown in a table on page 91 of this report.

*Reductions reflected in intrastate rates.*—It is apparent, therefore, that telephone rate reductions accomplished during the fiscal year are of far-reaching importance to the public. Furthermore, the reductions in rates for interstate and foreign telephone service in some instances have influenced or been reflected in intrastate reductions. Thus the saving to the public will be greatly in excess of the \$21,000,000 mentioned above.

Consideration is being given by the Telephone Division to the effect these rate reductions will have upon the revenues of telephone carriers and the extent to which traffic will be stimulated thereby.

*List of rate reductions.*—There follows a brief description of the interstate and foreign telephone-rate reductions that were made during the fiscal year 1937, arranged according to their effective dates:

1. Effective July 1, 1936, the rates of the American Telephone & Telegraph Co. were reduced for broadcast-program-transmission channels from Miami (Fla.) to San Jose (Costa Rica), Guatemala, Tegucigalpa (Honduras), Managua (Nicaragua), Panama, San Juan (P. R.), Barranquilla (Colombia), Bogota (Colombia), and Ciudad Trujillo (Dominican Republic); from New York (N. Y.) to Buenos Aires (Argentina), Rio de Janeiro (Brazil), London (England), Reykjavik (Iceland), and Lima (Peru); and from San Francisco (Calif.) to Honolulu (Hawaii) and Manila (P. I.).

2. Effective July 1, 1936, the rates of the American Telephone & Telegraph Co. were reduced for overseas-message toll telephone service from the United States to the principal European and Central American countries and to Honolulu (Hawaii), Manila (P. I.), Bogota (Colombia), and Ciudad Trujillo (Dominican Republic).

3. Effective July 1, 1936, the initial-period rates of the American Telephone & Telegraph Co. for message-toll telephone service to Cuba were reduced by \$1.50.

4. Effective July 1, 1936, the rates of the Radio Corporation of Puerto Rico were reduced for broadcast-program-transmission service from San Juan (P. R.) to Miami (Fla.).

5. Effective August 1, 1936, the rates of the American Telephone & Telegraph Co. were reduced for message-toll telephone service to ships at sea, plying between 500 and 1,500 nautical miles from New York (N. Y.) or San Francisco (Calif.), from \$18 to \$9.

6. Effective August 10, 1936, the charges of the American Telephone & Telegraph Co., in connection with broadcast-program-transmission channels, were reduced from \$4,000 per annum for the first, the first two, or the first three transmitting connections, to \$1,000 per annum for each transmitting connection.

7. Effective August 21, 1936, the method used by the Public Utilities California Corporation, a telephone and telegraph carrier serving points in California, Oregon, and Nevada, in computing interstate-message toll telephone service rates was changed from a specific point-to-point basis to an air-line-mileage basis, and the initial period was extended from 1 minute to 3 minutes, resulting in a rate reduction in the territory where the carrier operates.

8. Effective September 1, 1936, the person-to-person overtime rates of the American Telephone & Telegraph Co. were reduced for all message-toll telephone service calls of 234 miles or less air-line distance, and both the initial-period and overtime rates were reduced for all calls of more than 234 miles air-line distance. Similarly the rates of the associated Bell System companies were reduced. The total estimated saving to the public is more than \$7,350,000 per annum.

9. Effective September 20, 1936, the rates of the American Telephone & Telegraph Co. were reduced for broadcast-program-transmission channels to ships at sea plying between 500 and 1,500 nautical miles from shore.

10. Effective October 1, 1936, the rates of the American Telephone & Telegraph Co. were reduced for overseas-message toll telephone service from the United States to Bahama Islands, French Indo-China, Egypt, India, Netherland Indies, Palestine, Siam, Syria, Union of South Africa, and Venezuela, and special Sunday rates were established from the United States to the Bahama Islands and Venezuela.

11. Effective October 1, 1936, the rates of the American Telephone & Telegraph Co. were reduced for broadcast-program-transmission service from Miami

(Fla.) to Nassau (Bahamas) and Caracas (Venezuela), and from New York (N. Y.) to Cairo (Egypt), Bombay (India), and Capetown (South Africa).

12. Effective November 1, 1936, the method used by the American Telephone & Telegraph Co. in computing charges for broadcast-program-transmission channels, and certain other regulations applicable to this service, were changed as follows:

(1) The method of computing charges for interexchange channels was changed from a route or circuit basis to an air-line basis.

(2) In connection with schedule A channels, the receiving connection charge was reduced from \$4,000 per annum to \$175 a month.

(3) The higher-grade continuous service may be contracted for on a monthly basis instead of an annual basis.

(4) Amplifying equipment provided by the broadcaster at the studio may be used to interconnect channels.

(5) All classes of channel facilities furnished by the telephone carrier may be interconnected.

Similar changes were also made in the regulations applicable to the broadcast-program-transmission service of all the associated Bell System companies except the Bell Telephone Co. of Pennsylvania, the Diamond State Telephone Co., the New York Telephone Co., and the Northwestern Bell Telephone Co. It is estimated that \$250,000 per annum will be saved by the customers of the long lines department of the American Telephone & Telegraph Co., and that customers of the Associated Bell System Companies will save \$210,000 per annum on interexchange channels and \$70,000 per annum on local channels, making a combined saving of approximately \$530,000 per annum by the Bell System users.

13. Effective November 1, 1936, the rates of the American Telephone & Telegraph Co. were reduced for message-toll telephone service from San Francisco (Calif.) to Japan.

14. Effective November 6, 1936, certain message-toll telephone service rates of the Postal Telegraph-Cable Co. were reduced to the level of the reductions made by the Bell System companies on September 1, 1936.

15. Effective November 15, 1936, the rates of R. C. A. Communications, Inc., were reduced for broadcast-program-transmission service from New York (N. Y.) to Buenos Aires (Argentina), Rio de Janeiro (Brazil), Bogota (Colombia), Habana (Cuba), Berlin (Germany), Rome (Italy), Madrid (Spain), and Geneva (Switzerland), and from San Francisco (Calif.) to Batavia (Dutch East Indies) and Manila (P. I.).

16. Effective December 1, 1936, the rates of the Pacific Telephone & Telegraph Co. were reduced for interstate intracompany message-toll telephone service. The estimated saving to the public is \$290,000 per annum.

17. Effective January 15, 1937, the rates of the American Telephone & Telegraph Co. were reduced for message toll telephone station-to-station and person-to-person service between points over 43 miles apart (air-line distance), for message toll telephone person-to-person night-and-Sunday service between points over 49 miles apart (air-line distance), and for message toll telephone station-to-station night-and-Sunday service between points over 97 miles apart (air-line distance). The estimated saving to the public is \$12,000,000 per annum.

18. Effective May 1, 1937, the rates of the Postal Telegraph-Cable Co. were reduced between certain of its message toll telephone service points to the level of the reductions made by the American Telephone & Telegraph Co. on September 1, 1936.

19. Effective June 1, 1937, the interstate intracompany message-toll telephone service rates of the Southwestern Bell Telephone Co. were reduced to the level of the reductions established by the American Telephone & Telegraph Co. on January 15, 1937. The estimated saving to the public is \$460,000 per annum.

In addition to the foregoing, there were some miscellaneous reductions such as special message-toll telephone service rates on Christmas and New Year's Day.

The general revision of telephone rates effective on January 15, 1937, hereinbefore mentioned, resulted in Nation-wide reductions for interstate service, covering both station-to-station and person-to-

person calls. Illustrations of the reductions in rates that became effective on this date are given below:

*Examples of the reductions in rates of the American Telephone & Telegraph Co., effective Jan. 15, 1937, for the 3-minute initial period*

From Washington, D. C., to—	Day station-to-station		Day person-to-person	
	Old rate	New rate	Old rate	New rate
Richmond, Va.....	\$0.60	\$0.55	\$0.90	\$0.75
Philadelphia Pa.....	.75	.60	1.05	.85
Norfolk, Va.....	.85	.70	1.20	1.00
New York, N. Y.....	1.05	.85	1.40	1.20
Boston, Mass.....	1.50	1.25	1.90	1.65
Chicago, Ill.....	2.10	1.85	2.75	2.45
Omaha, Nebr.....	3.25	2.90	4.00	3.75
Denver, Colo.....	4.75	4.25	6.25	5.75
Salt Lake City, Utah.....	5.75	5.00	7.50	6.75
San Francisco, Calif.....	7.25	6.25	9.50	8.50

The most important of the above-listed reductions of rates and charges for services to the public were made effective after formal or informal conferences between members of the Telephone Division (or members of its staff) and officials of carriers and their technical staffs. Such reductions were accomplished without the delays, expense, and controversies incident to formal rate proceedings, and were made effective by the filing of revised tariffs by the carriers.

#### NEW AND EXTENDED SERVICES

The establishment of new or extended telephone services is also of importance to the public. Among such developments during the past fiscal year was the establishment of direct telephone service between the United States and China.

*List of new and extended services.*—There follows a brief description of the new or extended telephone services established during the fiscal year, arranged in the order of their effective dates:

1. Effective August 1, 1936, the American Telephone & Telegraph Co. added the steamship *Caledonia* to the list of ships equipped for overseas-message toll telephone service, bringing the total number of ships so equipped to 21.

2. Effective August 20, 1936, the American Telephone & Telegraph Co. and the New York Telephone Co. established coastal telephone and harbor telephone services through a radiotelephone station at New York (N. Y.).

3. Effective December 1, 1936, the Southern Bell Telephone & Telegraph Co. established coastal telephone and harbor telephone services through a radiotelephone station at Miami (Fla.).

4. Effective March 8, 1937, the New England Telephone & Telegraph Co. established coastal telephone service through a radiotelephone station at Boston (Mass.).

5. Effective March 30, 1937, the American Telephone & Telegraph Co. established direct message toll telephone and program-transmission services with Paris.

6. Effective April 1, 1937, the Ohio Bell Telephone Co. and the American Telephone & Telegraph Co. established message toll telephone service from and to points in the United States and foreign countries to and from vessels operating on the Great Lakes, through the radiotelephone station of the Lorain County Radio Corporation at Lorain (Ohio).

7. Effective April 14, 1937, the American Telephone & Telegraph Co. established program-transmission service between Miami (Fla.) and San Salvador (Salvador).

8. Effective June 12, 1937, the American Telephone & Telegraph Co. established message-toll telephone and program-transmission services with Shanghai (China).

## SUPERVISION OF ACCOUNTS

*Basis and purpose of accounting regulation.*—The regulation of accounts is authorized by section 220 of the act and is necessary in the effective administration of various other sections of the act. Such control is considered fundamental and indispensable in effective rate regulation.

*Revised system of accounts for the larger telephone carriers.*—A new uniform system of accounts for the larger telephone carriers,<sup>26</sup> formulated and prescribed by the Telephone Division, became effective on January 1, 1937. With certain minor modifications, this is the issue of June 19, 1935, which originally had been ordered effective on January 1, 1936, but which was delayed through an injunction proceeding instituted by various telephone carriers seeking to set aside the new system of accounts.

*Supreme Court decision.*—On December 7, 1936, the Supreme Court of the United States affirmed the decree of the United States District Court for the Southern District of New York, which had denied, with minor exceptions, the relief sought by the carriers in the aforesaid injunction proceeding. (*American Telephone and Telegraph Company et al. v. U. S. and F. C. C.* 14 Fed. S. 121, 299 U. S. 232.)

The principal provisions of this system of accounts that were the basis of this suit were those that required the carrier to show on its books the original cost of the property of the utility at the time such property was first dedicated to public use. The National Association of Railroad and Utilities Commissioners, representing various regulatory commissions, intervened in support of the contested order.

Mr. Justice Cardozo, in the opinion of the Supreme Court, made the following observation:

\* \* \* To a great extent, the telephone business as conducted in the United States is that of a far-flung system of parent, subsidiary, and affiliated companies. The Bell System is represented in this case by 37 companies, the American Telephone & Telegraph Co. at their head. Seven other companies, intervening as a group, represent a second and smaller system. Purchases are frequently made by a member or members of a system from affiliates or subsidiaries, and with comparative infrequency from strangers. At times obscurity or confusion has been born of such relations. There is widespread belief that transfers between affiliates or subsidiaries complicate the task of rate-making for regulatory commissions and impede the search for truth. Buyer and seller in such circumstances may not be dealing at arm's length, and the price agreed upon between them may be a poor criterion of value. \* \* \* Even if the property has been acquired by treaty with an independent utility or a member of a rival system, there is always a possibility that it is nuisance value only—and not market or intrinsic value for the uses of the business—that has dictated the price paid. Accordingly the work of the Commission may be facilitated by spreading on the face of the accounts a statement of the cost as of the time when the property to be valued was first acquired by a utility or dedicated to the public use. The same considerations show why the regulations do not direct that the inquiry as to original cost shall be carried even farther back,

<sup>26</sup> Prescribed for use by telephone carriers having average annual operating revenues in excess of \$50,000.

so as to cover, for illustration, the cost to manufacturers who may have sold to the first utility. In the process of analysis, inquiry is halted at the point where it ceases to be fruitful.

*New developments in accounting.*—This new system of accounts constitutes a revision, extensive in scope, of the uniform system of accounts prescribed by the Interstate Commerce Commission, effective on January 1, 1933.

To effect the restatement of plant accounts on the basis of original cost, carriers are required to submit adjusting journal entries to the Commission for approval. Investigations will be made, where necessary, to enforce the regulations of the new accounting system.

It is of paramount concern to the public that telephone-plant accounts be stated in such a manner as to reflect the history of the plant properties involved and to protect the public from inflation from one cause or another. It is essential that the accounts reflect the facts necessary to the determination of a proper rate base. It is felt that the new accounting system is an important step forward in accomplishing these objectives.

*Uniform system of accounts for small telephone carriers.*—A uniform system of accounts for small telephone carriers with average annual operating revenues not exceeding \$50,000 was in the course of preparation at the close of the year, based largely on the system discussed above for larger telephone carriers, but condensed for practical use by the smaller carriers. Before final adoption of this new system, conferences will be held with representatives of State regulatory bodies and other interested parties.

*Uniform work-order system and perpetual record of property changes.*—A uniform work-order system and regulations providing for a perpetual record of property changes for telephone carriers were also in course of preparation at the close of the fiscal year. These auxiliary accounting regulations will facilitate the audit and verification of plant accounts by Commission representatives. These regulations will be discussed with representatives of State regulatory bodies and other interested parties, as in the case of the accounting system for smaller carriers mentioned above.

#### DEPRECIATION STUDIES

Studies of depreciation are being made with a view to assembling reliable data on the basis of which rates of depreciation can be prescribed by the Commission pursuant to section 220 of the act and on the basis of which proper regulations for depreciation accounting can be prescribed.

In the past the determination of the amounts to be charged annually as expense of depreciation has been left largely to the discretion of the carriers, although depreciation is one of the largest items of operating expense and has an important effect upon the book valuation of telephone plant. For the calendar year 1936, the depreciation expense of the telephone carriers reporting to the Commission amounted to 23.62 percent of the total operating expense.

#### OTHER ACCOUNTING ACTIVITIES

*Application and interpretation of accounting regulations.*—Numerous inquiries were received from telephone carriers and represent-

atives of State regulatory bodies with respect to the application and interpretation of accounting regulations. The volume of such inquiries has been greatly increased on account of the new accounting system for telephone carriers.

*Approval of journal entries.*—Journal entries are being presented to the Commission for approval, relative to transfers of account balances incident to the installation of the new accounting system and with respect to the accounting for specific transactions. Various other inquiries or notifications are being received under the new accounting system, such as those relating to subdivisions of accounts and to clearing, temporary, and experimental accounts.

*Accounting circulars.*—An accounting circular was formulated and published by the Telephone Division containing regulations relative to accounting for social security taxes by telephone carriers.

*Relief and pensions.*—An order was adopted by the Telephone Division, effective June 16, 1937, containing additional regulations with respect to accounting for relief and pensions. This subject is receiving special attention of the Telephone Division.

*Destruction of records.*—During the fiscal year, attention was given to the enforcement of regulations relative to the destruction of records, and consideration is being given to the revision of such regulations.

*Bankruptcies and receiverships.*—Consideration was also given to special accounting regulations governing bankruptcies and receiverships of telephone carriers. Such proposed regulations will receive further consideration during the fiscal year 1938.

*Mergers and consolidations.*—Special attention was given during the fiscal year to accounting for mergers and consolidations by telephone carriers. Proposed journal entries submitted by the carriers, accounting for such transactions, were reviewed in each instance.

*Extensions of lines.*—Attention was also given to the accounting considerations involved in applications received from telephone carriers for authority to extend their lines. This was done for the purpose of securing correct accounting and particularly to preserve the integrity of the plant accounts affected by such extensions of lines.

#### COOPERATION WITH STATE REGULATORY BODIES

As hereinbefore indicated, the Telephone Division has pursued a policy of close cooperation, in all matters relating to telephone accounting, with State regulatory bodies and with the National Association of Railroad and Utilities Commissioners—particularly with the Association's Committee on Statistics and Accounts of Public Utility Companies. This has been especially true in the formulation of new accounting systems and changes in existing regulations. The cooperation and assistance of representatives of State regulatory bodies and of the association and its committee are gratefully acknowledged.

## WIRE FACILITIES UNDER THE JURISDICTION OF THE TELEPHONE DIVISION

This section of the report deals with the regulation of wire-telephone carriers, through the granting or denying of certificates of public interest and necessity for the construction, extension, and transfer of wire facilities as well as for the supplementing of existing facilities.

### EXTENSION OF LINES

Under section 214 carriers subject to all the provisions of the act are required to apply to the Commission for a certificate of public convenience and necessity for authority to construct, extend, acquire, or operate a telephone line that constitutes a part of an interstate line. This section provides that reasonable notice shall be given to the Governor of each State in which the property is located and that there be an opportunity for hearing. The section further provides that the Commission may, upon appropriate request being made, authorize temporary or emergency service, or the supplementing of existing facilities, without regard to the provisions of this section.

During the fiscal year 49 applications were received under this section of the act. This is a considerable increase over the 2 previous years. Four such applications were received during the year ended June 30, 1935, and nine during the year ended June 30, 1936.

*Acquisitions under section 214.*—Two of the above-mentioned applications were for authority to acquire new or extended lines.

(1) On August 25, 1936, the Telephone Division approved the application of the Southwestern Bell Telephone Co. to purchase 14.5 miles of wire circuit in the vicinity of Bay and Florence, Mo., from the United Telephone Co.

(2) On June 29, 1937, an application was received from the Nebraska Continental Telephone Co. for permission to acquire and operate all the telephone lines, system, business, and assets now owned by the Nebraska Continental Telephone Corporation. This application is now pending.

*Supplementing existing facilities.*—The remaining 47 applications were for authority to supplement existing facilities. Forty-six of these were analyzed and approved by the Commission. The other application was returned to the applicant because it did not conform to the requirements of the Commission. Many of these applications contemplated the substitution of cables for open-wire lines. The carriers anticipate the growth of business over their circuits and apply to the Commission for authority to construct their lines accordingly.

In connection with these projects it is the policy of the Commission to require periodic construction-and-progress reports and a full report upon their completion. The reports are received and analyzed by the engineering and accounting departments.

The estimated construction cost of these projects ranged from \$1,000 to \$2,378,000, with a total of \$5,466,000. This construction when completed will add 478 miles of cable and 8,593 circuit miles of open wire to interstate telephone toll plants.

*Construction of facilities by the Southwestern Bell Telephone Co.*—Among the applications to supplement existing facilities filed during the last fiscal year was one by the American Telephone & Telegraph Co. to supplement its existing toll facilities between Dallas and San Antonio and between Dallas and Houston, Tex.

By proper order, the Commission consolidated with the application of the American Telephone & Telegraph Co. a proposed plan of the Southwestern Bell Telephone Co. to supplement its existing facilities between the same points, which proposal the latter maintains does not come within the provisions of section 214. The proceeding is now before the Commission on briefs of interested parties.

#### PETITIONS FOR AUTHORITY TO CONSOLIDATE

*Authority given by the Act.*—Under section 221 (a) of the act telephone carriers desiring to consolidate their properties may file with the Commission a petition requesting it to certify that the proposed consolidation, merger, acquisition, or control of the property of one or more telephone companies by another company or other companies will be of advantage to the persons to whom service is to be rendered and in the public interest. If after due notice and hearing the Commission so certifies, the transaction is thereby exempted from the provisions of the antitrust acts of Congress.

Three applications coming under this section were considered by the Telephone Division during the fiscal year. The history of these applications follows:

*Crown Point Telephone Co. and the Northwestern Indiana Telephone Co., for certificate, etc.*—A joint petition was filed requesting the Commission to certify that the proposed acquisition by the Crown Point Telephone Co. (a wholly owned subsidiary of the Illinois Bell Telephone Co.) of the physical properties of the Northwestern Indiana Telephone Co., Valparaiso, Ind., would be of advantage to the persons to whom service is to be rendered and in the public interest. The Commission on August 13, 1936, after hearing, denied the petition. Briefly stated, the certificate was denied because the record did not show that the fair value of the physical properties to be acquired and the earnings of the company would justify the sale price of the properties as stipulated in the contract.

*Pacific Telephone & Telegraph Co. and the Campbell Telephone Co., for certificate, etc.*—On November 13, 1936, a joint petition was filed requesting the Commission to certify that the proposed acquisition by the Pacific Telephone & Telegraph Co. of the physical properties of the Campbell Telephone Co. would be of advantage to the persons to whom service is to be rendered and in the public interest. The Pacific Telephone & Telegraph Co. operated an exchange at Campbell, Calif. The properties of the Campbell Telephone Co. surrounded the exchange area of the Pacific Co. at Campbell. Under the then existing arrangements the Campbell Co. was responsible for the rendering of service from the telephones of its subscribers to the exchange area of the Pacific Co., the Pacific

Co. being responsible for rendering the remaining service. The Commission found that the proposed acquisition would be of advantage to the persons to whom service is to be rendered and in the public interest, should one company rather than two be responsible for the rendering of all telephone service in that community. The petition was granted and a certificate was issued.

*The Bell Telephone Co. of Pennsylvania and the Pennsylvania Telephone Corporation, for certificate, etc.*—On April 13, 1937, a joint petition was filed requesting the Commission to certify that the proposed acquisition by the Pennsylvania Telephone Corporation of certain of the physical properties of the Bell Telephone Co. of Pennsylvania and the proposed acquisition by the Bell Telephone Co. of certain physical properties of the Pennsylvania Telephone Corporation would be of advantage to the persons to whom service is to be rendered and in the public interest. The proposed acquisitions have as their main objective the elimination of the duplicated telephone facilities in the Johnstown, Pa., area. A public hearing upon this petition was held before an examiner of the Commission at Harrisburg, Pa., on June 28, 1937, and the matter is now pending.

#### PHYSICAL CONNECTION BETWEEN CARRIERS

Under section 201 (a) of the act the Commission in the regulation of interstate and foreign communication service may require carriers to establish physical connection with other carriers and to establish through routes and charges applicable thereto if, after opportunity for hearing, the Commission finds such action necessary or desirable in the public interest. During the year one petition was filed requesting the Commission to order a physical connection, which is discussed in the following paragraphs.

*Oklahoma-Arkansas Telephone Co. v. Southwestern Bell Telephone Co.*—The Oklahoma-Arkansas Telephone Co., of Poteau, Okla., filed a petition requesting the Commission to require the Southwestern Bell Telephone Co. to establish a physical connection with the facilities of the petitioner at Fort Smith, Ark. At the present time the interstate communication service of the Oklahoma-Arkansas Telephone Co. is handled over the lines of the Southwestern Bell Telephone Co., which operates a toll line into Poteau, Okla., where physical connection is made with the facilities of the petitioner. The petitioner has a toll line extending from Poteau, Okla., to Fort Smith, Ark. The cause of action arises out of the fact that the Southwestern Bell Telephone Co. refuses to give petitioner a physical connection at Fort Smith, Ark.

A public hearing upon this petition was held before an examiner of the Commission at Fort Smith, Ark., on October 5, 1936; the report of the examiner was released February 19, 1937; the respondent's exceptions thereto were filed May 24, 1937; and the petitioner's reply to the respondent's exceptions were filed June 4, 1937.

## RADIO FACILITIES UNDER THE JURISDICTION OF THE TELEPHONE DIVISION

The radio facilities under the jurisdiction of the Telephone Division may be divided into two general classes: (1) Fixed point-to-point radiotelephone and (2) Maritime radiotelephone.

### POINT-TO-POINT RADIOTELEPHONE

*International radiotelephone communication.*—Point-to-point radiotelephone stations supply telephone service to people separated by natural barriers. Through the use of these stations the wire-telephone systems in one country may be connected with the wire-telephone systems in other countries. This interconnection of the facilities of each continent has made it possible for any telephone subscriber in the United States having a connection with its Nation-wide wire facilities to communicate with over 95 percent of all the telephones in the world.

Radiotelephone service across the Atlantic between New York and London was inaugurated on January 7, 1927. Radio engineers determined that with highly directional antennas a satisfactory overseas circuit could be obtained with much less power than that required for the long-wave circuit originally employed. The first short-wave channel was placed in service in June 1928, between New York and London.

In April 1930, radiotelephone service was established between New York and Buenos Aires, in 1931 a direct connection was established with Rio de Janeiro, and Lima (Peru) was added in 1932.

Meanwhile engineers directed their attention to transpacific radiotelephone service. In December 1931, the service was opened to Honolulu, Hawaii. A direct connection was established in March 1933 with Manila. Late in 1934 a direct connection was made between San Francisco and Tokyo. Radio service to the Caribbean and Central American countries centered in Miami, Fla. Circuits from New York to Sidney by way of London were established in 1930, and negotiations are now pending for a direct circuit to Australia. On December 1, 1936, a direct short-wave radiotelephone channel was established between New York and Paris, the service being formally opened in the offices of the Commission on that date. The past year has seen direct radiotelephone service established to Shanghai, China.

*A. T. & T. Co. application for special experimental license.*—On February 9, 1937, the American Telephone & Telegraph Co. filed an application with the Commission seeking a special experimental license for experimental services only "to any fixed point beyond the continental limits of the United States." The applicant proposed to use in the operation of the experiment the 21 frequencies already licensed to it for telephone communication from its station at Lawrenceville, N. J.

The Commission set the case for hearing. Other carriers having an interest in radio communication to and from the United States were made parties to the proceeding. The hearing was originally set for June 17, 1937, but it was found necessary to postpone the hearing to a date beyond the end of this fiscal year.

The Commission (see sec. 218 of the act) is watching the development of radiotelephone communication with great interest. It is impossible to foresee what the future possibilities of the radiotelephone will be in making service available to people living in areas heretofore inaccessible to telephone-communication service.

In 1927 only 2,296 paid messages, in both directions, were handled over trans-Atlantic circuits, while in the first 6 months of the current calendar year (1937) 17,384 such messages were handled, indicating that the traffic for the entire year will be approximately 35,000 paid messages. (See table I and chart 1 of appendix K.) The terminals, length, and service date of each international radiotelephone circuit as of June 30, 1937, will be found in table II of appendix K. The following table shows the overseas countries and territories to which telephone service is available from the United States as of June 30, 1937.

*Overseas countries and territories to which telephone service is available from the United States June 30, 1937*

[\* Indicates direct circuit]

Algeria.	French Indo-China.	*Nicaragua.
*Argentina.	Germany.	Norway.
Australia.	Gibraltar.	Palestine.
Austria.	*Great Britain.	*Panama.
*Bahama Islands.	*Guatemala.	Paraguay.
Balearic Islands.	*Hawaii.	*Peru.
Belgium.	*Honduras.	*Philippine Islands.
*Bermuda.	Hungary.	Poland.
*Brazil.	Iceland.	Portugal.
Bulgaria.	India.	*Puerto Rico.
Canary Islands.	Irish Free State.	Rumania.
Chile.	Italy.	*Salvador.
*China.	*Jamaica.	Siam.
*Colombia.	*Japan.	Spain.
*Costa Rica.	Kenya.	Sweden.
Czechoslovakia.	Latvia.	Switzerland.
Danzig.	Lithuania.	Syria.
Denmark.	Luxemburg.	Tunisia.
*Dominican Republic.	Morocco (French).	Union of South Africa.
Egypt.	Morocco (Spanish).	Uruguay.
Finland.	Netherlands.	*Venezuela.
*France.	*Netherlands Indies.	Yugoslavia.

NOTE.—Canada, Cuba, and Mexico are served by wire lines.

#### MARITIME SERVICES

Maritime service under the jurisdiction of the Telephone Division may be divided into three general classes—coastal, coastal harbor, and ship.

*Coastal and coastal harbor stations.*—A coastal telephone station is a radio station used primarily for radiotelephone service with ocean-going vessels. A coastal harbor station is a radio station used primarily for radio communication service with small craft or other vessels that employ relatively low-power transmitters of limited range.

*Nation-wide service.*—Both coastal and coastal harbor stations are connected with the land-line wire network of the American communication systems, thus making possible telephone communication from any telephone subscriber in the United States to any person on board vessels equipped for this type of service.

*Coastal stations.*—As of June 30, 1936, there were three public coastal telephone stations. The American Telephone & Telegraph Co. operated stations at Ocean Gate and Lawrenceville, N. J., with power of 20 kilowatts and the Transpacific Communications Co., Inc., operated a station at Dixon, Calif., with power of 20 kilowatts.

During the year the Commission licensed the American Telephone & Telegraph Co. to operate a public coastal telephone station at Hialeah, Fla., with power of 400 watts, and authorized the transfer of the license of Station KMI, Dixon, Calif., as well as the licenses of fixed point-to-point telephone stations at this location, from the Transpacific Communications Co., Inc., to the American Telephone & Telegraph Co.

As of June 30, 1937, there are 21 ocean-going vessels that communicate with the coastal telephone stations. Twenty of these vessels ply the Atlantic Ocean and one the Pacific. A list of the vessels to which this communication service is offered may usually be found in the telephone directory of any large city.

*Coastal harbor stations.*—The service area of a coastal harbor station is much smaller than that of a coastal station, due to the fact that the public coastal harbor station uses a low-power transmitter. The limitation in the power of the coastal harbor station is made necessary because of the fact that the ships with which it communicates usually carry low-power transmitters having a smaller range of operation.

Public coastal harbor radiotelephone stations are operating at seven ports of the United States, as follows:

The Lorain (Ohio) station, operated by the Lorain County Radio Corporation, offers radiotelephone service with ships plying the Great Lakes. During the year, high-frequency operation has been inaugurated at this station.

The Marshfield (Mass.) station, operated by the New England Telephone & Telegraph Co., furnishes radiotelephone service in the vicinity of Boston Harbor.

The Staten Island (N. Y.) station, operated by the New York Telephone Co., furnishes radiotelephone service in the vicinity of New York Harbor.

The Miami (Fla.) station, operated by the American Telephone & Telegraph Co., furnishes coastal harbor radiotelephone service in the vicinity of Miami, Fla., as well as coastal telephone service along the southeast coast of the United States.

The San Rafael (Calif.) station, operated by the Pacific Telephone & Telegraph Co., furnishes radiotelephone service in the vicinity of San Francisco Harbor.

The San Pedro (Calif.) station, operated by Southern California Telephone Co., furnishes radiotelephone service in the vicinity of San Pedro Harbor.

The Edmonds (Wash.) station, operated by the Pacific Telephone & Telegraph Co., furnishes service in the Seattle, Wash., area.

*Renewal of licenses of stations WOX, KLH, KOW, and KOU.*—On September 9, 1936, the Commission granted the application of the New York Telephone Co. (WOX), the Pacific Telephone & Telegraph Co. (KLH and KOW), and the Southern California Telephone Co. (KOU) for the renewal of the licenses previously granted them to operate public coastal harbor radiotelephone stations. The applications had been set for hearing because of the fact that there had been very little use of this service. The high cost of equipping ships to communicate with the shore stations had been one of the principal reasons for the small use of this service. The hearing disclosed that a new type of equipment was shortly to be placed on the market and that the cost of equipping a boat for radiotelephone service would be materially decreased. The Commission granted the applications for renewal because of the need for the telephone service in the area served by each station.

During the year the Commission received three applications for new public coastal harbor stations, which are discussed in the following paragraphs:

*Warner & Tamble application.*—The Warner & Tamble Radio Service, a partnership, composed of R. V. Warner and G. H. Tamble, applied for authority to construct a public coastal harbor radiotelephone station at Memphis, Tenn., to communicate with vessels plying the Mississippi River and particularly vessels in the vicinity of Memphis Harbor. The case was heard before an examiner on May 7, 1937, and is now pending before the Commission.

*Chesapeake & Potomac Telephone Co. of Virginia application.*—The Chesapeake & Potomac Telephone Co. of Virginia, an operating wire-telephone carrier, applied for authority to construct a public coastal harbor radiotelephone station near Norfolk, Va., to communicate with vessels operating in the lower end of Chesapeake Bay and off the Virginia Capes. The case was heard before an examiner on June 9 and 10, 1937, and is now pending before the Commission.

*Thorne Donnelley application.*—Thorne Donnelley, an individual residing at Lake Bluff, Ill., applied for authority to construct a public coastal harbor radiotelephone station at Lake Bluff, Ill., to communicate with ships plying the Great Lakes, particularly those vessels operating in the southern end of Lake Michigan. The case was set for hearing before an examiner on July 8, 1937.

*Private coastal harbor stations.*—The city of New York, Department of Plant and Structures, with a station located in New York Harbor, and the Inland Waterways Corporation, with a station located at New Orleans, La., operate coastal harbor stations that are not open to public correspondence.

*Ship stations.*—As of June 30, 1936, there were 58 ship telephone stations licensed by the Commission. During the year 224 new stations were authorized and 25 stations were deleted, leaving 257 ship telephone stations in service as of June 30, 1937. The licenses herein mentioned are for stations on vessels plying the Great Lakes and inland and coastal waters, as well as for stations on small vessels, yachts, ferries, tugs, fishing boats, and other small craft. These ships, which usually carry a 5- to 50-watt transmitter, communicate with coastal harbor stations.

During the year the cost of low-power radio transmitters has been substantially reduced, and the number of vessels that are being equipped for this service is increasing. One reason for the popularity of this type of installation is the slight technical training necessary to obtain a license to operate the equipment. A small amount of study enables a captain or a member of a crew to obtain the third-class radiotelephone operator's license that is necessary for the operation of this apparatus.

*Safety of life at sea.*—The majority of these small vessels are not required by law to carry radio apparatus. The value of this equipment in case of emergency as a means of saving life and property is one of the reasons so many ships are being equipped for this service.

## COMPLAINTS AND INVESTIGATIONS

*General nature of complaints.*—The Telephone Division of the Commission receives many letters from parties complaining of acts of omission or commission on the part of the telephone companies. The majority of these letters relate to exchange, or local, telephone service. Under the provisions of the act of 1934, the Commission has no jurisdiction over such complaints. Upon the receipt of a complaint relating to exchange service, the complainant is informed that the State regulatory authority rather than the Federal Communications Commission has jurisdiction over the matter.

*Interstate toll service.*—Upon the receipt of a letter concerning a matter within the jurisdiction of the Commission, if the facts justify such action, the carrier or carriers involved are requested to inform the Commission with respect thereto in order that appropriate action may be taken. The carrier usually deals with the party making the complaint in an effort to bring about a satisfactory adjustment thereof, subject to the approval of the Commission. If any complaint seems to justify such action, the Commission may, on its own motion, institute an investigation. If the carrier does not effect a satisfactory adjustment or if the party complaining is not satisfied with the action taken, the latter may file either a formal or an informal complaint with the Commission. The procedure in handling such complaints is set forth in the rules of practice and procedure, adopted by the Commission.

### SPECIAL TELEPHONE INVESTIGATION

The Congress by Public Resolution No. 8, Seventy-fourth Congress (49 Stat. 43), directed the Federal Communications Commission to investigate the entire telephone industry, including the manufacture and sale of telephone instruments and equipment. The performance of these duties was assigned to the Telephone Division.

The Commission's report of its activities, findings, and recommendations under Public Resolution No. 8 will be submitted to the Congress as a separate report.

Final hearings on the general phases of the investigation, with the exception of rate analyses and special studies, were concluded on June 30, 1937. Seventy-seven volumes of staff reports covering the matters investigated were introduced at the hearings, as a part of the record. There are approximately 8,500 pages of testimony supported by these staff reports, and, in addition, hundreds of supplemental exhibits and thousands of work papers and documentary data.

The transcript of testimony and copies of all staff reports have been supplied to the Senate Committee on Interstate Commerce and to the House Committee on Interstate and Foreign Commerce. Copies of the staff reports have also been furnished to all the State regulatory commissions.

The information so compiled will be useful to the Congress in considering future legislation applicable to the telephone industry, and also will be useful to this Commission and to State regulatory agencies as basic material in the effective regulation of the industry.

The matters investigated include the corporate organization and control, inter-company relationships, financial history, rates, services, public relations, patents, expenses, profits, and operating policies and practices of the American Telephone & Telegraph Co. and its subsidiaries and affiliates, including the Western Electric Co., Inc., Bell Telephone Laboratories, Inc., Electrical Research Products, Inc., and the operating telephone companies.

Information early developed in the investigation indicated that interstate telephone rates were too high. Various reductions in rates, totaling approximately \$24,000,000 per annum, or \$65,750 a day, have followed the instituting of the investigation.

Further investigation of interstate rates is now being made to determine the effect of past rate reductions and the reasonableness of the charges now in effect. Appropriations are available to continue these studies until the close of the fiscal year ending June 30, 1938.

#### MISCELLANEOUS STUDIES AND INVESTIGATIONS

During the fiscal year the Telephone Division conducted the following miscellaneous studies and investigations:

1. A report of the radio amateur participation in the flood of January 1937.
2. A comparison of telephone rates in the various countries of the world.
3. The radiotelephone facilities of the Bell System companies.
4. A quantitative analysis of American cable, radiotelegraph, and radiotelephone rates and facilities to all parts of the world.
5. The program-transmission facilities and rates of the Bell System companies.
6. The service areas of the various independent telephone companies reporting to the Commission.
7. The telephone services of the United States, requested by the Bureau of International Telecommunications Union.

## FINANCIAL AND OTHER STATISTICAL DATA

### ANNUAL AND MONTHLY REPORTS

*Basis and purpose of reports.*—Pursuant to section 219 of the act, class A and class B telephone carriers<sup>27</sup> are required to file annual reports with the Commission disclosing financial and other statistical data. Monthly reports are required from the larger telephone carriers whose average annual operating revenues amount to more than \$250,000. These reports constitute an important and economical means of securing financial and other factual data relative to individual telephone carriers and with respect to the telephone industry as a whole. This information is of considerable importance in the regulation of telephone carriers and is of economic interest throughout the country. The annual reports are filed on a calendar-year basis.

*Form and content of reports.*—Annual and monthly report forms are prescribed by the Telephone Division. These forms are somewhat similar to those prescribed for telephone carriers in prior years, in order to obtain comparability of statistical data, but have been expanded or modified from time to time as occasion has arisen.

The annual report form is comprehensive in nature and contains information specifically required by section 219 of the act, mentioned above. During the fiscal year 1937, this report form was expanded somewhat, so as to include, among other things, the following requirements: That telephone carriers disclose the beneficial owners of their capital stock, if known; that an additional schedule be inserted in the report containing an analysis of advertising expense; that additional information be submitted relative to pensions and other benefits to employees; and that additional information be submitted regarding taxes.

*Number of carriers filing reports.*—During the past fiscal year a total of 103 telephone carriers filed annual reports for the calendar year 1936. A total of 148 telephone carriers filed annual reports for the calendar year 1935. The reduction to 103 for the calendar year 1936 is accounted for largely by some carriers' claiming to be subject only to sections 201-205 of the act. Fifty-one of the telephone carriers filing annual reports filed monthly reports during 1936, inasmuch as only the larger carriers having average annual operating revenues of more than \$250,000 are required to report monthly, as hereinbefore stated. Thirty other telephone carriers voluntarily filed monthly reports for statistical purposes.

*Examination and correction of reports.*—All accounting schedules and other statistical data contained in the reports filed by telephone carriers are carefully examined, and corrections are made where necessary, following correspondence with the carriers.

*Holding-company reports.*—Holding companies owning interests in communication carriers are also required to file annual reports with

<sup>27</sup> Includes all telephone carriers subject to the act with average annual operating revenues in excess of \$50,000 except carriers subject only to secs. 201-205 of the act.

the Commission. Two report forms have been prescribed for such companies, designed respectively for holding companies owning large interests in communication carriers and for those owning only minor interests therein.

During the fiscal year 1937, 23 holding companies owning interests in telephone carriers filed annual reports with the Commission.

*Public reference room.*—Annual and monthly reports filed by telephone carriers and annual reports filed by holding companies are made available to the public through the medium of a public reference room, mentioned on page 24 of this report.

#### STATISTICAL COMPILATIONS

The following publications containing financial and other statistical data relative to telephone carriers were issued during the fiscal year:

Selected financial and operating data from annual reports of telephone carriers for the year ended December 31, 1935.

Summary of monthly reports of large telephone carriers in the United States.  
Salary report of telephone and telegraph carriers, 1935.

These publications contain financial and economic data of general interest throughout the country. Copies of these compilations are requested by other governmental agencies, financial and educational institutions, and interested individuals.

*Summary of selected statistical data.*<sup>28</sup>—Reports filed with the Commission show that the 103 telephone carriers filing annual reports had \$4,554,000,000 invested in telephone plant at the close of 1936. The operating revenues for the year were \$1,079,000,000, or approximately 8 percent greater than the operating revenues for the previous year, and the operating expenses amounted to \$724,000,000. These telephone carriers reported operating tax accruals in the approximate amount of \$122,000,000, subdivided into \$34,000,000 for United States Government taxes and \$88,000,000 for State and local Government taxes. Excise taxes (not included in operating taxes) amounting to approximately \$19,000,000 were collected from the users of communication service for payment principally to the United States Government. The total operating and excise taxes reported by the 103 telephone carriers were \$140,000,000, and of this amount the United States Government taxes were slightly less than \$50,000,000.

The net operating income of the aforesaid telephone carriers was \$234,000,000 and the net income or profit (without elimination of intercompany duplications) amounted to \$363,000,000. Dividends in the amount of \$347,000,000 were declared on the capital stock of the carriers, resulting in an average rate<sup>29</sup> on all common and preferred stock of 8.1 percent.

The telephone carriers reporting to the Commission on an annual basis had 16,140,000 telephones and 21,700 teletypewriter and Morse stations in service at the close of 1936. An average of 2,304,000,000 local calls and 73,000,000 toll calls were handled each month through the carriers' central offices during the year. On December 31, 1936,

<sup>28</sup> The figures herein stated cover only carriers reporting to the Commission, whereas the figures shown on page 85 refer to the whole telephone industry.

<sup>29</sup> Based on total par value of all par stock plus total book liability of all stock without par value.

there were 282,500 employees in service—110,600 male and 171,900 female. Salaries and wages paid to employees amounted to approximately \$435,000,000, or an average of more than \$1,500 per employee per annum.

*Tables and charts contained in the appendix.*—As elsewhere mentioned in this report, there are contained in the appendix many tables and charts showing financial and other statistical data relative to communication carriers and one table showing the intercorporate relations between communication carriers and holding companies. With some exceptions, the tables and charts are separated into (1) those relating exclusively to telephone carriers, (2) those relating exclusively to telegraph carriers, and (3) those relating to both telephone and telegraph carriers. Brief comment is made in the appendix concerning each of these tables and charts.

## TECHNICAL DEVELOPMENTS IN THE TELEPHONE ART

During the past year many technical developments were effected in telephone communication, the most important of which are as follows:

### WIRE TELEPHONY

*Carrier systems.*—In telephonic carrier-transmission a number of telephone circuits are obtained on a single pair of conductors through the use of frequencies above the voice range. The wider the frequency range the greater the number of telephone channels that can be operated on the same conductor. New developments have been carried on for the purpose of widening the frequency range and thus obtaining more telephone circuits on a single pair of conductors.

From these developments, three new carrier systems have been evolved and, because of the wide band of frequencies on which they transmit, these are all classed as broad-band systems.

One system, for cables, the development of which has been almost completed, using frequencies up to 60000 cycles, will give 12 two-way telephone circuits on two pairs of cable conductors. A commercial cable is now being installed on which it is contemplated to employ this carrier system.

Another system for open-wire lines, which is also nearing completion, will provide 12 telephone circuits and can be employed with three channels of the existing Type-C carrier system and one voice-frequency talking circuit. This will allow a maximum of 16 talking circuits to be employed on one pair of wires. The top frequency of this system is 140000 cycles. This will be ready for use on a transcontinental line on a limited basis about the middle of 1938 and will be generally available in the early part of 1939.

*Coaxial systems.*—The third system comprises the coaxial cable, the construction of which was authorized by the Commission to extend between New York and Philadelphia, a distance of 94½ miles, and has been licensed to be operated experimentally for telephone, telegraph, and television purposes. The cable was in place and ready for field experiments in December 1936. It is expected that this cable will have a capacity of either 240 telephone channels or more than 2,000 telegraph channels, and may permit a single high-grade transmission of television.

In preparation for the trial operation of transmission over this cable, "over-all" tests and adjustments have been made, and on April 19, 1937, 27 circuits were routed over this coaxial system—16 New York to Philadelphia circuits and 11 circuits extending from New York via Philadelphia to other points.

While the above-mentioned circuits were being used temporarily for commercial telephone operation, some tests were made in which a voice-frequency telegraph system was superposed on a spare coaxial channel looped at Philadelphia. Some telephotographs were also

transmitted over a similar loop. Under the conditions of the test the performance of the coaxial system was reasonably satisfactory.

Each of these systems will fill an important place in the communication industry—the cable and the open-wire systems particularly where these lines already exist and the coaxial system where new structures are needed and on heavy traffic routes. All these systems require complicated equipment and in the immediate future will probably prove to be economical chiefly for transmission over long distances.

These systems have been made possible through extensive research and development of new types of vacuum tubes, amplifiers, copper-oxide modulators and demodulators, filters, automatic transmission-regulators controlled by pilot wires, etc.

*Cross-bar switch.*—During the year additional improvements were made in the cross-bar switch, which is a device for reducing considerably the amount of equipment and maintenance required for the operation of an automatic telephone exchange.

*Protectors.*—New protectors have been developed for the purpose of guarding communication lines and equipment against damage and interruptions due to power and lightning interference.

*Buried wire.*—The use of buried telephone wire with loading coils and cases and a new method of laying the buried wire have been developed. It is expected that this form of construction will eliminate a large number of pole lines now carrying a small number of telephone wires.

*Equipment.*—Many improvements of desk stands and ringing apparatus in connection with telephone subscriber equipment have been announced. Along with many other developments and improvements in connection with toll and exchange equipment have been the development and use of unattended dial central offices in a number of villages throughout the country.

#### RADIOTELEPHONY

*Single sideband system.*—The past year has seen much progress in the art of radiotelephony, especially in its application to transoceanic communications. New circuits have been connected to several countries not heretofore served, and new developments have been adapted to this type of service. The use of single-sideband transmission and reduced carrier power on high-frequency radiotelephone circuits has increased appreciably the efficiency and quality of the service. This single-sideband system also gives promise of reducing the number of radio-frequency channels needed for a certain number of circuits by the use of duplexing or multiplexing. Experimental work is now being carried on with the idea of using each side of a radio-frequency assignment for separate single-sideband channels to form a twin single-sideband arrangement allowing the use of two circuits on the same frequency.

*Antenna development.*—In the development of receiving apparatus the use of the multiple-unit steerable antenna is perhaps the most outstanding commercial innovation of this period. By using several directional receiving antennas of the rhombic type all in a row, and by steering the vertical receiving angle for best reception, it is pos-

sible to get a high degree of signal strength with good quality and with little or no frequency- or phase-distortion. This type of antenna system is being experimentally used on the transatlantic circuits, where reliable reception at all times is essential because of the large volume of traffic. It may be adapted later to other radiotelephone circuits when their volume of business justifies the slightly higher cost of installation for this type.

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## APPENDIX A

### FINANCIAL AND OTHER STATISTICAL DATA CONCERNING TELEPHONE AND TELEGRAPH CARRIERS AND HOLDING COMPANIES

*Arrangement of charts and tables relating to telephone and telegraph carriers.*—There are contained in this appendix tables and charts showing statistical data concerning telephone and telegraph carriers and holding companies, based principally on annual and monthly reports filed with the Commission. For convenience, the tables and charts which relate to telephone and telegraph carriers are divided into two groups. The first group contains statistical data based principally on the annual reports filed with the Commission by these carriers and the second group contains statistical data based principally on monthly reports filed with the Commission. With some exceptions, the tables and charts contained in these two groups are further subdivided to show: First, those relating to telephone carriers; second, those relating to telegraph carriers; and third, those relating both to telephone and telegraph carriers.

*Intercorporate relations.*—Following the two groups of tables and charts relating to telephone and telegraph carriers, there is included in this appendix a table showing the intercorporate relations between holding companies and telephone and telegraph carriers and containing an index to all such companies.

*Statistics cover preponderance of the industry.*—The telephone and telegraph carriers embraced in the annual-report statistics contained in this appendix are listed in Tables I and V, respectively, and represent a preponderance of the telephone and telegraph industries. A number of telephone carriers having average operating revenues exceeding \$50,000 per annum do not file annual reports since they claim exemption from the jurisdiction of the Commission, but the reporting telephone carriers receive approximately 95 percent of all telephone operating revenues in the United States. The telephone carriers embraced in the monthly report statistics are listed in table XXII and the telegraph carriers filing monthly reports are shown in table XXVIII.

*Bell System statistics limited.*—Unless otherwise stated, the statistical data shown in this appendix for Bell System carriers exclude returns from the Cincinnati and Suburban Bell Telephone Co. and the Southern New England Telephone Co.

*Geographical groupings of telephone carriers.*—For statistical purposes, telephone carriers are grouped geographically into three districts. These districts, in turn, are further subdivided into a total of nine regions. These districts and regions are as follows:

#### EASTERN DISTRICT

*New England region.*—This region comprises the following States: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

*Middle Atlantic region.*—This region comprises the following States: Delaware, New Jersey, New York, and Pennsylvania.

*Great Lakes region.*—This region comprises the following States: Illinois, Indiana, Michigan, Ohio, and Wisconsin.

#### SOUTHERN DISTRICT

*Chesapeake region.*—This region comprises the following States and Territory: District of Columbia, Maryland, Virginia, and West Virginia.

*Southeastern region.*—This region comprises the following States: Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee.

#### WESTERN DISTRICT

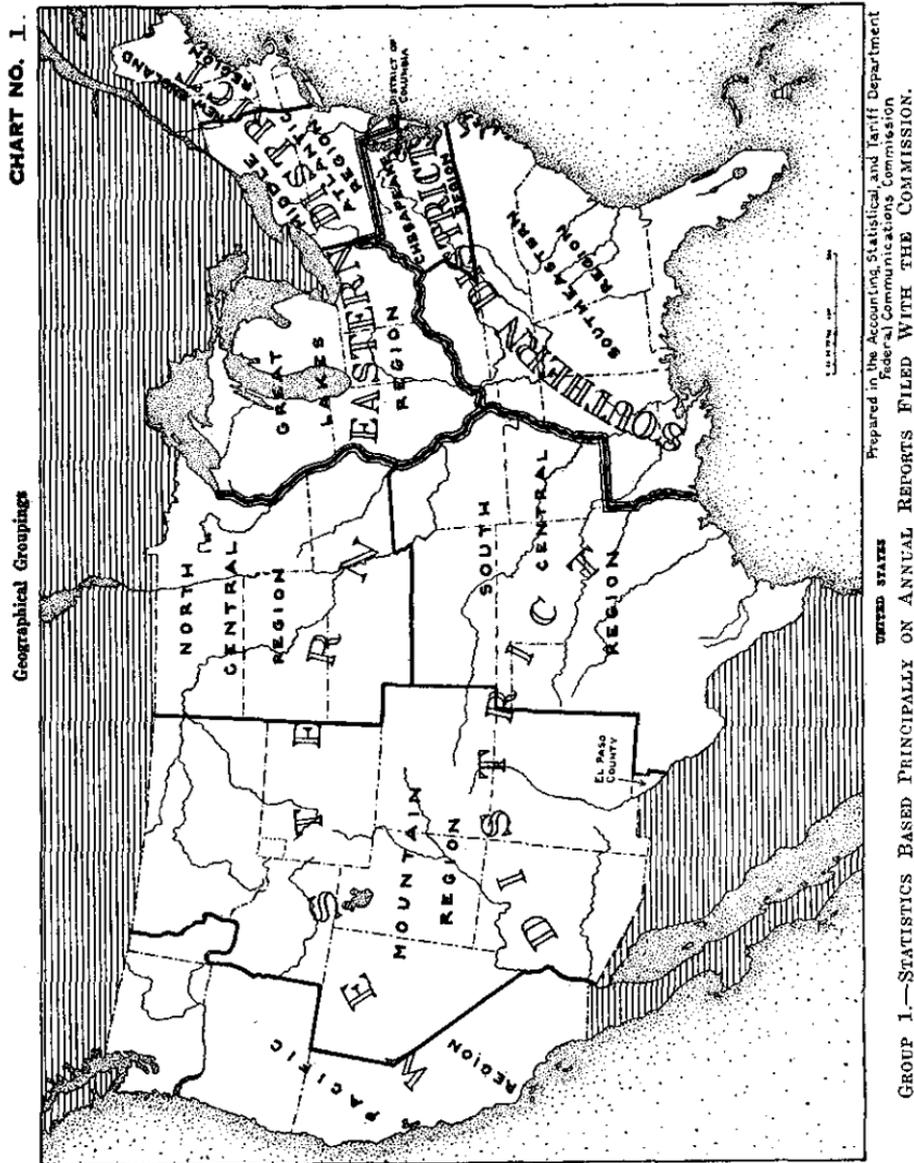
*North Central region.*—This region comprises the following States: Iowa, Minnesota, Nebraska, North Dakota, and South Dakota.

*South Central region.*—This region comprises the following States: Arkansas, Kansas, Missouri, Oklahoma, and Texas (except El Paso County).

*Mountain region.*—This region comprises the following States: Arizona, Colorado, Idaho (south of Salmon River), Montana, Nevada, New Mexico, Texas (El Paso County), Utah, and Wyoming.

*Pacific region.*—This region comprises the following States: California, Idaho (north of Salmon River), Oregon, and Washington.

The geographical groupings of telephone carriers are shown by chart 1.



TELEPHONE STATISTICS (BASED ON ANNUAL REPORTS)

*Telephone carriers filing reports.*—Approximately 45 carriers that filed annual reports in 1935 did not file annual reports for 1936 because they claimed to be subject only to the provisions of sections 201–205 of the act, while 5 carriers

making similar claims, voluntarily filed annual reports with the Commission. In table I, which follows, are shown the names of telephone carriers that filed annual reports with the Commission for the calendar year 1936. These reports are included in the statistics of telephone carriers based principally on annual reports.

TABLE I.—List of telephone carriers reporting on an annual basis to the Commission for the year 1936 showing classification<sup>1</sup> and geographical region to which the carriers have been assigned for statistical purposes

Name of carrier	Class of carrier	Geographical region
American Telephone Co.	A	South Central.
*American Telephone & Telegraph Co.	A	Middle Atlantic.
*Bell Telephone Co. of Nevada	A	Mountain.
*Bell Telephone Co. of Pennsylvania	A	Middle Atlantic.
Bluefield Telephone Co.	A	Chesapeake.
Carolina Telephone & Telegraph Co.	A	Southeastern.
Champaign Telephone Co.	B	Great Lakes.
Chenango & Unadilla Telephone Corporation	A	Middle Atlantic.
*Chesapeake & Potomac Telephone Co.	A	Chesapeake.
*Chesapeake & Potomac Telephone Co. of Baltimore City	A	Do.
*Chesapeake & Potomac Telephone Co. of Virginia	A	Do.
*Chesapeake & Potomac Telephone Co. of West Virginia	A	Do.
*Christian-Todd Telephone Co.	A	Southeastern.
Cincinnati & Suburban Bell Telephone Co.	A	Great Lakes.
Clear Telephone Co. <sup>2</sup>	B	Middle Atlantic.
Colusa County Telephone Co.	B	Pacific.
*Crown Point Telephone Co.	B	Great Lakes.
*Dakota Central Telephone Co.	A	North Central.
Del Rio & Winter Garden Telephone Co.	A	South Central.
*Diamond State Telephone Co.	A	Middle Atlantic.
Eastern Kansas Telephone Co.	B	South Central.
*Eastern Telephone & Telegraph Co. (Maine)	A	New England.
Eastern Telephone & Telegraph Co. (Pennsylvania)	A	Middle Atlantic.
*Emporia Telephone Co. <sup>3</sup>	A	South Central.
*Fulda Telephone Co. <sup>4</sup>	B	North Central.
Home Telephone Co. of Ridgway	B	Middle Atlantic.
Home Telephone & Telegraph Co. (Indiana)	A	Great Lakes.
Home Telephone & Telegraph Co. of Virginia	B	Chesapeake.
*Illinois Bell Telephone Co.	A	Great Lakes.
Indiana Associated Telephone Corporation	A	Do.
*Indiana Bell Telephone Co.	A	Do.
Inter-Mountain Telephone Co.	A	Southeastern.
Interstate Telegraph Co.	A	Pacific.
Interstate Telephone Co.	A	Do.
Jamestown Telephone Corporation	A	Middle Atlantic.
Kansas State Telephone Co.	B	South Central.
Kansas Telephone Co.	A	Do.
Keystone Telephone Co. of Philadelphia	A	Middle Atlantic.
LaCrosse Telephone Corporation	A	Great Lakes.
*Lebanon Telephone Co.	B	Do.
Lee Telephone Co.	B	Chesapeake.
Lincoln Telephone & Telegraph Co.	A	North Central.
Meadville Telephone Co.	A	Middle Atlantic.
Michigan Associated Telephone Co.	A	Great Lakes.
*Michigan Bell Telephone Co.	A	Do.
Middle States Telephone Co. of Illinois	A	Do.
Middle States Utilities Co. of Iowa	B	North Central.
Middle States Utilities Co. of Missouri	A	South Central.
*Moosehead Telephone & Telegraph Co.	B	New England.
*Mountain States Telephone & Telegraph Co.	A	Mountain.
Nebraska Continental Telephone Corporation	A	North Central.
*New England Telephone & Telegraph Co.	A	New England.
*New Jersey Bell Telephone Co.	A	Middle Atlantic.
New Jersey Telephone Co.	A	Do.
*New York Telephone Co.	A	Do.
*Nicollet County Telephone & Telegraph Co.	B	North Central.
Norfolk & Carolina Telephone & Telegraph Co.	A	Southeastern.
North-West Telephone Co.	A	Great Lakes.
North-Western Indiana Telephone Co.	A	Do.
Northern States Power Co.	A	North Central.
Northwestern Bell Telephone Co.	A	Do.

\* Represents carriers included in the Bell System.

<sup>1</sup> Telephone carriers filing annual reports are classified as follows: Class A—Carriers having average annual operating revenues exceeding \$100,000; Class B—Carriers having average annual operating revenues exceeding \$50,000, but not more than \$100,000. Telephone carriers having average annual operating revenues not exceeding \$50,000 are not required to file annual reports.

<sup>2</sup> Merged with United Telephone Co. of Pennsylvania as of July 1, 1936.

<sup>3</sup> Merged with the Southwestern Bell Telephone Co. as of July 31, 1936.

<sup>4</sup> Merged with the Tri-State Telephone & Telegraph Co. as of August 31, 1936.

TABLE I.—List of telephone carriers reporting on an annual basis to the Commission for the year 1936 showing classification and geographical region to which the carriers have been assigned for statistical purposes—Continued

Name of carrier	Class of carrier	Geographical region
Northwestern Telephone Co.....	A	Great Lakes.
Ohio Associated Telephone Co.....	A	Do.
*Ohio Bell Telephone Co.....	A	Do.
Ohio Telephone Service Co.....	A	Do.
Oregon Washington Telephone Co.....	A	Pacific.
Oxnard Home Telephone Co.....	B	Do.
Ozark Central Telephone Co.....	A	South Central.
*Pacific Telephone & Telegraph Co.....	A	Pacific.
Pennsylvania Telephone Corporation.....	A	Middle Atlantic.
*Peoples Telephone Co. <sup>4</sup> .....	B	North Central.
Platte Valley Telephone Corporation.....	A	Do.
Public Utilities California Corporation.....	A	Pacific.
Red River Valley Telephone Co.....	B	North Central.
*Rio Grande Valley Telephone Co. <sup>5</sup> .....	A	South Central.
Rochester Telephone Corporation.....	A	Middle Atlantic.
San Angelo Telephone Co.....	A	South Central.
Santa Barbara Telephone Co.....	A	Pacific.
Santa Paula Home Telephone Co.....	B	Do.
Southeast Missouri Telephone Co.....	A	South Central.
*Southern Bell Telephone & Telegraph Co.....	A	Southeastern.
*Southern California Telephone Co.....	A	Pacific.
Southern New England Telephone Co.....	A	New England.
Southwest Telephone Co. (Kansas).....	A	South Central.
Southwestern Associated Telephone Co.....	A	Do.
*Southwestern Bell Telephone Co.....	A	Do.
Tri-State Associated Telephone Corporation.....	B	Middle Atlantic.
*Tri-State Telephone & Telegraph Co.....	A	North Central.
Union Telephone Co. (Indiana).....	A	Great Lakes.
*United Telephone Co. (Kansas).....	A	South Central.
United Telephone Co. (Missouri).....	A	Do.
United Telephone Co. (Wisconsin).....	B	Great Lakes.
United Telephone Companies, Inc.....	A	Do.
United Telephone Co. of Pennsylvania.....	A	Middle Atlantic.
West Coast Telephone Co.....	A	Pacific.
*Westerly Automatic Telephone Co.....	A	New England.
Western Arkansas Telephone Co.....	B	South Central.
*Western New England Telephone Co.....	B	New England.
Western Telephone Corporation.....	A	South Central.
Western Telephone Corporation of Oklahoma.....	A	Do.
Western Telephone Corporation of Texas <sup>7</sup> .....	B	Do.
*White River Valley Telephone Co.....	B	New England.
*Wisconsin Telephone Co.....	A	Great Lakes.

<sup>4</sup> Merged with the Tri-State Telephone & Telegraph Co. as of June 30, 1936.

<sup>5</sup> Merged with the Southwestern Bell Telephone Co. as of December 31, 1936.

<sup>7</sup> Telephone property purchased by the Southwestern Associated Telephone Co. as of October 1, 1936.

*Telephone statistics by geographic divisions.*—Selected statistics for the year ended December 31, 1936, obtained from the annual reports filed by 80 class A telephone carriers and 23 class B telephone carriers are shown classified by geographic divisions in table II below. The summary includes operating data for the period of operations during 1936 for two merged class A carriers and four merged class B carriers.

TABLE II.—Statistics of telephone carriers, reporting on an annual basis to the Commission, classified by geographic divisions

[Year ended Dec. 31, 1936]

No.	Item	All carriers				Bell System carriers			
		United States	Eastern District <sup>1</sup>	Southern District	Western District	United States	Eastern District <sup>1</sup>	Southern District	Western District
1	Number of carriers.....	103	46	12	45	38	18	6	14
2	Investment in telephone plant.....	\$4,554,142,260	\$3,035,904,362	\$402,290,204	\$1,115,947,694	\$4,262,460,626	\$2,814,379,751	\$391,861,419	\$1,056,219,456
3	Investments other than telephone plant.....	2,647,931,284	2,419,130,996	18,462,615	210,337,673	2,640,179,303	2,414,351,650	18,390,909	207,436,744
4	Cash.....	186,056,402	170,889,275	4,306,625	10,860,502	179,771,782	166,653,683	3,893,457	9,314,642
5	Material and supplies.....	54,751,127	37,950,240	4,286,318	12,514,569	50,364,503	35,201,808	4,100,352	11,062,343
6	Total current assets.....	543,645,657	471,052,024	21,446,456	51,147,177	519,342,578	452,976,683	20,306,688	46,059,207
7	Capital stock.....	4,310,451,317	3,316,477,013	214,780,500	779,193,804	4,172,028,137	3,207,886,865	210,156,400	753,984,872
8	Funded debt.....	979,805,850	767,220,765	66,011,200	146,573,885	902,413,900	713,060,660	65,006,200	124,350,100
9	Total long-term debt.....	1,236,343,703	904,309,844	97,307,069	234,726,790	1,148,227,217	842,510,065	96,145,243	209,571,909
10	Total current liabilities.....	231,445,606	198,254,124	10,128,908	23,062,574	220,051,840	189,007,453	9,628,167	21,416,220
11	Total accrued liabilities not due.....	128,426,045	98,599,533	7,818,784	22,007,728	122,490,393	93,688,958	7,572,816	21,228,619
12	Depreciation reserve.....	1,191,631,042	800,996,793	94,667,013	295,967,236	1,125,753,009	751,049,611	91,412,601	283,290,797
13	Total surplus.....	387,006,427	337,428,873	17,939,970	31,637,584	370,968,555	325,159,795	16,583,217	29,225,543
	Operating revenues:								
14	Local service.....	709,007,128	463,991,223	68,522,944	176,492,961	665,738,608	429,768,722	66,861,997	169,107,889
15	Toll service.....	318,993,949	218,190,261	27,066,575	73,737,113	308,457,252	210,176,622	25,979,746	70,300,884
16	Miscellaneous.....	54,818,257	40,656,608	4,313,974	9,847,675	52,532,773	38,832,967	4,246,535	9,453,276
17	Uncollectible. Dr.....	3,406,392	2,111,890	292,579	1,001,923	3,201,809	1,983,948	277,158	940,803
18	Total operating revenues.....	1,079,412,942	720,726,202	99,610,914	259,075,826	1,021,526,829	676,794,463	96,811,120	247,921,246
	Operating expenses:								
19	Depreciation and extraordinary retirements.....	170,992,781	113,044,578	15,967,767	41,980,436	161,140,869	105,564,090	15,520,371	40,056,408
20	All other maintenance.....	192,262,817	129,601,220	16,736,115	45,925,482	182,222,994	121,699,174	16,356,803	44,167,017
21	Traffic.....	148,470,785	95,196,625	15,658,864	37,615,296	139,665,344	88,618,845	15,195,878	35,850,621
22	Commercial.....	82,346,721	53,507,635	7,768,744	21,070,342	78,322,203	50,522,877	7,625,055	20,174,271
23	General office salaries and expenses.....	58,638,237	42,095,888	4,010,155	12,582,194	53,350,042	39,663,682	3,801,381	11,890,979
24	Other.....	71,263,569	54,397,614	5,598,594	11,267,361	68,849,176	52,488,801	5,497,030	10,863,345
25	Total operating expenses.....	724,024,910	487,843,560	65,740,239	170,441,111	685,556,628	458,557,469	63,996,518	163,002,641
26	Operating ratio..... percent.....	67.08	67.69	66.00	65.79	67.11	67.75	66.10	65.75

<sup>1</sup> Data concerning the American Telephone & Telegraph Co. have been included in the Middle Atlantic region and the eastern district inasmuch as only aggregate figures are reported.

TABLE II.—Statistics of telephone carriers, reporting on an annual basis to the Commission, classified by geographic divisions—Continued

No.	Item	All carriers				Bell System carriers			
		United States	Eastern District	Southern District	Western District	United States	Eastern District	Southern District	Western District
27	Operating taxes:								
28	Other than U. S. Government.....	\$87,736,026	\$57,354,156	\$8,795,250	\$21,586,620	\$84,076,649	\$54,773,818	\$8,504,322	\$20,768,509
	U. S. Government.....	33,818,411	22,076,881	3,361,114	8,380,416	32,319,183	20,922,642	3,245,800	8,150,741
29	Total operating taxes.....	121,554,437	79,431,037	12,156,364	29,967,036	116,395,832	75,696,460	11,750,122	28,949,250
30	Net operating income.....	233,786,734	153,451,604	21,714,312	58,620,818	219,528,572	142,540,533	21,064,481	55,923,558
31	Other income.....	189,878,940	177,992,915	384,562	11,501,463	189,472,099	177,766,121	371,021	11,334,957
32	Interest deductions.....	59,339,268	46,373,992	4,232,635	8,732,641	54,949,592	43,364,812	4,174,498	7,410,282
33	Net income.....	362,664,863	284,046,252	17,678,907	60,939,704	352,659,334	276,050,587	17,076,241	59,532,506
	Dividends declared:								
34	Preferred stock.....	12,904,340	4,589,750	166,116	8,148,474	10,728,762	3,303,790	91,200	7,333,772
35	Common stock.....	333,860,864	269,115,463	16,436,731	48,308,670	327,207,931	263,326,868	15,042,428	47,938,635
36	Miles of wire in cable.....	79,042,477	53,912,013	6,814,632	18,315,832	74,862,237	50,277,520	6,710,063	17,874,654
37	Miles of aerial wire.....	4,418,077	1,948,507	744,296	1,725,274	3,889,958	1,697,868	703,939	1,488,151
38	Total miles of wire.....	83,460,554	55,860,520	7,558,928	20,041,106	78,752,195	51,975,388	7,414,002	19,362,805
39	Miles of pole line.....	511,827	216,288	53,825	241,714	406,907	172,377	49,315	185,215
40	Miles of underground conduit (single duct).....	126,656	90,166	8,379	28,111	116,715	80,679	8,311	27,725
	Central offices, type of switchboard:								
41	Magneto, manual.....	4,564	1,545	772	2,247	3,502	1,189	745	1,568
42	Common battery, manual.....	2,840	1,258	473	1,109	2,417	1,062	428	927
43	Auto, manual.....	12	6	6	6	6	4	2	2
44	Dial (automatic) system.....	1,273	680	195	398	1,046	575	120	351
45	Total central offices.....	8,689	3,489	1,440	3,760	6,971	2,830	1,293	2,848
46	Company telephones.....	15,762,918	9,437,779	1,802,747	4,522,392	14,471,141	8,482,740	1,739,959	4,238,442
47	Service telephones.....	297,216	48,841	40,606	207,769	250,877	38,472	38,060	174,345
48	Private line telephones.....	83,569	52,357	5,779	25,433	81,052	50,166	5,759	25,127
49	Total, telephones.....	16,143,703	9,538,977	1,849,132	4,755,594	14,803,070	8,581,378	1,783,778	4,437,914
50	Other stations.....	21,733	15,258	1,376	5,099	21,339	14,871	1,376	5,092
	Company telephones by type of switchboard:								
51	Magneto, manual.....	817,939	388,970	135,160	293,809	630,120	302,264	131,387	196,460
52	Common battery, manual.....	7,456,817	4,432,487	1,008,035	2,016,295	6,814,835	3,967,176	960,081	1,837,578

53	Auto, manual.....	7,621	4,897	659,552	2,724	3,915	3,829	648,491	2,154,309	86
54	Dial (automatic) system.....	7,480,513	4,611,397	659,552	2,209,564	7,022,243	4,219,443	648,491	2,154,309	
	Company telephones by type of customer:									
55	Business.....	6,238,344	3,709,697	737,882	1,700,765	5,782,166	3,453,736	714,603	1,613,827	
56	Residential.....	9,524,574	5,638,082	1,064,865	2,821,627	8,688,975	5,039,004	1,025,356	2,624,615	
	Company telephones by class:									
57	Main.....	11,180,486	6,550,600	1,281,332	3,348,554	10,184,395	5,851,845	1,230,821	3,101,729	
58	P. B. X.....	3,027,336	1,962,239	328,940	736,157	2,864,212	1,820,597	323,833	719,782	
59	Extension.....	1,555,096	924,940	192,475	437,681	1,422,534	820,298	185,305	416,931	
	Average number of calls originated per month:									
60	Local calls.....	2,303,997,208	1,190,113,230	344,624,387	769,259,591	2,107,818,397	1,053,133,525	332,772,137	721,912,735	
61	Toll calls.....	73,056,450	48,182,294	6,643,671	18,230,485	67,926,773	44,549,518	6,351,477	17,026,778	
62	Average number of company and service tele- phones.....	15,553,012	9,211,893	1,763,319	4,577,800	14,246,459	8,281,740	1,700,557	4,264,162	
	Private line service revenues: <sup>3</sup>									
63	Commercial, broadcasting.....	\$6,578,956	\$5,886,371	\$177,114	\$515,471	\$6,536,901	\$5,844,584	\$177,114	\$515,203	
64	Commercial, miscellaneous.....	17,424,929	16,838,975	59,454	526,500	17,345,524	16,763,012	58,962	523,550	
65	Government.....	832,475	787,079	40,542	4,254	832,205	787,409	40,542	4,254	
66	Press.....	3,900,009	3,799,079	142	100,788	3,897,650	3,796,990	142	100,518	
	Telegraph stations:									
	Private line Morse:									
67	Number.....	3,605	3,197	7	401	3,600	3,193	6	401	
68	Revenue.....	\$7,200,612	\$6,737,464	\$83,021	\$380,127	\$7,167,537	\$6,722,073	\$80,652	\$364,812	
	Private line teletypewriter:									
69	Number.....	7,510	6,084	264	1,162	7,350	5,952	262	1,136	
70	Revenue.....	\$10,732,589	\$8,733,501	\$236,904	\$1,762,184	\$10,635,565	\$8,651,820	\$233,642	\$1,750,103	
	Teletypewriter exchange service:									
71	Number.....	10,643	5,977	1,108	3,558	10,339	5,726	1,108	3,555	
72	Revenue.....	\$5,645,415	\$4,085,261	\$289,707	\$1,270,447	\$5,560,484	\$4,003,841	\$289,707	\$1,266,936	
73	Telephotograph service: Revenue.....	\$467,338	\$404,783	\$288	\$62,267	\$467,338	\$404,783	\$288	\$62,267	
74	Other telegraph service: Revenue.....	\$120,164	\$65,194	\$506	\$54,464	\$119,962	\$64,992	\$506	\$54,464	
75	Number of employees at close of June.....	277,686	168,085	31,917	77,684	258,534	155,054	30,826	72,654	
76	Number of employees at close of year.....	282,507	170,866	32,989	78,652	263,287	157,719	31,822	73,746	
77	Male employees.....	110,624	68,518	11,774	30,332	103,003	63,056	11,355	28,591	
78	Female employees.....	171,883	102,348	21,215	48,320	160,284	94,663	20,466	45,155	
79	Total compensation for year.....	\$434,528,690	\$288,467,278	\$39,708,447	\$106,352,925	\$410,532,315	\$269,955,667	\$38,616,454	\$101,960,194	
80	Compensation chargeable to operating ex- penses.....	\$376,262,066	\$252,391,028	\$32,929,325	\$90,941,713	\$355,994,602	\$236,974,675	\$32,003,744	\$87,016,183	

<sup>2</sup> Excludes 28 telephones of American Telephone & Telegraph Co. which were not connected with exchange offices.<sup>3</sup> Relates, except in minor instances, to interstate services furnished to customers and includes revenues from intrastate lines used in interstate communication.

TABLE II.—Statistics of telephone carriers, reporting on an annual basis to the Commission, classified by geographic divisions—Continued

No.	Item	Eastern district			Southern district		Western district			
		New England region	Middle Atlantic region †	Great Lakes region	Chesapeake region	Southeastern region	North Central region	South Central region	Mountain region	Pacific region
1	Number of carriers.....	7	17	22	7	5	12	20	2	11
2	Investment in telephone plant.....	\$392,972,538	\$1,778,757,879	\$864,173,945	\$153,300,096	\$248,990,108	\$185,194,892	\$367,645,714	\$106,203,183	\$456,903,905
3	Investments other than telephone plant.....	7,375,387	2,400,586,454	11,169,155	342,557	18,120,058	30,989,490	12,694,434	397,695	166,256,054
4	Cash.....	2,467,040	154,832,363	13,589,872	759,322	3,547,303	1,288,941	5,963,242	570,792	3,037,527
5	Material and supplies.....	3,460,452	24,220,747	10,269,041	1,516,710	2,769,608	2,599,337	3,595,994	1,318,452	5,000,816
6	Total current assets.....	17,377,347	400,412,444	53,262,233	6,896,844	14,549,612	8,640,005	18,285,994	4,112,225	20,108,953
7	Capital stock.....	174,325,565	2,611,867,653	530,283,795	35,452,100	129,328,400	121,955,538	209,076,073	52,899,700	395,262,493
8	Funded debt.....	94,149,300	615,639,100	57,432,365	4,305,700	61,705,500	5,009,900	54,380,885		87,183,100
9	Total long-term debt.....	124,320,849	687,868,666	92,120,329	23,573,743	73,733,326	37,418,208	63,406,634	19,980,958	113,920,990
10	Total current liabilities.....	5,248,091	174,513,188	18,492,845	4,274,794	5,854,114	4,189,354	8,418,980	1,736,638	8,717,602
11	Total accrued liabilities not due.....	3,738,771	68,217,780	26,642,982	2,328,200	5,490,584	3,966,587	6,499,826	2,901,957	8,839,358
12	Depreciation reserve.....	101,969,444	483,888,976	215,138,373	34,540,194	60,126,819	52,728,067	93,267,852	31,878,134	118,063,173
13	Total surplus.....	12,218,774	276,231,304	48,978,795	11,056,476	6,883,494	4,947,744	10,113,465	1,449,418	6,126,957
	Operating revenues:									
14	Local service.....	64,275,806	246,390,312	153,325,105	29,898,590	38,624,354	29,371,189	56,446,599	15,147,678	75,527,495
15	Toll service.....	21,966,219	154,174,314	42,049,728	8,396,066	18,670,509	11,509,965	26,207,926	7,237,196	28,782,026
16	Miscellaneous.....	2,858,051	30,769,963	7,028,594	1,793,826	2,520,148	2,021,084	4,228,600	902,960	2,695,031
17	Uncollectible, Dr.....	162,005	1,551,567	398,318	109,103	183,476	178,736	343,454	62,566	417,167
18	Total operating revenues.....	88,938,071	429,783,022	202,005,109	39,979,379	59,631,535	42,723,502	86,539,671	23,225,268	106,587,385
	Operating expenses:									
19	Depreciation and extraordinary retirements.....	15,005,541	66,519,940	31,519,097	6,202,455	9,765,312	6,819,126	13,887,425	3,927,937	17,345,888
20	All other maintenance.....	18,019,148	77,423,307	34,158,765	6,725,799	10,010,316	8,308,470	13,967,575	3,776,680	19,872,757
21	Traffic.....	15,225,356	50,546,763	29,420,506	6,468,490	9,190,374	6,631,637	12,636,533	3,861,778	14,485,348
22	Commercial.....	6,976,625	30,997,815	15,533,195	3,590,244	4,178,500	3,523,077	6,760,375	2,260,364	8,496,526
23	General office salaries and expenses.....	3,931,377	28,664,388	9,500,123	1,873,834	2,136,321	2,481,769	3,965,588	1,269,553	4,865,284
24	Other.....	4,006,481	41,446,733	8,944,400	1,935,499	3,663,095	2,086,907	4,084,264	1,111,833	3,984,417
25	Total operating expenses.....	63,164,528	295,598,946	129,080,086	26,796,321	38,943,918	29,850,986	55,301,700	16,238,205	69,050,220
26	Operating ratio.....percent..	71.02	68.78	63.90	67.03	65.31	69.87	63.50	69.92	64.78

27	Operating taxes:									
28	Other than U. S. Government.....	\$5,783,617	\$31,408,310	\$20,162,229	\$3,000,745	\$5,794,505	\$2,878,833	\$6,547,846	\$2,110,806	\$10,049,135
	U. S. Government.....	2,150,415	12,017,032	7,909,434	1,464,943	1,896,171	1,429,354	2,809,706	647,412	3,493,944
29	Total operating taxes.....	7,934,032	43,425,342	28,071,663	4,465,688	7,690,676	4,308,187	9,357,552	2,758,218	13,543,079
30	Net operating income.....	17,839,511	90,758,733	44,853,360	8,717,371	12,996,941	8,564,330	21,833,369	4,229,231	23,993,888
31	Other income.....	271,778	176,942,074	779,063	58,854	325,708	490,223	779,496	42,495	10,189,249
32	Interest deductions.....	5,772,324	36,086,921	4,514,747	970,481	3,262,154	1,224,701	2,755,482	1,007,143	3,745,315
33	Net income.....	12,017,050	231,011,536	41,017,666	7,784,535	9,894,372	7,747,999	19,720,759	3,263,420	30,207,526
	Dividend declared:									
34	Preferred stock.....		3,560,721	1,029,029	80,268	85,848	883,825	2,037,718		5,226,931
35	Common stock.....	11,230,562	218,926,280	39,958,621	6,946,058	9,490,673	6,135,357	15,899,399	4,007,604	22,266,250
36	Miles of wire in cable.....	6,661,064	30,460,668	16,790,281	2,601,081	4,213,551	2,693,371	6,466,922	1,286,757	7,868,782
37	Miles of aerial wire.....	259,539	1,095,968	593,000	142,488	601,808	447,315	628,819	286,713	362,427
38	Total miles of wire.....	6,920,603	31,556,636	17,383,281	2,743,569	4,815,359	3,140,686	7,095,741	1,573,470	8,231,209
39	Miles of pole line.....	34,922	84,380	96,986	14,412	39,413	83,439	81,432	40,874	35,969
40	Miles of underground conduit (single duct).....	10,780	50,123	29,263	3,998	4,381	4,197	8,147	1,964	13,803
	Central offices, type of switchboard:									
41	Magneto, manual.....	398	456	691	150	622	592	852	295	508
42	Common battery, manual.....	234	564	460	159	314	246	399	195	269
43	Auto, manual.....			6				3		3
44	Dial (automatic) system.....	97	359	224	67	128	82	126	18	172
45	Total central offices.....	729	1,379	1,381	376	1,064	920	1,380	508	952
46	Company telephones.....	1,504,545	4,489,033	3,444,201	743,699	1,059,048	862,086	1,477,748	454,758	1,727,800
47	Service telephones.....	1,965	19,493	27,383	8,254	32,352	64,325	82,351	14,889	46,204
48	Private line telephones.....	5,903	32,094	14,360	4,040	1,739	2,984	5,328	1,428	15,693
49	Total telephones.....	1,512,413	4,540,620	3,485,944	755,993	1,093,139	929,395	1,565,427	471,075	1,789,697
50	Other stations.....	1,553	9,429	4,276	494	882	465	1,373	395	2,866
	Company telephones by type of switchboard: <sup>2</sup>									
51	Magneto, manual.....	119,497	116,478	152,995	34,744	100,416	91,471	128,979	32,150	41,209
52	Common battery, manual.....	745,255	1,658,054	1,829,178	424,915	583,120	409,473	604,638	294,190	707,994
53	Auto, manual.....			1,897				376		2,348
54	Dial (automatic) system.....	639,793	2,514,473	1,457,131	284,040	378,512	361,142	743,755	128,418	976,249
	Company telephones by type of customer:									
55	Business.....	531,863	1,976,849	1,290,985	294,601	443,281	279,591	554,042	181,971	685,161
56	Residential.....	972,682	2,512,184	2,153,216	449,098	615,767	582,495	923,706	272,787	1,042,639

<sup>1</sup> Data concerning the American Telephone & Telegraph Co. have been included in the Middle Atlantic region and the eastern district inasmuch as only aggregate figures are reported.

<sup>2</sup> Excludes 28 telephones of American Telephone & Telegraph Co. which were not connected with exchange offices.

TABLE II.—Statistics of telephone carriers, reporting on an annual basis to the Commission, classified by geographic divisions—Continued

No.	Item	Eastern district			Southern district		Western district			
		New England region	Middle Atlantic region	Great Lakes region	Chesapeake region	Southeastern region	North Central region	South Central region	Mountain region	Pacific region
	Company telephones by class:									
57	Main.....	1, 124, 355	2, 925, 053	2, 501, 192	486, 810	794, 522	677, 587	1, 116, 354	338, 896	1, 215, 717
58	P. B. X.....	221, 962	1, 086, 618	653, 659	168, 815	160, 125	111, 862	211, 038	70, 501	342, 756
59	Extension.....	158, 228	477, 362	289, 350	88, 074	104, 401	72, 637	150, 356	45, 361	169, 327
	Average number of calls originated per month:									
60	Local calls.....	192, 544, 984	541, 428, 396	456, 139, 850	103, 419, 726	241, 204, 661	148, 257, 182	305, 996, 424	69, 701, 180	245, 304, 805
61	Toll calls.....	9, 190, 451	26, 878, 845	12, 112, 998	3, 465, 440	3, 178, 231	2, 240, 038	5, 347, 010	1, 333, 293	9, 310, 144
62	Average number of company and service telephones.....	1, 482, 138	4, 388, 161	3, 341, 594	721, 853	1, 041, 466	907, 064	1, 519, 158	450, 238	1, 701, 340
	Private line service revenues: <sup>3</sup>									
63	Commercial, broadcasting.....	\$63, 078	\$5, 561, 492	\$261, 801	\$60, 831	\$116, 283	\$80, 011	\$136, 101	\$34, 513	\$264, 846
64	Commercial, miscellaneous.....	237, 441	16, 326, 309	275, 225	22, 465	36, 989	39, 084	97, 597	2, 345	387, 474
65	Government.....		786, 890	789	4, 653	35, 889	522		3, 732	
66	Press.....		3, 796, 990	2, 089		142	270			100, 518
	Telegraph stations:									
	Private line Morse:									
67	Number.....	144	2, 361	692	3	4	18	135	36	212
68	Revenue.....	\$32, 725	\$6, 220, 338	\$484, 401	\$25, 342	\$57, 679	\$30, 207	\$103, 075	\$62, 357	\$184, 488
	Private line teletypewriter:									
69	Number.....	548	4, 344	1, 192	153	111	96	260	23	783
70	Revenue.....	\$270, 595	\$7, 447, 069	\$1, 015, 837	\$100, 307	\$136, 597	\$58, 440	\$268, 331	\$215, 343	\$1, 220, 070
	Teletypewriter exchange service:									
71	Number.....	861	2, 724	2, 392	338	770	356	978	336	1, 888
72	Revenue.....	\$197, 632	\$2, 796, 936	\$1, 090, 693	\$81, 663	\$208, 044	\$109, 447	\$287, 671	\$85, 331	\$787, 998
73	Telephotograph service: Revenue.....	\$180	\$395, 390	\$9, 213	\$288		\$486	\$1, 040	\$23, 154	\$37, 587
74	Other telegraph service: Revenue.....	\$6, 248	\$4, 490	\$54, 456	\$506			\$2, 830		\$51, 634
75	Number of employees at close of June.....	25, 054	89, 390	53, 041	12, 316	19, 601	14, 699	26, 770	7, 692	28, 523
76	Number of employees at close of year.....	25, 511	90, 234	55, 121	12, 536	20, 453	14, 323	26, 540	8, 063	29, 726
77	Male employees.....	9, 425	38, 694	20, 399	4, 435	7, 339	5, 638	9, 539	3, 091	12, 044
78	Female employees.....	16, 086	51, 540	34, 722	8, 101	13, 114	8, 665	17, 001	4, 972	17, 682
79	Total compensation for year.....	\$40, 494, 445	\$167, 978, 199	\$79, 994, 634	\$17, 122, 970	\$22, 585, 477	\$18, 920, 387	\$32, 205, 872	\$9, 705, 332	\$45, 521, 334
80	Compensation chargeable to operating expenses.....	\$34, 753, 834	\$146, 996, 173	\$70, 641, 021	\$14, 587, 444	\$18, 341, 881	\$16, 029, 965	\$27, 706, 375	\$8, 082, 601	\$39, 062, 772

<sup>3</sup>Relates, except in minor instances, to interstate services furnished to customers and includes revenues from intrastate lines used in interstate communication.

*Proportion of the telephone industry covered by annual reports to the Federal Communications Commission.*—In table III, which follows, are shown data from the annual reports of carriers reporting to the Interstate Commerce Commission for the year 1932, data applicable to 1932 for carriers reporting to the Federal Communications Commission in 1936, and data from annual reports filed with the Federal Communications Commission for 1936; compared with similar data concerning all telephone systems and lines compiled for the year 1932 by the Bureau of the Census in the "Census of Electrical Industries: Telephones and Telegraphs."

While the number of telephone carriers reporting to the Federal Communications Commission for 1936, as shown in this table, is less than one-fourth of 1 percent of the number of telephone systems and lines reported by the Bureau of the Census for 1932, the relatively few carriers reporting to the Federal Communications Commission, as shown by this table, own the preponderance of telephone plant and perform most of the telephone operations in the United States.

TABLE III.—Comparison of data concerning telephone carriers shown in the report of the Bureau of the Census for 1932, and reports filed with the Interstate Commerce Commission for 1932,<sup>1</sup> and the Federal Communications

Item	Census figures, 1932	Interstate Commerce Commission, 1932		Federal Communications Commission, 1936			
		Amount	Per-cent of census figures	1932 <sup>1</sup>		1936	
				Amount	Per-cent of census figures	Amount	Per-cent of census figures
Number of systems and lines.....	44,828	295	0.7	113	0.25	103	0.23
Investment in tele- phone plant.....	\$4,791,902,525	\$4,660,662,997	97.3	\$4,441,546,189	92.7	\$4,554,142,260	95.0
Operating revenues.....	\$1,061,530,140	\$1,049,757,095	98.9	\$1,013,923,755	95.5	\$1,079,412,942	101.7
Central offices.....	19,228	11,130	57.9	8,654	45.0	8,689	45.2
Total telephones.....	17,424,406	18,148,115	92.7	15,084,135	86.6	18,143,703	92.6
Number of employees.....	334,085	300,485	89.9	285,798	85.5	282,507	84.6
Total compensation.....	\$458,116,677	( <sup>2</sup> )	-----	( <sup>3</sup> )	-----	\$434,528,650	94.9

<sup>1</sup> Comparison is made both with statistics of all telephone carriers reporting to the Interstate Commerce Commission in 1932, and with only those carriers reporting to the Interstate Commerce Commission in 1932 and also to the Federal Communications Commission in 1936.

<sup>2</sup> Represents data applicable to 1932 for carriers reporting to the Federal Communications Commission in 1936.

<sup>3</sup> Data not reported.

*Development of class A telephone carriers from 1926 to 1936.*—Selected data of class A telephone carriers which reported to the Federal Communications Commission for the year 1936, showing the development of such carriers through the years 1926 to 1936, inclusive, are shown in table IV below. The trends of selected items for these class A telephone carriers are reflected in chart 2 which follows table IV. Of particular significance is the increase, over the period, in investment in telephone plant from \$2,979,000,000 to \$4,548,000,000.

TABLE IV.—Selected data showing the development through the years 1926 to 1936, inclusive, of class A telephone carriers which reported for the year 1936<sup>1</sup>

Year	Investment in telephone plant	Depreciation reserve	Net book investment	Ratio of depreciation to investment
				Percent
1926	\$2,978,605,980	\$602,307,533	\$2,376,298,447	20.22
1927	3,221,105,044	625,518,439	2,595,586,605	19.42
1928	3,490,080,222	675,453,577	2,814,626,645	19.35
1929	3,871,639,622	725,232,583	3,146,407,039	18.73
1930	4,228,754,381	762,993,261	3,465,761,120	18.04
1931	4,396,334,333	815,021,911	3,581,312,422	18.54
1932	4,435,203,513	847,122,365	3,588,081,148	19.10
1933 <sup>2</sup>	4,444,610,621	930,651,854	3,513,958,767	20.94
1934	4,453,829,451	1,009,119,626	3,444,709,825	22.66
1935	4,470,875,855	1,104,199,029	3,366,676,826	24.70
1936	4,547,768,755	1,189,658,769	3,358,109,986	26.16

Year	Total telephone capital	Capital stock	Funded debt	Ratio of debt to capital	Total surplus
				Percent	
1926	\$3,574,972,985	\$2,584,564,794	\$990,408,191	27.70	\$345,178,089
1927	3,843,376,476	2,865,949,381	977,427,095	25.43	477,996,409
1928	4,162,702,335	3,183,914,087	978,788,248	23.51	545,760,357
1929	4,472,615,510	3,323,288,557	1,149,326,953	25.70	631,779,709
1930	5,194,480,291	4,093,275,086	1,101,205,205	21.20	638,545,298
1931	5,307,980,679	4,279,912,061	1,028,068,618	19.37	639,670,962
1932	5,222,326,409	4,220,769,607	1,001,556,802	19.18	589,661,617
1933 <sup>2</sup>	5,251,662,016	4,257,104,243	994,557,773	18.94	523,033,808
1934	5,268,213,221	4,276,535,633	991,677,588	18.82	459,694,781
1935	5,296,783,823	4,276,777,886	1,020,005,937	19.26	412,291,221
1936	5,286,217,825	4,308,007,775	978,210,050	18.50	386,852,940

Year	Operating revenues	Operating expenses	Operating ratio	Operating taxes	Net operating income
			Percent		
1926	\$880,770,543	\$590,215,254	67.01	\$73,362,780	\$211,808,473
1927	949,644,851	638,249,490	67.21	79,568,964	228,896,434
1928	1,033,799,086	692,241,670	66.96	84,967,050	250,200,222
1929	1,134,428,449	767,231,913	67.63	87,199,666	272,617,338
1930	1,168,809,945	808,470,227	68.91	89,869,833	264,203,113
1931	1,138,770,401	769,725,950	67.59	94,087,170	265,825,761
1932	1,012,647,187	691,310,165	68.27	89,733,637	218,325,425
1933 <sup>2</sup>	934,703,113	667,773,246	71.44	87,971,066	178,857,878
1934	946,106,390	666,535,039	70.45	92,669,662	186,812,760
1935	998,613,821	703,456,158	70.44	99,083,327	196,006,367
1936	1,077,951,314	722,873,513	67.06	121,439,551	233,591,388

Year	Miles of wires <sup>3</sup>	Total tele-phones	Number of employees	Total compensation	Average compensation per employee per annum
1926	54,663,477	14,412,386	323,195	(4)	
1927	60,508,634	15,228,262	328,502	(4)	
1928	65,952,961	16,081,596	350,686	(4)	
1929	73,741,919	17,036,125	387,850	(4)	
1930	80,650,647	17,159,602	347,139	(4)	
1931	84,422,271	16,863,513	315,492	(4)	
1932	85,993,421	15,042,335	285,162	(4)	
1933	82,438,035	14,349,949	267,876	\$369,922,803	\$1,381
1934	82,211,367	14,675,383	268,490	386,506,246	1,440
1935	82,562,316	15,172,549	265,649	402,658,982	1,516
1936	83,389,098	16,101,981	281,822	433,919,299	1,540

<sup>1</sup> Includes, for the entire period, carriers consolidated and merged in prior years for which annual report data are available. Intercorporate duplications have not been excluded.

<sup>2</sup> In comparing data in this table, consideration should be given to the effect of the revision of the Uniform System of Accounts, effective as of Jan. 1, 1933, which resulted in certain changes and rearrangements of both the balance sheet and the income statement.

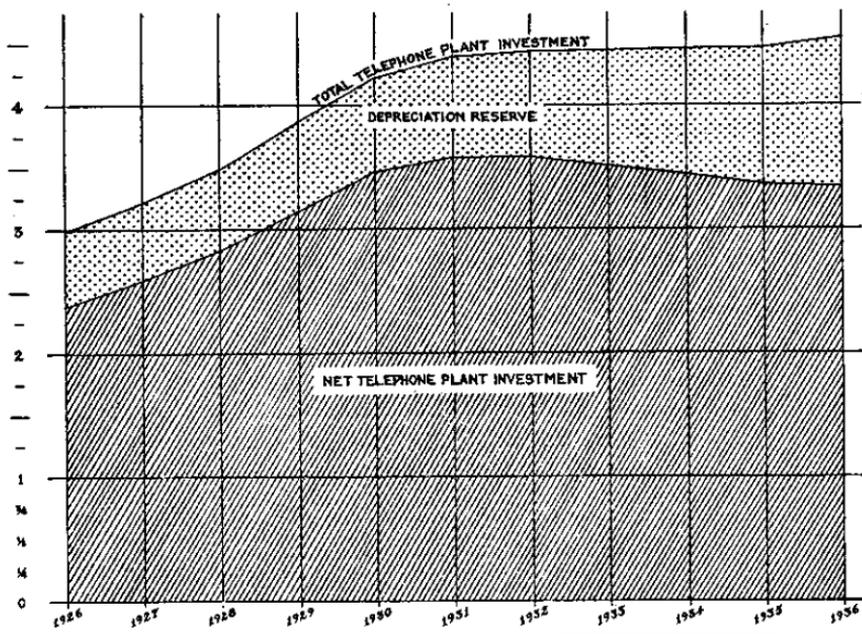
<sup>3</sup> The revision of the instructions in 1933 concerning the reporting of wire mileage by telephone carriers accounts for most of the decrease shown for that year.

<sup>4</sup> Data not reported.

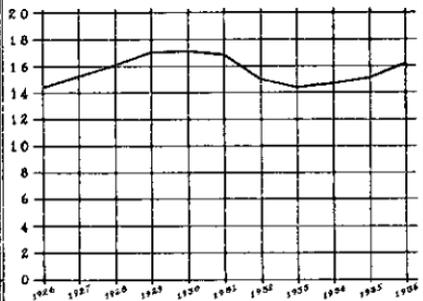
NOTE.—Class A telephone carriers are those carriers having average annual operating revenues exceeding \$100,000.

CHART NO. 2.

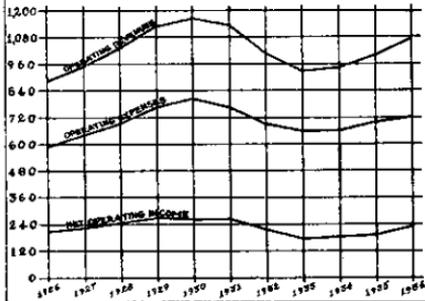
TELEPHONE PLANT INVESTMENT  
IN BILLIONS OF DOLLARS  
1926-1936



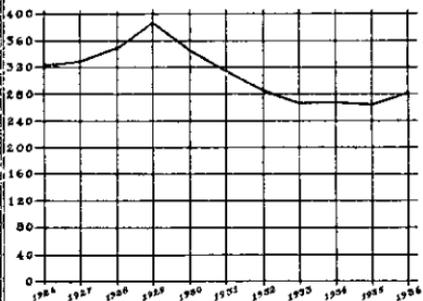
NUMBER OF TELEPHONES  
IN MILLIONS



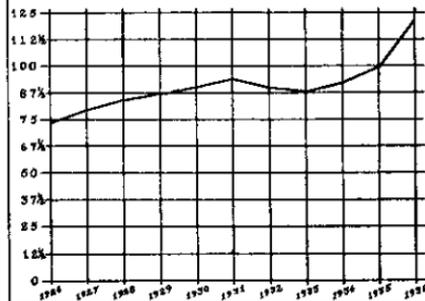
OPERATING REVENUES, OPERATING EXPENSES, AND NET OPERATING INCOME  
IN MILLIONS OF DOLLARS



TELEPHONE EMPLOYEES  
IN THOUSANDS



OPERATING TAXES  
IN MILLIONS OF DOLLARS



*Membership dues and contributions paid by telephone carriers to nonbusiness organizations.*—The following statement relates to the membership dues and contributions paid during 1936 by telephone carriers to nonbusiness organizations such as chambers of commerce, boards of trade, social and athletic clubs, professional and scientific societies, and other organizations of a like nature. These statistics include all telephone carriers reporting to the Commission on an annual basis. This information was required of telephone carriers for the first time in 1936.

Item	Amount
Number of memberships.....	8,309
Number of organizations.....	5,668
Amount of dues and contributions.....	\$534,272

*List of telegraph carriers filing reports.*—A list of telegraph carriers filing annual reports with the Commission for the calendar year 1936 is shown in table V, which follows:

TABLE V.—List of wire-telegraph and radiotelegraph carriers reporting on an annual basis to the Commission for the year 1936<sup>1</sup>

Name of carrier	Type of carrier
All America Cables, Inc.....	Ocean cable.
Canadian Pacific Ry. Co.....	Land line telegraph.
Central Radio Telegraph Co.....	Radiotelegraph.
City of Seattle, Harbor Department.....	Do.
Colorado & Wyoming Telegraph Co.....	Land line telegraph.
Commercial Cable Co.....	Ocean cable.
Commercial Pacific Cable Co.....	Do.
Continental Telegraph Co.....	Land line telegraph.
French Telegraph Cable Co.....	Ocean cable.
Globe Wireless, Ltd.....	Radiotelegraph.
Great North Western Telegraph Co. of Canada.....	Land line telegraph.
Hearst Radio, Inc.....	Radiotelegraph.
Interstate Telephone & Telegraph Co.....	Land line telegraph.
Mackay Radio & Telegraph Co. (California).....	Radiotelegraph.
Mackay Radio & Telegraph Co. (Delaware).....	Do.
Magnolia Radio Corporation.....	Do.
Mexican Telegraph Co.....	Ocean cable.
Michigan Wireless Telegraph Co.....	Radiotelegraph.
Minnesota & Manitoba R. R.....	Land line telegraph.
Mountain Telegraph Co.....	Do.
Northern Telegraph Co.....	Do.
Olympic Radio Co.....	Radiotelegraph.
Pere Marquette Radio Corporation.....	Do.
Postal Telegraph-Cable Co. (land line system).....	Land line telegraph.
Press Wireless, Inc.....	Radiotelegraph.
R. C. A. Communications, Inc.....	Do.
Radiomarine Corporation of America.....	Do.
South Porto Rico Sugar Co. (of Puerto Rico).....	Do.
Southern Radio Corporation.....	Do.
Tidewater Wireless Telegraph Co.....	Do.
Tropical Radio Telegraph Co.....	Do.
United States-Liberia Radio Corporation.....	Do.
Wabash Radio Corporation.....	Do.
Western Radio Telegraph Co.....	Do.
Western Union Telegraph Co.....	Land line telegraph and ocean cable.

<sup>1</sup> The report of the Central Idaho Telegraph & Telephone Co. for 1936 was not received in time to include the statistics of that carrier in this appendix.

Statistics of telegraph carriers, 1936.—A summary of selected statistics concerning 15 wire telegraph carriers and 20 radiotelegraph carriers filing annual reports for the year 1936, is shown in table VI below:

TABLE VI.—Statistics of wire-telegraph and radiotelegraph carriers reporting on an annual basis to the Commission classified by kinds of carriers

[Year ended Dec. 31, 1936]

No.	Item	Wire telegraph carriers (Land line and ocean cable)	Radio-telegraph carriers	Total
1	Number of carriers.....	15	20	35
2	Investment in plant and equipment.....	\$501,000,869	\$31,352,900	\$533,253,769
3	Other investments.....	\$55,201,539	\$13,388,734	\$68,590,273
4	Cash.....	\$18,683,782	\$1,435,493	\$20,119,275
5	Material and supplies.....	\$8,795,918	\$820,510	\$9,616,428
6	Total working assets.....	\$66,215,165	\$5,172,096	\$71,387,261
7	Capital stock.....	\$166,249,603	\$8,094,757	\$174,944,360
8	Unmatured funded debt.....	\$114,250,913	\$967,808	\$115,218,721
9	Total long-term debt.....	\$167,314,941	\$1,765,828	\$169,080,769
10	Total current liabilities.....	\$41,183,438	\$16,645,168	\$57,828,606
11	Reserve for accrued depreciation.....	\$106,651,205	\$16,648,193	\$123,299,398
12	Total corporate surplus.....	\$109,668,802	\$1,959,898	\$111,628,700
13	Telegraph operating revenues.....	\$132,897,992	\$8,842,520	\$141,540,512
14	Telegraph operating expenses.....	\$109,988,619	\$8,303,268	\$118,291,887
15	Other operating revenues.....		\$1,858,432	\$1,858,432
16	Other operating expenses.....		\$1,796,771	\$1,796,771
Operating taxes:				
17	Other than U. S. Government.....	\$4,653,817	\$193,721	\$4,847,538
18	U. S. Government.....	585,769	202,945	788,714
19	Total operating taxes.....	5,239,586	396,666	5,636,252
20	Operating income.....	\$16,817,512	\$172,018	\$16,989,530
21	Total interest deductions.....	\$8,470,926	\$703,347	\$9,174,273
22	Net income.....	\$6,927,888	\$45,768	\$6,882,120
23	Dividends declared.....	\$1,845,035	\$542,637	\$2,387,672
Miles of wire:				
24	In cable.....	<sup>2</sup> 570,354		1,570,354
25	Aerial wire.....	1,855,460		1,855,460
26	Total miles of wire.....	2,425,814		2,425,814
27	Miles of pole line.....	252,386		252,386
28	Miles of underground conduit (single duct).....	6,793		6,793
Telegraph offices:				
29	United States <sup>3</sup> .....	25,822	136	25,958
30	Foreign.....	182	27	209
31	Total telegraph offices.....	26,004	163	26,167
Telegraph revenue messages transmitted:				
32	Domestic.....	190,415,286	3,220,147	193,635,433
33	Foreign.....	10,055,436	4,459,833	14,515,289
34	Mobile.....		741,092	741,092
35	Total.....	200,470,722	8,421,092	208,891,814
Number of employees:				
36	Close of June.....	69,998	3,026	73,024
37	Close of year.....	73,343	3,047	76,390
38	Total compensation for year.....	\$78,483,418	\$4,569,308	\$83,052,726
39	Amount of compensation chargeable to operating expenses.....	\$70,679,193	\$4,131,508	\$74,810,701

<sup>1</sup> Deficit or other reverse item.

<sup>2</sup> Includes 59,345 nautical miles of wire.

<sup>3</sup> Includes Territories and possessions of the United States except the Philippine Islands.

*Selected telegraph data for the years 1934 to 1936, inclusive.*—A summary of selected data relative to telegraph carriers, further subdivided as between wire telegraph and radiotelegraph carriers, covering the years 1934 to 1936, inclusive, is contained in table VII which follows. This table includes returns for the years 1935 and 1936 from the Minnesota and Manitoba Railroad, which carrier did not report for the year 1934; however, the amounts involved are relatively small. The volume of business of wire telegraph and radiotelegraph carriers, as reflected by operating revenues, as well as by revenue messages transmitted, showed substantial gains in 1935 and 1936.

TABLE VII.—*Summary of selected data from annual reports of wire-telegraph and radiotelegraph carriers classified by kinds of carriers*

[Years 1934 to 1936, inclusive]

Item	Total, all carriers		
	1936	1935	1934
Number of carriers.....	35	36	35
Investment in plant and equipment.....	\$533,253,769	\$532,561,389	\$532,650,535
Capital stock.....	\$174,944,360	\$174,069,065	\$173,864,680
Unmatured funded debt.....	\$115,218,721	\$130,381,076	\$130,353,000
Reserve for accrued depreciation.....	\$123,299,398	\$121,838,544	\$120,831,566
Total corporate surplus.....	\$111,628,700	\$107,266,043	\$111,256,833
Operating revenues.....	\$141,540,512	\$130,170,934	\$126,481,408
Operating expenses.....	\$118,291,887	\$110,419,170	\$109,825,695
Operating income.....	\$16,989,530	\$14,150,956	\$11,189,969
Dividends declared.....	\$2,387,672	\$6,216,031	\$2,096,498
Total miles of wire.....	2,425,814	2,400,624	2,399,039
Revenue messages transmitted.....	208,891,814	190,645,697	165,786,459
Number of employees at end of June.....	73,024	68,987	70,983
Total compensation for year.....	\$83,052,726	\$76,376,532	\$77,170,766
Wire telegraph carriers (land line and ocean cable)			
Number of carriers.....	15	16	15
Investment in plant and equipment.....	\$501,900,869	\$501,141,370	\$501,753,560
Capital stock.....	\$166,249,603	\$166,402,308	\$166,398,823
Unmatured funded debt.....	\$114,250,913	\$126,237,036	\$126,564,000
Reserve for accrued depreciation.....	\$106,651,205	\$106,111,956	\$106,036,082
Total corporate surplus.....	\$109,668,802	\$105,369,020	\$107,178,422
Operating revenues.....	\$132,697,992	\$122,207,928	\$119,053,078
Operating expenses.....	\$109,988,619	\$102,575,187	\$102,802,369
Operating income.....	\$16,817,512	\$14,426,334	\$11,024,120
Dividends declared.....	\$1,845,035	\$4,816,031	\$1,796,498
Total miles of wire.....	2,425,814	2,400,624	2,399,039
Revenue messages transmitted.....	200,470,722	183,769,723	160,700,029
Number of employees at end of June.....	69,998	66,172	68,621
Total compensation for year.....	\$78,483,418	\$72,171,075	\$73,129,228
Radiotelegraph carriers			
Number of carriers.....	20	20	20
Investment in plant and equipment.....	\$31,352,900	\$31,420,019	\$30,905,975
Capital stock.....	\$8,694,757	\$7,666,757	\$7,465,857
Unmatured funded debt.....	\$967,808	\$4,144,040	\$3,789,000
Reserve for accrued depreciation.....	\$16,848,193	\$15,726,588	\$14,795,484
Total corporate surplus.....	\$1,959,898	\$1,897,023	\$4,078,411
Operating revenues.....	\$8,842,520	\$7,963,006	\$7,428,330
Operating expenses.....	\$8,303,268	\$7,843,983	\$7,023,326
Operating income.....	\$172,018	\$275,378	\$165,849
Dividends declared.....	\$542,637	\$1,400,000	\$300,000
Total miles of wire.....	8,421,092	6,875,974	5,086,430
Revenue messages transmitted.....	3,026	2,815	2,362
Number of employees at end of June.....	\$4,569,308	\$4,205,457	\$4,041,538

<sup>1</sup> Deficit or other reverse item.

*Selected statistics of telephone and telegraph carriers, 1936.*—A summary of selected data for the year 1936 from the annual reports of all telephone, wire-telegraph, and radiotelegraph carriers reporting to the Commission is shown in table VIII which follows. It will be noted from this table that communication carriers reporting to the Commission have an investment in plant and equipment in excess of \$5,000,000,000; that their operating revenues for the year 1936 were over \$1,200,000,000; and that employees received more than \$517,000,000 in salaries and wages during the year.

**TABLE VIII.**—*Summary of selected data from annual reports of all telephone, wire-telegraph, and radiotelegraph carriers reporting to the Federal Communications Commission*

[Year ended Dec. 31, 1936]

Item	Telephone carriers	Wire telegraph carriers (land line and ocean cable)	Radiotelegraph carriers	Total
Number of carriers.....	103	15	20	138
Investment in plant and equipment.....	\$4,554,142,200	\$501,900,869	\$31,352,900	\$5,087,396,029
Capital stock.....	\$4,310,451,317	\$166,249,603	\$8,694,757	\$4,485,395,677
Funded debt.....	\$979,865,850	\$114,250,913	\$967,808	\$1,095,024,571
Depreciation reserve.....	\$1,191,631,042	\$106,651,205	\$16,648,193	\$1,314,930,440
Total surplus.....	\$387,006,427	\$109,668,802	\$1,959,868	\$498,635,127
Operating revenues.....	\$1,079,412,942	\$132,697,992	\$8,842,520	\$1,220,953,454
Operating expenses.....	\$724,024,910	\$109,988,619	\$8,303,268	\$842,316,797
Operating taxes:				
Other than U. S. Government.....	\$87,736,026	\$4,653,817	\$193,721	\$92,583,564
U. S. Government taxes.....	\$33,818,411	\$585,769	\$202,945	\$34,607,125
Total operating taxes.....	\$121,554,437	\$5,239,586	\$396,666	\$127,190,689
Net operating income.....	\$233,786,734	\$16,817,512	\$172,018	\$250,776,264
Dividends declared.....	\$346,765,204	\$1,845,035	\$542,637	\$349,152,876
Miles of wire.....	83,460,554	2,425,814	.....	85,886,368
Number of employees (Dec. 31).....	282,507	73,343	3,047	358,897
Total compensation for year.....	\$434,528,650	\$78,483,418	\$4,569,308	\$517,581,376

*Averages and ratios of selected data concerning telephone and telegraph carriers.*—Some averages and ratios of selected data concerning telephone and wire-telegraph carriers for 1936 are shown in table IX which follows. As shown by this table, the average investment by telephone carriers in all telephone plant per company telephone was \$289 at December 31, 1936, and the average amount of revenue per telephone (including toll and miscellaneous revenue) amounted to \$6.94 per month during 1936. During this year, about 35 percent of the operating revenues of telephone carriers was paid out directly to employees as salaries or wages, while more than 53 percent of the operating revenues of wire-telegraph carriers was used for this purpose.

**TABLE IX.**—*Averages and ratios of selected data of telephone and wire-telegraph carriers*<sup>1</sup>

[Year ended Dec. 31, 1936]

Item	Amount
<b>TELEPHONE CARRIERS</b>	
Investment in telephone plant:	
Per mile of wire.....	\$54.57
Per dollar of revenue.....	\$4.22
Per company telephone.....	\$283.91
Depreciation reserve, ratio to investment in telephone plant.....	percent 26.17
Operating revenues per telephone per month.....	\$6.94
Operating expenses per telephone per month.....	\$4.66
Operating ratio.....	percent 67.08
Depreciation expense:	
Ratio to investment in telephone plant.....	percent 3.75
Percent of operating revenues.....	15.84
Percent of operating expenses.....	23.62

<sup>1</sup> For basic data underlying the computations in this table, see tables II and VI.

<sup>2</sup> This computation is based on the total book value of all operating plants as reported to the Commission by the carriers concerned.

TABLE IX.—Averages and ratios of selected data of telephone and wire-telegraph carriers—Continued

[Year ended Dec. 31, 1936]

Item	Amount
Wire mileage:	
Percent in cable.....	94.71
Percent of aerial wire.....	5.29
Calls originated per telephone per month:	
Local.....	148.14
Toll.....	4.70
Employees, percent of total:	
Male.....	39.16
Female.....	60.84
Average compensation per employee per annum.....	\$ 1,538.12
Compensation chargeable to operating expenses:	
Percent of operating revenues.....	34.86
Percent of operating expenses.....	51.97
WIRE TELEGRAPH CARRIERS <sup>4</sup>	
<i>Land line and ocean cable</i>	
Investment in plant and equipment:	
Per mile of wire.....	\$ 206.90
Per dollar of revenue.....	\$ 3.78
Reserve for accrued depreciation, ratio to investment in plant and equipment..... percent	21.25
Operating ratio..... percent	82.89
Depreciation expense:	
Ratio to investment in plant and equipment..... percent	1.56
Percent of operating revenues.....	5.88
Percent of operating expenses.....	7.10
Wire mileage:	
Percent in cable.....	23.51
Percent of aerial wire.....	76.49
Average compensation per employee per annum.....	\$ 1,070.09
Compensation chargeable to operating expenses:	
Percent of operating revenues.....	53.26
Percent of operating expenses.....	64.26

<sup>1</sup> This computation is based on the total book value of all operating plants as reported to the Commission by the carriers concerned.

<sup>2</sup> Represents total compensation for the year divided by the number of employees as of the close of the year.

<sup>4</sup> Excludes radiotelegraph carriers.

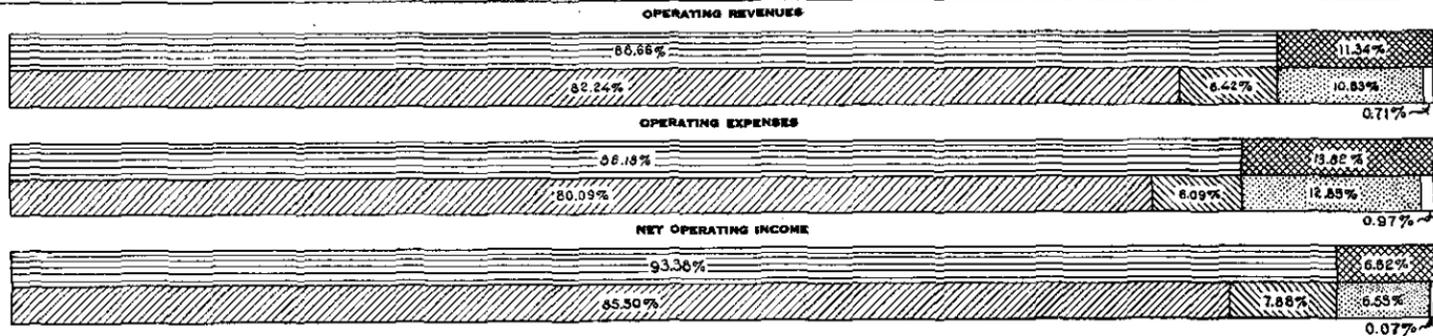
*Analysis of operating statistics of communication carriers.*—An analysis of the operating revenues, operating expenses, and net operating income of all telephone, wire-telegraph, and radiotelegraph carriers filing annual reports for the year 1936 is shown in chart 3, which follows. This chart also includes returns from 39 telephone carriers which claimed to be subject only to the provisions of sections 201-205 of the act and which filed monthly reports but did not file annual reports.

The 142 telephone carriers filing annual or monthly reports, or both, with the Commission, had operating revenues for 1936 in the amount of \$1,101,300,000, as shown by chart 3. The 15 wire telegraph carriers included in this chart had operating revenues amounting to \$132,000,000, and the 20 radiotelegraph carriers had operating revenues amounting to \$8,800,000. The total operating revenues of all these carriers amounted to \$1,242,100,000.

Under the uniform system of accounts prescribed for telephone carriers "Uncollectible operating revenues," are deducted from the gross operating revenues before transferring the latter amount to the income statement; whereas, under the uniform system of accounts prescribed for telegraph carriers "Uncollectible operating revenues," are not deducted from gross operating revenues before transferring the latter amount to the income statement, but are subsequently deducted from "Net telegraph and cable operating revenues." For comparative purposes, the operating revenues of wire-telegraph and radiotelegraph carriers have been adjusted, in chart 3, to exclude "Uncollectible operating revenues," which amounted to \$709,876 for the year 1936.

OPERATING REVENUES, OPERATING EXPENSES, AND NET OPERATING INCOME FOR THE YEAR 1936  
OF ALL COMMUNICATION CARRIERS REPORTING TO THE FEDERAL COMMUNICATIONS COMMISSION

CHART NO. 3



	OPERATING REVENUES	OPERATING EXPENSES	NET OPERATING INCOME	
BELL SYSTEM CARRIERS	\$1,021,526,869	\$695,556,628	\$219,508,578	
OTHER THAN BELL SYSTEM CARRIERS	79,734,794	32,133,914	20,286,800	
<b>ALL TELEPHONE CARRIERS</b>	<b>\$1,101,261,743</b>	<b>\$737,690,542</b>	<b>\$239,795,378</b>	
WIRE TELEGRAPH CARRIERS	132,080,345	109,968,619	16,117,512	
RADIOTELEGRAPH CARRIERS	8,810,691	8,569,268	172,048	
<b>ALL WIRE TELEGRAPH &amp; RADIOTELEGRAPH CARRIERS</b>	<b>140,891,036</b>	<b>118,537,887</b>	<b>16,289,560</b>	
<b>ALL REPORTING CARRIERS</b>	<b>1,242,152,779</b>	<b>856,228,429</b>	<b>256,084,938</b>	

*Distribution of operating revenues.*—Distribution of the operating revenues on a percentage basis among the major groups of operating expense accounts, operating taxes, and other deductions, and the net operating income of all telephone, wire-telegraph, and radiotelegraph carriers reporting on an annual basis for 1936 is shown in table X which follows. The distribution of each \$100 of operating revenues on the same basis is reflected in chart 4 which follows table X. These data show operating ratios of 67.1 percent for telephone carriers and 83.6 percent for wire-telegraph and radiotelegraph carriers. Telephone carriers deducted 11.3 percent of their operating revenues for taxes while the wire-telegraph and radiotelegraph carriers deducted 4 percent for this purpose.

TABLE X.—*Distribution of operating revenues showing operating expenses, operating taxes, and other deductions, and net operating income of telephone, wire-telegraph, and radiotelegraph carriers for the year 1936*

TELEPHONE CARRIERS

Item	Amount	Percent of operating revenues
Operating revenues.....	\$1,079,412,942	100.0
Operating expenses:		
Depreciation and extraordinary retirements.....	170,992,781	15.9
All other maintenance.....	192,262,817	17.8
Traffic.....	148,470,785	13.8
Commercial.....	82,346,721	7.6
General office salaries and expenses.....	58,633,237	5.4
Other.....	71,263,569	6.6
Total operating expenses.....	724,024,910	67.1
Operating taxes:		
Other than U. S. Government.....	87,736,026	8.1
U. S. Government.....	33,818,411	3.2
Total operating taxes.....	121,554,437	11.3
Other deductions before net operating income.....	46,861	(1)
Net operating income.....	233,736,734	21.6

WIRE-TELEGRAPH AND RADIOTELEGRAPH CARRIERS<sup>1</sup>

Operating revenues.....	\$141,540,512	100.0
Operating expenses:		
Depreciation.....	9,267,127	6.5
All other maintenance.....	16,928,469	12.0
Conducting operations.....	84,368,340	59.6
General and miscellaneous.....	7,727,951	5.5
Total operating expenses.....	118,291,887	83.6
Operating taxes:		
Other than U. S. Government.....	4,847,538	3.4
U. S. Government.....	788,714	.6
Total operating taxes.....	5,636,252	4.0
Other deductions before operating income.....	622,843	.4
Operating income.....	16,989,530	12.0

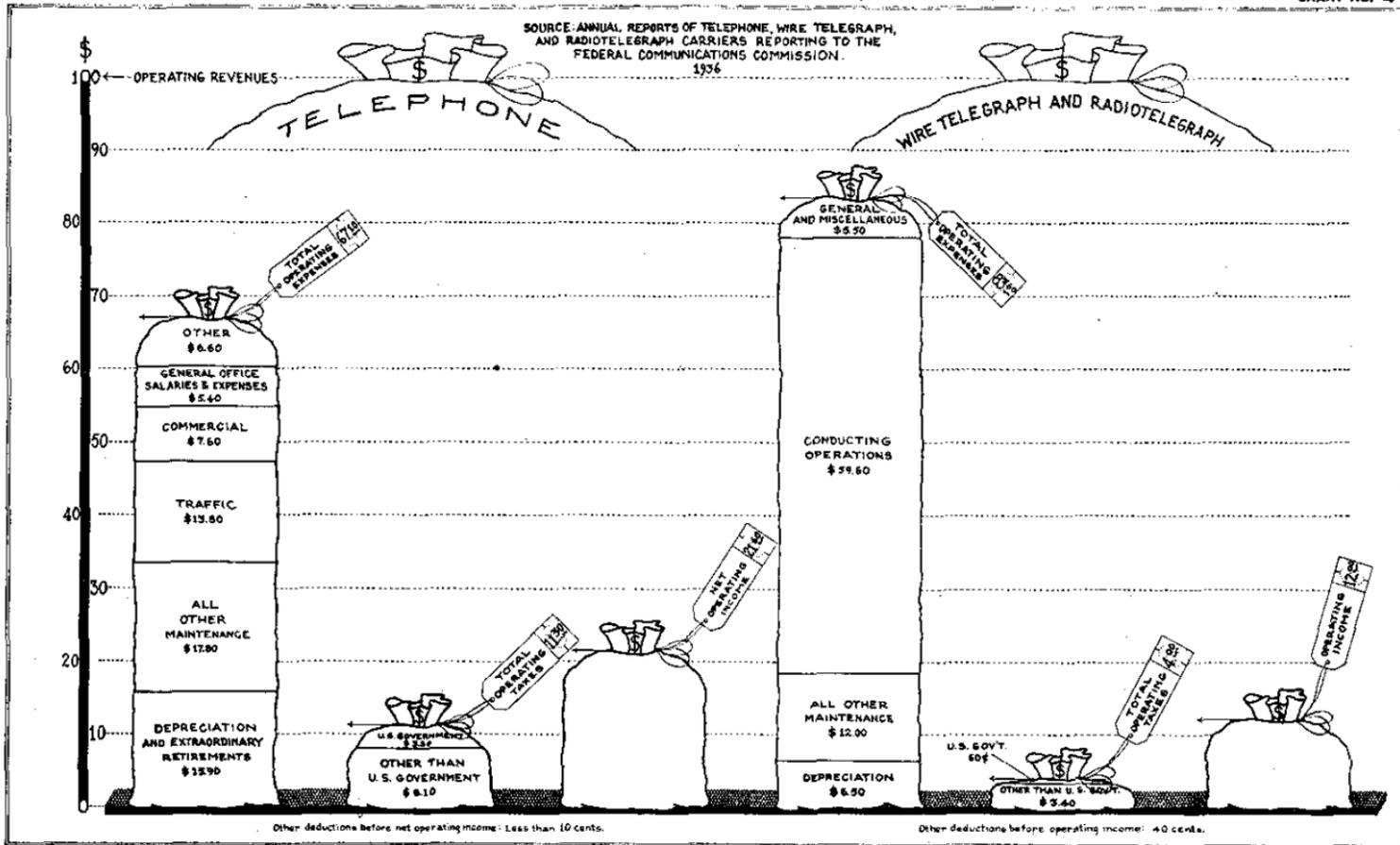
<sup>1</sup> Less than  $\frac{1}{10}$  of 1 percent.

<sup>2</sup> Wire-telegraph carriers comprise land lines and ocean cables.

DISTRIBUTION OF EACH \$100.00 OF OPERATING REVENUES SHOWING OPERATING EXPENSES, OPERATING TAXES, AND NET OPERATING INCOME

CHART NO. 4

SOURCE: ANNUAL REPORTS OF TELEPHONE, WIRE TELEGRAPH, AND RADIOTELEGRAPH CARRIERS REPORTING TO THE FEDERAL COMMUNICATIONS COMMISSION. 1936



PREPARED IN THE ACCOUNTING, STATISTICAL AND TARIFF DEPARTMENT, FEDERAL COMMUNICATIONS COMMISSION, JUNE, 1937

*Operating tax accruals by States and Federal Government.*—The operating tax accruals, by States and the Federal Government, as reported by class A and class B telephone carriers for the year 1936, are shown in table XI which follows. Tax accruals to be paid to State governments and subdivisions of State governments amounted to approximately \$87,700,000, as compared with approximately \$33,800,000 to be paid to the United States Government. These data exclude excise taxes collected by telephone carriers from persons using telephone service.

TABLE XI.—*Operating tax accruals, by States and the Federal Government, of telephone carriers reporting on an annual basis to the Commission*

[Year ended Dec. 31, 1936]

State	Class A carriers	Class B carriers	Total
Total, United States.....	\$121,438,058	\$114,886	\$121,552,944
Alabama.....	598,178	.....	598,178
Arizona.....	386,521	.....	386,521
Arkansas.....	352,793	6,528	359,321
California.....	7,240,308	10,506	7,250,814
Colorado.....	729,191	.....	729,191
Connecticut.....	782,495	.....	782,495
Delaware.....	76,838	75	76,913
Florida.....	537,383	.....	537,383
Georgia.....	642,354	.....	642,354
Idaho.....	269,423	.....	269,423
Illinois.....	9,893,892	.....	9,893,892
Indiana.....	2,147,505	9,026	2,156,531
Iowa.....	925,155	4,211	929,366
Kansas.....	929,325	11,437	940,762
Kentucky.....	757,096	.....	757,096
Louisiana.....	1,103,713	.....	1,103,713
Maine.....	356,287	2,651	358,938
Maryland.....	1,339,196	.....	1,339,196
Massachusetts.....	4,430,105	5,382	4,435,487
Michigan.....	2,903,441	.....	2,903,441
Minnesota.....	953,894	4,455	958,349
Mississippi.....	648,479	.....	648,479
Missouri.....	1,878,480	28	1,878,508
Montana.....	270,276	.....	270,276
Nebraska.....	705,302	.....	705,302
Nevada.....	151,372	.....	151,372
New Hampshire.....	390,756	.....	390,756
New Jersey.....	4,449,324	.....	4,449,324
New Mexico.....	110,932	.....	110,932
New York.....	20,194,469	6,666	20,201,135
North Carolina.....	885,442	1,396	886,838
North Dakota.....	187,428	1,655	189,083
Ohio.....	4,786,245	5,332	4,791,577
Oklahoma.....	1,145,112	29	1,145,141
Oregon.....	975,897	.....	975,897
Pennsylvania.....	3,270,957	525	3,271,482
Rhode Island.....	234,339	.....	234,339
South Carolina.....	470,603	.....	470,603
South Dakota.....	249,585	.....	249,585
Tennessee.....	818,704	.....	818,704
Texas.....	2,521,179	2,390	2,523,578
Utah.....	320,996	.....	320,996
Vermont.....	114,302	1,876	116,178
Virginia.....	701,609	8,315	709,924
Washington.....	1,758,266	.....	1,758,266
West Virginia.....	584,782	.....	584,782
Wisconsin.....	1,820,846	4,906	1,825,752
Wyoming.....	134,048	.....	134,048
District of Columbia.....	512,412	.....	512,421
U. S. Government.....	33,790,923	27,488	33,818,411

<sup>1</sup> Excludes \$1,493 Canadian taxes.

NOTE.—Class A telephone carriers are those carriers having average annual operating revenues in excess of \$100,000; class B telephone carriers are those carriers having average annual operating revenues exceeding \$50,000 but not more than \$100,000.

*Operating tax accruals and excise taxes.*—In table XII, which follows, is shown, in summary form, for all telephone, wire-telegraph, and radiotelegraph carriers reporting to the Commission for the year 1936, the operating tax accruals and the excise taxes collected from persons using communication service. These carriers reported more than \$127,000,000 in operating taxes, and, in addition, collected approximately \$25,000,000 in excise taxes, to be paid to the Federal Government or State governments, from persons using communication service.

**TABLE XII.**—*Operating tax accruals and excise taxes collected from persons using communication service, as reported by all telephone, wire-telegraph, and radiotelegraph carriers which filed annual reports with the Commission*

[Year ended Dec. 31, 1936]

Kind of tax	Telephone carriers	Wire-telegraph carriers (land line and ocean cable)	Radio-telegraph carriers	Total
<b>Operating taxes:</b>				
Other than U. S. Government.....	\$87, 736, 026	\$4, 653, 817	\$193, 721	\$92, 583, 564
U. S. Government.....	33, 818, 411	585, 769	202, 945	34, 607, 125
Total operating taxes.....	<sup>1</sup> 121, 554, 437	5, 239, 586	396, 666	<sup>1</sup> 127, 190, 689
<b>Excise taxes collected from persons using communication service:</b>				
Other than U. S. Government.....	2, 714, 129	57, 903	2, 790	2, 774, 822
U. S. Government.....	15, 846, 954	6, 453, 967	117, 651	22, 418, 572
Total excise taxes collected.....	18, 561, 083	6, 511, 870	120, 441	25, 193, 394
<b>Total taxes accounted for during the year:</b>				
Other than U. S. Government.....	90, 450, 155	4, 711, 720	196, 511	95, 358, 386
U. S. Government.....	49, 685, 365	7, 039, 736	320, 596	57, 025, 697
Grand total.....	<sup>1</sup> 140, 115, 520	11, 751, 456	517, 107	<sup>1</sup> 152, 384, 083

<sup>1</sup> Includes \$1,493 Canadian taxes.

*Advertising expenses.*—The distribution of advertising expenses of class A telephone carriers and of wire-telegraph and radiotelegraph carriers reporting to the Commission for 1936 is shown in table XIII which follows. The table shows, among other things, that telephone carriers reporting to the Commission spent about \$5,900,000 for advertising and that the greater portion of this amount was used for advertising in newspapers and periodicals. Wire-telegraph and radiotelegraph carriers reported \$385,000 in advertising expenses.

**TABLE XIII.**—*Distribution of advertising expenses of class A telephone carriers and of wire-telegraph and radiotelegraph carriers*

[Year ended Dec. 31, 1936]

Item	Amount
<b>TELEPHONE CARRIERS</b>	
Salaries and wages.....	\$860, 254
Publicity and advertisements:	
Newspaper and periodical advertising:	
Advertising space newspapers, regular.....	2, 015, 631
Special newspaper advertising space and all other periodicals.....	1, 120, 706
Preparation cost.....	290, 876
Unassigned expenses.....	364, 644
Total newspaper and periodical advertising.....	3, 791, 857
Booklets, pamphlets, and bill inserts.....	376, 531
Window display, exhibits, posters, and placards.....	221, 879
Motion pictures.....	49, 076

TABLE XIII.—Distribution of advertising expenses of class A telephone carriers and of wire-telegraph and radiotelegraph carriers—Continued

[Year ended Dec. 31, 1936]

Item	Amount
TELEPHONE CARRIERS—continued	
Publicity and advertisements—Continued.	
Other publicity and advertisements:	
General press service and special news stories.....	\$30, 704
Lectures, demonstrations, radio, central office visits, etc.....	251, 827
Miscellaneous.....	87, 739
Unassigned expenses.....	36, 664
Total other publicity and advertisements.....	406, 934
Total publicity and advertisements.....	4, 846, 277
Other expenses.....	178, 067
Grand total—class A telephone carriers.....	5, 884, 598
WIRE-TELEGRAPH AND RADIOTELEGRAPH CARRIERS <sup>1</sup>	
Newspapers.....	19, 560
Periodicals.....	39, 103
Radio advertising.....	10, 490
Contributions and donations charged to advertising.....	779
Advertising department salaries and expenses.....	6, 921
All other advertising expenses.....	249, 716
Grand total—Wire-telegraph and radiotelegraph carriers.....	384, 509

<sup>1</sup> Wire-telegraph carriers comprise land lines and ocean cables.

NOTE.—Class A telephone carriers are those carriers having average annual operating revenues exceeding \$100,000.

*Free and concession service of telephone carriers and frank service of telegraph carriers.*—In tables XIV, XIV-A, and XIV-B, which follow respectively, are shown available data concerning: (1) The amount of free and concession service granted by Bell System telephone carriers during 1934, including both interstate and intrastate service; (2) the free and concession service reported by S1 class A telephone carriers during 1935, relating only to interstate service; and (3) data concerning telegraph frank service reported by wire-telegraph and radiotelegraph carriers during 1936.

Only Bell System carriers are included in the statistics for the year 1934 inasmuch as only two other carriers reported any free and concession service during that year. The tabulation for the year 1935 excludes intrastate free and concession service, inasmuch as carriers were not required to report such data to the Commission.

The telegraph data appearing in table XIV-B are confined to the year 1936, inasmuch as that is the first full year for which complete data were required of telegraph carriers. No frank service was granted by carriers exclusively engaged in ocean cable operations during the year 1936.

TABLE XIV.—Amount of free and concession service granted by Bell System telephone carriers during 1934<sup>1</sup>

[Interstate and intrastate service]

Types of service	Amount of free and concession service granted
Local.....	\$3, 993, 466
Toll.....	795, 351
Not classified.....	125, 394
Total.....	4, 914, 211

<sup>1</sup> Includes returns from Cincinnati and Suburban Bell Telephone Co. and the Southern New England Telephone Co.

TABLE XIV-A.—Amount of free and concession service granted by class A telephone carriers during 1935

[Interstate service exclusively]

Recipients of free and concession service	Amount of free and concession service granted	
	Bell System <sup>1</sup>	Total
Individuals connected with the reporting carrier.....	\$638, 048	\$638, 917
Individuals connected with other carriers.....	136, 616	136, 616
Less offset.....	2, 035	2, 035
Total, individuals.....	772, 629	773, 498
Corporations and others.....	34, 735	34, 785
Total, individuals, corporations, and others.....	807, 364	808, 283

<sup>1</sup> Includes returns from Cincinnati and Suburban Bell Telephone Co. and the Southern New England Telephone Co.

NOTE.—Class A telephone carriers are those carriers having a average annual operating revenues exceeding \$100,000.

TABLE XIV-B.—Amount of frank service granted by telegraph carriers during 1936

[Interstate and intrastate service]

Name of company	Number of franks outstanding	Number of messages transmitted	Revenue if charged
Globe Wireless Ltd.....	12	50	\$114
Mackay Radio & Telegraph Co. (California and Delaware corporations).....	761	2, 021	3, 946
Mutual Telephone Co. (Wireless Department—Hawaii).....	40	156	315
Postal Telegraph-Cable Co. (land-line system).....	385	4, 513	4, 023
Radiomarine Corporation of America.....	833	3, 413	7, 895
Tropical Radio Telegraph Co.....	110	575	1, 704
Western Union Telegraph Co.....	5, 389	88, 952	64, 937
Total.....	7, 530	99, 680	82, 934

*Telephone employees and their compensation.*—The number of employees of class A telephone carriers classified with respect to character of service rendered and according to rate of compensation per week, at the close of the year 1936, is shown in table XV which follows. It will be noted that of the 171,000 female telephone employees reported, 61,000, or about 36 percent, were in the \$18 to \$23.99 per week class; 36,000, or about 21 percent, were in the \$24 to \$35.99 per week class; and 32,000, or about 19 percent, were in the \$15 to \$17.99 per week class. More than one-half of the male employees were receiving from \$36 to \$59.99 per week.

TABLE XV.—Number of employees of class A telephone carriers classified with respect to character of service rendered and according to rate of compensation per week, at Dec. 31, 1936

Class of employees	Number of employees at close of year			Number of employees classified according to rate of compensation per week at close of year															
				Less than \$9		\$9 to \$11.99		\$12 to \$14.99		\$15 to \$17.99		\$18 to \$23.99		\$24 to \$35.99		\$36 to \$59.99		\$60 and over	
	Male	Female	Total	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
General officers and assistants..	717	20	737	32	2	9	8	7	10	15	4	60	7	575	7				
Operating officials and assistants	7,645	449	8,094				2	1	2	4	12	143	185	2,353	224	5,142	26		
Attorneys and right-of-way agents	521	1	522	3		3			1	2	1	24		255		233			
Engineers	4,614	21	4,635						2	3		99	3	1,693	16	2,817	2		
Draftsmen, surveyors, and student engineers	2,383	100	2,483	2		1	10	62	2	184	13	470	32	1,351	43	303	10		
Accountants	1,302	23	1,325	1					1	2	7	63	9	477	5	759	1		
Clerical employees	11,676	41,957	53,633	57	97	38	230	306	2,070	643	5,672	932	13,946	2,510	17,354	6,428	2,532	762	56
Local managers	2,258	256	2,514	1	7	1	25	8	59	10	39	53	94	289	31	1,401	1	495	
Commercial agents	5,105	63	5,168	9	7	50	6	287	12	363	6	194	10	1,377	19	2,571	2	254	1
Experienced switchboard operators	182	106,782	106,964	37	3,099	27	4,540	21	13,425	28	21,982	35	45,312	17	16,916	15	1,440	2	78
Operators in training	7	14,709	14,716	3	1,404	3	2,948	1	6,997	3,245		115							
Service inspectors	108	1,864	1,972		1				2		27		374	1	1,211	45	246	62	
Supervising foremen	1,042	2	1,044									6		35	1	322	1	679	
Central office installation and maintenance men	21,013	46	21,059	2		2		47	6	178	5	388	9	2,578	24	15,916	2	1,902	
Line and station construction, installation, and maintenance men	33,578		33,578	58		51		468		1,017		2,206		7,200		21,613		965	
Cable and conduit construction and maintenance men	6,898		6,898			1		121		344		729		1,661		3,724		318	
All other employees	11,311	5,169	16,480	506	839	261	426	599	896	645	1,071	1,472	1,207	4,617	550	3,103	174	108	6
Total employees	110,360	171,462	281,822	711	5,446	447	8,175	1,878	23,467	3,301	32,052	6,220	61,100	21,099	36,339	61,327	4,693	15,377	190
<b>RECAPITULATION</b>																			
Bell System carriers:																			
Full-time employees	101,967	152,005	253,972	33	349	166	4,927	1,621	19,858	2,834	29,219	5,025	57,711	18,646	35,274	58,834	4,486	14,808	18
Part-time employees	953	8,176	9,129	504	3,885	150	1,864	115	1,501	46	562	47	289	25	47	41	27	25	1

Other than Bell System carriers																					
Full-time employees.....	7,352	10,771	18,133	127	952	121	1,280	125	2,016	415	2,225	1,146	3,092	2,424	1,018	2,450	180	544		8	
Part-time employees.....	88	510	598	47	260	10	104	17	92	6	46	2	8	4							
Total class A carriers:																					
Full-time employees.....	109,319	162,776	272,095	180	1,301	287	6,207	1,746	21,874	3,249	31,444	6,171	60,803	21,070	36,292	61,284	4,666	15,352		189	
Part-time employees.....	1,041	8,686	9,727	551	4,145	160	1,968	132	1,593	52	608	49	297	29	47	43	27	25		1	

NOTE.—Class A telephone carriers are those carriers having average annual operating revenues exceeding \$100,000.

*Telegraph employees and their compensation.*—The number of employees of wire-telegraph and radiotelegraph carriers classified with respect to character of service rendered, together with the aggregate monthly rates of compensation by classes of employees, are shown in Table XVI which follows. Statistics are shown for June 30 and December 31, 1936, except in the case of aggregate compensation which is shown for December 31, 1936, only.

TABLE XVI.—*Number of employees of wire-telegraph and radiotelegraph carriers classified with respect to character of service rendered, together with the aggregate monthly rates of compensation by classes of employees*

[Year ended Dec. 31, 1936]

Class of employees	Wire-telegraph carriers <sup>1</sup>			Radiotelegraph carriers			Total		
	Number of employees		Aggregate monthly rates of compensation at close of year	Number of employees		Aggregate monthly rates of compensation at close of year	Number of employees		Aggregate monthly rates of compensation at close of year
	June	December		June	December		June	December	
General officers and staff.....	161	163	\$97, 233	109	111	\$23, 827	270	274	\$121, 060
General office clerks.....	1, 139	1, 137	212, 802	118	129	15, 940	1, 257	1, 266	228, 742
Other officers and staff.....	544	537	157, 861	56	54	13, 880	600	591	171, 741
Other officers' clerks.....	2, 000	1, 949	286, 016	15	16	1, 766	2, 015	1, 965	287, 782
Managers.....	4, 678	4, 676	602, 546	105	108	27, 498	4, 783	4, 784	630, 044
Solicitors.....	549	567	87, 641	45	47	7, 968	594	614	95, 609
Chief operators.....	1, 762	1, 771	335, 882	93	97	9, 154	1, 855	1, 868	345, 036
Operators.....	17, 878	17, 906	1, 967, 946	763	749	107, 688	18, 641	18, 655	2, 075, 634
Office clerks.....	10, 594	11, 048	1, 015, 048	396	412	35, 651	10, 990	11, 460	1, 050, 699
Other office employees.....	1, 477	1, 490	134, 448	198	188	20, 063	1, 675	1, 678	154, 511
Messengers.....	22, 019	24, 866	951, 543	346	375	16, 579	22, 365	25, 241	988, 122
Testing and regulating force.....	1, 699	1, 723	324, 877	164	174	26, 582	1, 863	1, 897	351, 459
Equipment and power men.....	898	903	128, 152	136	122	23, 331	1, 034	1, 025	151, 483
Section linemen and foremen of construction and maintenance.....	2, 278	2, 162	325, 580	7	9	1, 345	2, 235	2, 171	326, 925
Linemen, laborers, teamsters, etc.....	1, 296	1, 416	154, 596	115	103	13, 276	1, 411	1, 519	167, 872
Others.....	1, 076	1, 029	106, 483	360	353	31, 720	1, 436	1, 382	138, 203
<b>Total.....</b>	<b>69, 998</b>	<b>73, 343</b>	<b>6, 888, 654</b>	<b>3, 026</b>	<b>3, 047</b>	<b>376, 268</b>	<b>73, 024</b>	<b>76, 390</b>	<b>7, 264, 922</b>

<sup>1</sup> Wire-telegraph carriers comprise land lines and ocean cables.

*Relief and pension data of communication carriers.*—A summary of relief and pension data of class A telephone, wire-telegraph, and radiotelegraph carriers for the year 1936 is shown in table XVII which follows. This table shows that the reporting carriers paid \$7,600,000 in benefits and \$6,900,000 in pensions to employees and former employees during 1936, whereas the total relief and pension charges to operating expenses amounted to approximately \$24,000,000 for the year. An unascertained portion of the latter sum, together with interest on approximately \$170,000,000 in pension funds, were added to benefit and pension reserves and to pension funds held by trustees during 1936.

**TABLE XVII.—Summary of relief and pension data of class A telephone, wire-telegraph, and radiotelegraph carriers**

[Year ended Dec. 31, 1936]

Item	Class A telephone carriers	Wire-telegraph carriers (land line and ocean cable)	Radio telegraph carriers	Total
<b>Benefits:</b>				
Number of cases handled during year.....	49,799	8,053	131	57,983
Amount paid during year.....	\$6,881,006	\$715,479	\$4,636	\$7,601,121
<b>Pensions:</b>				
Number of cases being paid at end of year.....	7,147	2,748	3	9,898
Amount paid during year.....	\$4,931,690	\$1,973,164	\$3,090	\$6,907,944
Benefit and pension reserve at end of year.....	\$1,274,073	\$10,293,576	\$143,978	\$11,711,627
Pension funds held by outside trustees.....	\$169,403,860	-----	\$544,700	\$169,948,560
Relief and pension charges to operating expenses <sup>1</sup> .....	\$20,559,174	\$3,395,635	\$35,505	\$23,990,314
Total number of employees.....	281,822	73,343	3,047	358,212
Total compensation for the year.....	\$433,919,299	\$78,483,418	\$4,569,308	\$516,972,025
Total operating revenues.....	\$1,077,951,314	\$132,697,992	\$8,842,520	\$1,219,491,826

<sup>1</sup> Consists of charges to account 672, "Relief and pensions" for telephone carriers, and charges to account 649 "Relief department and pensions," for telegraph, cable and radiotelegraph carriers.

NOTE.—Class A telephone carriers are those carriers having average annual operating revenues exceeding \$100,000.

*Statistics of accidents.*—In tables XVIII and XIX, which follow respectively, are shown, for class A telephone carriers, and for wire-telegraph and radio-telegraph carriers, the number of persons killed and injured in accidents during 1936.

**TABLE XVIII.—Persons killed or injured in accidents occurring in connection with the activities of class A telephone carriers**

[Year ended Dec. 31, 1936]

Class of employees	Employees and other persons killed or injured during year					
	Number of persons killed			Number of persons injured		
	Male	Female	Total	Male	Female	Total
General officers and assistants.....				1		1
Operating officials and assistants.....				7	2	9
Attorneys and right-of-way agents.....				3		3
Engineers.....				4		4
Draftsmen, surveyors, and student engineers.....				1	1	2
Accountants.....				1		1
Clerical employees.....				13	82	95
Local managers.....	1		1	13	2	15
Commercial agents.....				71		71
Experienced switchboard operators.....					436	436
Operators in training.....					19	19
Service inspectors.....				3	12	15
Supervising foremen.....				2		2
Central office installation and maintenance men.....	1		1	64		64
Line and station construction, installation, and maintenance men.....	11		11	469		469
Cable and conduit construction and maintenance men.....				100		100
All other employees.....	3		3	87	98	185
Total for employees.....	16		16	839	652	1,491
Persons other than employees.....	64	18	82	1,765	1,135	2,900
<b>Grand total—Employees and other persons.....</b>	<b>80</b>	<b>18</b>	<b>98</b>	<b>2,604</b>	<b>1,787</b>	<b>4,391</b>

NOTE.—Class A telephone carriers are those carriers having average annual operating revenues exceeding \$100,000.

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TABLE XIX.—*Employees killed or injured in accidents occurring in connection with the operations of wire-telegraph and radiotelegraph carriers*<sup>1</sup>

[Year ended Dec. 31, 1936]

Description of injury	Employees killed or injured			
	In plant work	In operation	Otherwise	Total
<b>Killed:</b>				
Male.....	1	4	10	15
Female.....				
Total.....	1	4	10	15
<b>Injured:</b>				
Male.....	329	1,652	2,023	4,004
Female.....		358	34	442
Total.....	329	2,010	2,107	4,446

<sup>1</sup> Wire-telegraph carriers comprise land lines and ocean cables.

*Receiverships and trusteeships.*—In table XX, which follows, are shown a list of telephone carriers and holding companies in the hands of receivers or trustees; the names of the fiduciaries and the dates of their appointments; and the amounts of investment in telephone plant, capital stock, and matured and unmatured funded debt involved. No telegraph carrier was in receivership or trusteeship at December 31, 1936, and it may be noted from the table that only one telephone carrier was in receivership at this date. The amount of telephone plant investment involved in the one receivership was only \$882,322. However, extensive communication interests, both telephone and telegraph, were under control by holding companies in receivership at December 31, 1936.

TABLE XX.—Summary showing statistics of reporting communication carriers and holding companies in the hands of receivers and trustees

[Year ended Dec. 31, 1936]

Name of company	Receivers or trustees		Date of appointment	Investment in tele- phone plant	Capital stock	Funded debt	Matured funded debt
	Name	Title					
<b>TELEPHONE CARRIERS</b>							
<b>CLASS A</b>							
Kansas Telephone Co., The.....	M. B. Gourley and M. F. Cosgrove.....	Receivers.....	Feb. 27, 1932	\$882, 322	\$5, 000	\$620, 500	-----
<b>HOLDING COMPANIES*</b>							
Ann Arbor Railroad Co., The.....	Norman B. Pitcairn and Frank C. Nico- demus, Jr.	do.....	Dec. 4, 1931 <sup>2</sup>	-----	7, 250, 000	9, 164, 341	\$200
Chicago, Milwaukee, St. Paul & Pacific R. R. Co.	Walter J. Cummings and George I. Haight.	Trustees.....	Jan. 1, 1936	-----	<sup>3</sup> 224, 440, 761	463, 404, 856	13, 192, 862
Indiana Central Telephone Co.....	Christopher L. Ward, Jr.	Trustee.....	June 25, 1935	-----	<sup>4</sup> 1, 000, 000	-----	1, 700, 000
Middle Western Telephone Co.....	Owen J. Nolan and Benjamin Brown	Trustees.....	( <sup>4</sup> )	-----	<sup>5</sup> 755, 545	1, 148, 500	-----
Postal Telegraph & Cable Corporation.....	Alfred E. Smith and George S. Gibbs	do.....	Dec. 24, 1935 <sup>7</sup>	-----	<sup>6</sup> 55, 970, 750	50, 670, 210	-----
United Telephone & Electric Co.....	William C. A. Henry	Trustee.....	( <sup>5</sup> )	-----	<sup>9</sup> 12, 053, 050	-----	-----
Wabash Railway Co.....	Norman B. Pitcairn and Frank C. Nico- demus, Jr.	Receivers.....	Dec. 1, 1931 <sup>10</sup>	-----	138, 120, 767	131, 945, 126	2, 200
Total, holding companies.....	-----	-----	-----	-----	439, 590, 873	656, 333, 033	14, 895, 262
Grand total.....	-----	-----	-----	-----	882, 322	439, 595, 873	14, 895, 262

\* Comprises companies controlling communication carriers.

<sup>1</sup> Represents book liability for 1,000 shares of common stock without par value.<sup>2</sup> Norman B. Pitcairn appointed receiver, Oct. 20, 1933, to succeed Walter S. Franklin, resigned.<sup>3</sup> Includes \$105,133,461 book liability for 1,174,060 shares of common stock without par value.<sup>4</sup> Represents book liability for 100 shares of common stock without par value.<sup>5</sup> Data not reported.<sup>6</sup> Represents book liability for 171,302 shares of common stock without par value.<sup>7</sup> Date of temporary appointment, made permanent Jan. 27, 1936.<sup>8</sup> Includes \$25,441,250 book liability for 1,017,500 shares of common stock without par value.<sup>9</sup> Includes \$3,099,350 book liability for 86,178 shares of common stock without par value.<sup>10</sup> Norman B. Pitcairn appointed receiver, Oct. 19, 1933, to succeed Walter S. Franklin, resigned.

*Railway telegraph and telephone data.*—In table XXI, which follows, are shown data of revenues and wire mileage pertaining to the telegraph and telephone operations of class I steam railways during 1936. The revenues and the mileage data were obtained from annual reports of the railway carriers filed with the Interstate Commerce Commission. The revenues shown in this table do not measure the value of telegraph and telephone services to the railway carriers concerned but are the amounts received by railway carriers for services and facilities furnished in connection with telegraph and telephone services performed for the public.

TABLE XXI.—*Telegraph and telephone revenues received and mileage operated by class I steam railways*

[Compiled from annual reports filed with the Interstate Commerce Commission for the year ended Dec. 31, 1936]

Name of railway	Operating revenues (account 138)			Mileage operated		
	Telegraph	Telephone	Total	Pole line	Telegraph wire	Telephone wire
Atchison, Topeka & Santa Fe Ry. Co.	\$347,498	-----	\$347,498	13,011	42,660	36,543
Baltimore & Ohio R. R. Co.	60,152	-----	60,152	5,778	18,683	18,730
Chicago, Burlington, & Quincy R. R. Co.	150,196	-----	150,196	8,728	26,337	17,676
Chicago, Milwaukee, St. Paul & Pacific R. R. Co.	42,719	-----	42,719	10,211	20,723	22,129
Duluth, Missabe & Northern Ry. Co.	2,925	\$76,567	79,492	561	1,206	5,397
Great Northern Ry. Co.	119,937	-----	119,937	7,835	28,045	21,590
Louisville & Nashville R. R. Co.	49,543	-----	49,543	4,558	2,666	18,901
Minneapolis, St. Paul & Sault Ste. Marie Ry. Co.	52,189	-----	52,189	4,101	15,783	817
New York, New Haven & Hartford R. R. Co.	33,819	-----	33,819	2,056	610	26,906
Northern Pacific Ry. Co.	90,062	-----	90,062	5,876	12,869	17,791
Pennsylvania R. R. Co.	131,009	-----	131,009	9,202	8,457	137,710
Southern Pacific Co.	416,803	25,006	441,809	8,399	23,673	19,032
Texas & New Orleans R. R. Co.	30,995	-----	30,995	4,323	7,932	10,645
Union Pacific R. R. Co.	284,118	-----	284,118	9,579	25,340	22,697
Other class I steam railways <sup>1</sup>	221,297	16,930	238,227	129,069	288,933	358,565
Total, United States	2,033,262	118,503	2,151,765	223,287	521,917	735,129
Copper River and Northwestern Ry. Co. (Alaska)	-----	2,383	2,383	194	-----	241
Grand total	2,033,262	120,886	2,154,148	223,481	521,917	735,370

<sup>1</sup> Represents returns from 67 class I steam railways in the United States, each having gross annual telegraph and telephone revenues less than \$25,000.

GROUP 2.—STATISTICS BASED PRINCIPALLY ON MONTHLY REPORTS FILED WITH THE COMMISSION

TELEPHONE STATISTICS (BASED ON MONTHLY REPORTS)

*Large telephone carriers reporting monthly.*—The names of the carriers included in the statistics of large telephone carriers contained in this appendix are listed in table XXII below. The carriers included in the Bell System are marked with an asterisk. The carriers marked with a dagger claim to be subject only to the provisions of sections 201-205 of the act but are voluntarily filing monthly reports with the Commission for statistical purposes. The Rio Grande Valley Telephone Co. was merged by the Southwestern Bell Telephone Co. on December 31, 1936.

**TABLE XXII.—List of 81 large telephone carriers reporting on a monthly basis to the Commission showing geographical regions to which the carriers have been assigned for statistical purposes**

Name of carrier	Geographical region
American Telephone Co.	South Central.
*American Telephone & Telegraph Co.	Middle Atlantic.
†Ashland Home Telephone Co.	Southeastern.
†Associated Telephone Co., Ltd.	Pacific.
*Bell Telephone Co. of Nevada.	Mountain.
*Bell Telephone Co. of Pennsylvania.	Middle Atlantic.
Bluefield Telephone Co.	Chesapeake.
Carolina Telephone & Telegraph Co.	Southeastern.
*Chesapeake & Potomac Telephone Co.	Chesapeake.
*Chesapeake & Potomac Telephone Co. of Baltimore City.	Do.
*Chesapeake & Potomac Telephone Co. of Virginia.	Do.
*Chesapeake & Potomac Telephone Co. of West Virginia.	Do.
Cincinnati & Suburban Bell Telephone Co.	Great Lakes
†Citizens Independent Telephone Co.	Do.
†Commonwealth Telephone Co. (Pennsylvania).	Middle Atlantic.
†Commonwealth Telephone Co. (Wisconsin).	Great Lakes.
*Dakota Central Telephone Co.	North Central.
*DeKalb-Ogle Telephone Co.	Great Lakes.
*Diamond State Telephone Co.	Middle Atlantic.
Home Telephone & Telegraph Co.	Great Lakes.
*Illinois Bell Telephone Co.	Do.
†Illinois Central Telephone Co.	Do.
†Illinois Commercial Telephone Co.	Do.
†Illinois Consolidated Telephone Co.	Do.
†Illinois Telephone Co.	Do.
Indiana Associated Telephone Corporation.	Do.
*Indiana Bell Telephone Co.	Do.
Inter-Mountain Telephone Co.	Southeastern.
Interstate Telephone Co.	Pacific.
†Intra State Telephone Co.	Great Lakes.
Jamestown Telephone Corporation.	Middle Atlantic.
Keystone Telephone Co. of Philadelphia.	Do.
†Kittanning Telephone Co.	Do.
La Crosse Telephone Corporation.	Great Lakes.
†Lexington Telephone Co.	Southeastern.
†Lincoln Telephone & Telegraph Co.	North Central.
†Lorain Telephone Co.	Great Lakes.
†Mansfield Telephone Co.	Do.
Michigan Associated Telephone Co.	Do.
*Michigan Bell Telephone Co.	Do.
Middle States Telephone Co. of Illinois.	Do.
†Missouri Telephone Co.	South Central.
*Mountain States Telephone & Telegraph Co.	Mountain.
Nebraska Continental Telephone Co.	North Central.
*New England Telephone & Telegraph Co.	New England.
*New Jersey Bell Telephone Co.	Middle Atlantic.
*New York Telephone Co.	Do.
*Northwestern Bell Telephone Co.	North Central.
Ohio Associated Telephone Co.	Great Lakes.
*Ohio Bell Telephone Co.	Do.
†Ohio Standard Telephone Co.	Do.
†Pacific Telephone & Telegraph Co.	Pacific.
†Peninsular Telephone Co.	Southeastern.
†Portsmouth Home Telephone Co.	Great Lakes.
Rochester Telephone Corporation.	Middle Atlantic.
San Angelo Telephone Co.	South Central.
Santa Barbara Telephone Co.	Pacific.
Southeast Missouri Telephone Co.	South Central.
*Southern Bell Telephone & Telegraph Co.	Southeastern.
*Southern California Telephone Co.	Pacific.
†Southern Continental Telephone Co.	Southeastern.
Southern New England Telephone Co.	New England.
†Southwest Telephone Co. (Texas).	South Central.
Southwestern Associated Telephone Co.	Do.
*Southwestern Bell Telephone Co.	Do.
†Southwestern States Telephone Co.	Do.
†Star Telephone Co.	Great Lakes.
†Texas Long Distance Telephone Co.	South Central.
*Tri-State Telephone & Telegraph Co.	North Central.
Two States Telephone Co.	South Central.
†Union Telephone Co.	Great Lakes.

See footnotes at end of table.

TABLE XXII.—List of 81 large telephone carriers reporting on a monthly basis to the Commission showing geographical regions to which the carriers have been assigned for statistical purposes—Continued

Name of carrier	Geographical region
*United Telephone Co. (Kansas).....	South Central.
†United Telephone Co. (Missouri).....	Do.
United Telephone Companies, Inc.....	Great Lakes.
†United Telephone Co. of Pennsylvania.....	Middle Atlantic.
†Upstate Telephone Corporation of New York.....	Do.
†Wabash Telephone Co.....	Great Lakes.
Warren Telephone Co.....	Do.
West Coast Telephone Co.....	Pacific.
†Western Telephone Corporation of Missouri.....	South Central.
*Wisconsin Telephone Co.....	Great Lakes.

\*Represents carriers included in the Bell System.

†Represents carriers, subject only to the provisions of sections 201-205 of the Communications Act of 1934, which file reports for statistical purposes.

NOTE.—“Large telephone carriers” comprises a group of 81 carriers, each having annual operating revenues of approximately \$250,000 or more.

*Summary of monthly reports of large telephone carriers.*—A summary of the monthly reports of large telephone carriers for the month of December, with cumulative figures for 12 months ended with December 1936, together with data for the corresponding periods in 1935, are shown in table XXIII below. Operating revenues of large telephone carriers for the month of December 1936 were slightly more than 10 percent greater than corresponding revenues for the previous December as indicated by this table, while the increase in net operating income was approximately 34 percent. The operating revenues for the entire year 1936 were 8 percent larger than the operating revenues for the preceding year; whereas, for the similar period, net operating income increased 19 percent.

TABLE XXIII.—Summary of revenues, expenses, and capital changes from monthly reports of large telephone carriers

## MONTH OF DECEMBER

Item	1936	1935 <sup>1</sup>	Increase or decrease <sup>2</sup>	
			Amount	Ratio, percent
Number of company telephones in service at end of month.....	16, 066, 800	15, 084, 293	982, 507	6. 51
Operating revenues:				
Subscribers' station revenues.....	\$57, 986, 417	\$53, 400, 395	\$4, 586, 022	8. 69
Public telephone revenues.....	4, 059, 236	3, 741, 796	317, 440	8. 48
Miscellaneous local service revenues.....	1, 003, 755	912, 210	91, 545	10. 04
Message tolls.....	26, 340, 405	22, 620, 028	3, 720, 377	16. 45
Miscellaneous toll service revenues.....	2, 801, 365	2, 575, 176	226, 189	8. 78
Revenues from general services and licenses.....	1, 189, 853	1, 105, 615	84, 238	7. 62
Sundry miscellaneous revenues.....	3, 557, 383	3, 483, 272	74, 111	2. 13
Uncollectible operating revenues, Dr.....	300, 859	276, 938	23, 921	8. 64
Operating revenues.....	96, 637, 555	87, 561, 654	9, 006, 001	10. 37
Operating expenses:				
Depreciation and extraordinary retirements.....	12, 627, 784	14, 883, 929	<sup>2</sup> 2, 256, 145	<sup>2</sup> 15. 16
All other maintenance.....	18, 617, 571	16, 494, 140	2, 123, 431	12. 87
Traffic expenses.....	13, 393, 905	12, 174, 280	1, 219, 625	10. 02
Commercial expenses.....	7, 568, 479	6, 791, 577	776, 902	11. 44
General office salaries and expenses.....	5, 397, 357	5, 090, 732	306, 625	6. 02
General services and licenses.....	1, 169, 585	1, 082, 112	87, 473	8. 08
All other operating expenses.....	5, 116, 759	5, 052, 378	64, 381	1. 27
Operating expenses.....	63, 891, 440	61, 569, 143	2, 322, 292	3. 77

See footnotes at end of table.

TABLE XXIII.—Summary of revenues, expenses, and capital changes from monthly reports of large telephone carriers—Continued

## MONTH OF DECEMBER—Continued

Item	1936	1935 <sup>1</sup>	Increase or decrease <sup>2</sup>	
			Amount	Ratio, percent
<b>Income items:</b>				
Net operating revenues.....	32,746,115	25,992,406	6,753,709	25.98
Rent from lease of operating property.....	337	374	<sup>2</sup> 37	<sup>2</sup> 9.89
Rent for lease of operating property.....	4,090	3,975	115	2.89
Net operating income before tax deduction.....	32,742,362	25,988,805	6,753,557	25.99
Operating taxes.....	8,920,136	8,159,331	760,805	9.32
Net operating income.....	23,822,226	17,829,474	5,992,752	33.61
Ratio of expenses to revenues..... percent.....	66.11	70.32	<sup>2</sup> 4.21	-----
<b>Changes in capital items:</b>				
Increase during month in "telephone plant".....	\$51,389	\$8,263,786	-----	-----
Increase during month in "Capital stock".....	<sup>2</sup> \$8,221,102	\$1,125	-----	-----
Increase during month in "Funded debt".....	<sup>2</sup> \$31,917,470	<sup>2</sup> \$3,229,100	-----	-----

## TWELVE MONTHS ENDED WITH DECEMBER

Item	1936 <sup>3</sup>	1935 <sup>1</sup>	Increase or decrease <sup>2</sup>	
			Amount	Ratio, percent
<b>Operating revenues:</b>				
Subscribers' station revenues.....	\$661,271,317	\$625,255,909	\$36,015,408	5.76
Public telephone revenues.....	44,276,346	41,439,076	2,837,270	6.85
Miscellaneous local service revenues.....	11,621,367	10,687,729	933,628	8.74
Message tolls.....	288,188,029	264,732,757	33,455,272	13.18
Miscellaneous toll service revenues.....	32,983,795	29,553,153	3,430,642	11.61
Revenues from general services and licenses.....	13,595,448	12,788,162	807,286	6.31
Sundry miscellaneous revenues.....	41,420,299	38,834,871	2,585,428	6.66
Uncollectible operating revenues—Dr.....	3,450,981	4,129,629	<sup>2</sup> 678,648	<sup>2</sup> 16.43
Operating revenues.....	1,069,905,610	1,009,162,028	80,743,582	8.00
<b>Operating expenses:</b>				
Depreciation and extraordinary retirements.....	172,747,312	180,132,355	<sup>2</sup> 7,385,043	<sup>2</sup> 4.10
All other maintenance.....	193,899,713	183,438,972	10,460,741	5.70
Traffic expenses.....	149,518,835	138,918,133	10,595,702	7.63
Commercial expenses.....	83,032,874	78,073,793	4,959,081	6.35
General office salaries and expenses.....	59,313,278	56,447,320	2,865,958	5.08
General services and licenses.....	13,319,291	12,532,718	786,573	6.28
All other operating expenses.....	58,174,311	60,188,867	<sup>2</sup> 2,014,556	<sup>2</sup> 3.35
Operating expenses.....	730,000,614	709,732,158	20,268,456	2.86
<b>Income items:</b>				
Net operating revenues.....	359,904,996	299,429,870	60,475,126	20.20
Rent from lease of operating property.....	5,222	5,176	46	0.89
Rent for lease of operating property.....	49,312	70,241	<sup>2</sup> 20,929	<sup>2</sup> 29.80
Net operating income before tax deduction.....	359,860,906	299,364,805	60,496,101	20.21
Operating taxes.....	122,781,074	100,176,378	22,604,696	22.56
Net operating income.....	237,079,832	199,188,427	37,891,405	19.02
Ratio of expenses to revenues..... percent.....	66.98	70.33	<sup>2</sup> 3.35	-----
<b>Changes in capital items:</b>				
Increase during period in "Telephone plant.....	\$78,444,953	\$26,252,969	-----	-----
Increase during period in "Capital stock".....	\$29,558,906	\$1,549,400	-----	-----
Increase during period in "Funded debt".....	<sup>2</sup> \$39,487,336	\$32,469,230	-----	-----

<sup>1</sup> Returns in this column reflect depreciation adjustments on property in Nebraska.

<sup>2</sup> Deficit or other reverse item.

<sup>3</sup> Returns in this column reflect adjustments covering estimated refunds.

NOTE.—"Large telephone carriers" comprises a group of 81 carriers, each having annual operating revenues of approximately \$250,000 or more.

*Proportion of the telephone industry covered by monthly reports to the Federal Communications Commission.*—In the next following statement, statistics applicable to the year 1932, of telephone carriers reporting on a monthly basis to the Commission for the year 1936, are compared with statistics of all telephone carriers operating in the United States as reported by the Bureau of the Census in "Census of Electrical Industries: Telephones and Telegraphs, 1932," and with the statistics of telephone carriers reporting on a monthly basis to the Interstate Commerce Commission in 1932.

Item	Total operating revenues for year 1932	Number of telephones Dec. 31, 1932
Census of electrical industries; 44,828 systems and lines.....	\$1,061,530,140	17,424,406
104 carriers reporting to the Interstate Commerce Commission.....	\$1,031,429,879	15,142,489 <sup>1</sup>
Percent of census total.....	97.16	86.90
81 carriers reporting in 1936 to the Federal Communications Commission.....	\$1,022,192,348	14,907,286 <sup>1</sup>
Percent of census total.....	96.29	85.55
Percent of Interstate Commerce Commission total.....	99.10	98.45

<sup>1</sup> Includes all telephones except private-line telephones and telephones of connecting lines for which local or switching services are rendered.

The difference in the number of telephone carriers reporting to the Interstate Commerce Commission for 1932 and the number reporting to the Federal Communications Commission for 1936 is accounted for, in part, by mergers and reorganizations. In addition, a few carriers are not reporting because they are claiming exemption under the act. These carriers have been requested to resume filing monthly reports for statistical purposes.

As reflected in the above statement, the operating revenues of the 81 telephone carriers now reporting on a monthly basis to the Commission were \$1,022,192,348 for the year 1932, which amount is over 96 percent of the total telephone operating revenues of all systems and lines in the United States as reported by the Bureau of the Census for that year.

*Operating statistics of telephone carriers, by months, January 1933 to June 1937, inclusive.*—A summary of the operating revenues, operating expenses, and net operating income of large telephone carriers reporting on a monthly basis, from January 1933 to June 1937, inclusive, is shown in table XXIV, which follows, and the trends of the various items during this period are indicated in chart 5 which follows table XXIV. Among the facts of interest shown by the table is the increase from the month of June 1933 to the month of June 1937 in operating revenues from \$80,000,000 to \$96,700,000; in operating expenses from \$55,700,000 to \$65,800,000; and in net operating income from \$16,000,000 to \$18,900,000.

Refunds amounting to approximately \$16,000,000 to Chicago coin-box subscribers, covering an 11-year period, were deducted during June 1934 by the Illinois Bell Telephone Company, but have been restored in chart 5 in order to preserve the consistency of the trend. The revised Uniform System of Accounts for telephone carriers became effective January 1, 1937, but the changes had only a minor effect on the operating returns.

TABLE XXIV.—Monthly telephone operating statistics showing revenues, expenses, and net operating income as reported by large telephone carriers from January 1933 to June 1937, inclusive.

Month	Operating revenues	Operating expenses	Net operating income
1933			
January.....	\$79,009,225	\$57,738,657	\$13,838,315
February.....	75,359,589	55,105,584	12,911,515
March.....	78,240,075	56,928,953	14,082,004
April.....	77,361,079	55,212,904	14,701,534
May.....	80,085,242	56,843,095	15,795,445
June.....	79,989,802	55,729,966	16,004,495
July.....	78,717,113	55,023,776	15,755,871
August.....	78,641,773	55,244,936	16,181,489
September.....	77,906,490	54,828,078	15,622,388
October.....	79,705,631	55,754,758	16,394,682
November.....	78,547,076	56,318,756	14,825,835
December.....	79,986,324	58,525,801	15,237,317
Total.....	943,548,419	673,255,264	181,350,890
1934			
January.....	80,924,986	56,387,835	16,543,144
February.....	77,898,208	54,383,038	15,613,285
March.....	81,980,255	57,355,367	16,444,769
April.....	81,136,948	56,017,082	17,216,058
May.....	82,693,775	58,154,683	16,029,218
June.....	<sup>1</sup> 65,915,988	<sup>1</sup> 40,906,873	<sup>1</sup> 17,279,279
July.....	79,869,348	58,346,601	13,623,003
August.....	80,663,116	58,179,220	14,485,697
September.....	79,364,306	56,543,761	15,017,300
October.....	82,940,225	58,892,853	16,561,162
November.....	80,909,123	57,860,613	15,521,036
December.....	<sup>1</sup> 81,727,414	<sup>1</sup> 59,633,086	<sup>1</sup> 15,271,908
Total.....	<sup>1</sup> 955,923,692	<sup>1</sup> 672,661,012	<sup>1</sup> 189,605,859
1935			
January.....	82,807,143	58,647,929	15,760,916
February.....	<sup>1</sup> 79,169,909	<sup>1</sup> 56,218,551	<sup>1</sup> 14,631,270
March.....	82,547,774	58,114,415	16,184,715
April.....	83,486,740	58,332,729	16,616,852
May.....	<sup>2</sup> 84,761,475	59,887,801	16,451,940
June.....	83,127,634	58,278,595	16,433,424
July.....	83,428,884	60,535,018	14,771,409
August.....	83,738,403	59,090,556	16,431,131
September.....	84,060,990	58,242,896	17,388,035
October.....	87,726,236	60,209,029	18,898,205
November.....	<sup>1</sup> 86,746,286	<sup>1</sup> 60,605,491	<sup>1</sup> 17,791,056
December.....	87,561,554	<sup>1</sup> 61,569,148	<sup>1</sup> 17,829,474
Total.....	<sup>1</sup> 1,009,162,028	<sup>1</sup> 709,732,158	<sup>1</sup> 199,188,427
1936			
January.....	87,894,569	60,168,491	17,610,413
February.....	86,485,509	58,320,529	18,073,773
March.....	90,044,212	60,272,513	19,490,449
April.....	89,896,865	60,243,669	19,139,320
May.....	90,363,509	60,317,978	19,512,650
June.....	90,842,420	<sup>2</sup> 60,494,354	<sup>2</sup> 19,587,295
July.....	91,129,198	62,135,734	18,297,913
August.....	89,571,325	59,959,805	18,853,325
September.....	90,668,099	60,923,036	19,276,540
October.....	93,979,470	61,910,236	22,142,151
November.....	92,392,879	61,362,829	21,278,777
December.....	96,637,555	63,891,440	23,822,226
Total.....	1,089,905,610	<sup>2</sup> 730,000,614	<sup>2</sup> 237,079,832
1937			
January.....	94,277,491	<sup>2</sup> 61,453,124	<sup>2</sup> 20,774,218
February.....	91,263,251	60,300,793	19,072,490
March.....	97,048,975	64,861,971	20,043,358
April.....	96,133,405	63,958,897	20,106,125
May.....	96,414,872	65,034,699	19,150,739
June.....	96,677,900	65,760,618	18,933,672
Total.....	571,815,894	<sup>2</sup> 381,370,012	<sup>2</sup> 118,080,602

<sup>1</sup> These returns reflect adjustments covering estimated refunds.

<sup>2</sup> These returns reflect depreciation adjustments on property in Nebraska.

NOTE.—“Large telephone carriers” comprises a group of 81 carriers, each having annual operating revenues of approximately \$250,000 or more.

TELEPHONE STATISTICS SHOWING OPERATING REVENUES, OPERATING EXPENSES, AND NET OPERATING INCOME AS REPORTED BY LARGE TELEPHONE CARRIERS CHART NO. 5



*Monthly total and daily average message tolls.*—In table XXV, which follows, are shown the monthly total and daily average message tolls of large telephone carriers from January 1933 to June 1937, inclusive. The revenues received from "Toll private line services" and "Other toll service" are not included in this table. The table shows that the daily average toll message revenues increased from \$658,000 in June 1933 to \$858,000 in June 1937. Message tolls for the year 1933 amounted to \$223,400,000 and increased to \$288,200,000 in 1936.

Chart 5-A, which follows table XXV below, indicates the trend of average revenues per day from toll messages of large telephone carriers for the period January 1933 to June 1937, inclusive.

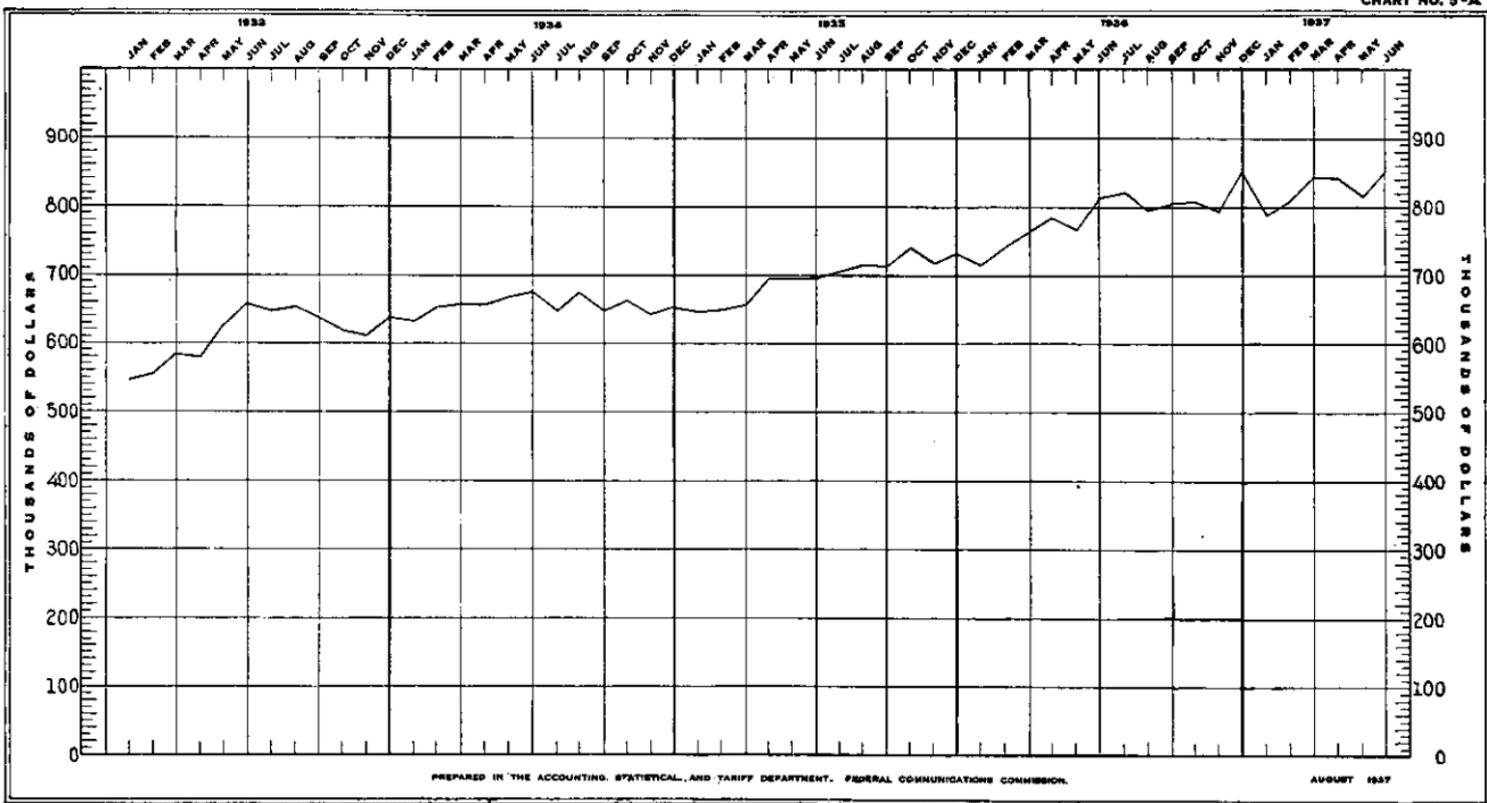
TABLE XXV.—Summary showing monthly total and daily average message tolls of large telephone carriers from January 1933 to June 1937, inclusive

Month	1933		1934		1935		1936		1937	
	Message tolls	Average message tolls per day	Message tolls	Average message tolls per day	Message tolls	Average Message tolls per day	Message tolls	Average message tolls per day	Message tolls	Average message tolls per day
January.....	\$16,925,143	\$545,972	\$19,555,736	\$630,830	\$20,042,020	\$646,517	\$22,099,465	\$712,886	\$24,420,129	\$787,746
February.....	15,421,746	550,777	18,240,274	651,438	18,183,164	649,399	21,481,436	740,739	22,657,639	809,201
March.....	18,072,817	582,994	20,409,975	658,386	20,307,966	655,096	23,678,009	763,807	26,155,538	843,727
April.....	17,359,085	578,636	19,724,011	657,467	20,831,481	694,383	23,515,316	783,844	25,259,370	841,979
May.....	19,391,598	625,535	20,690,362	667,431	21,513,354	693,979	23,709,767	764,831	25,295,829	815,994
June.....	19,733,560	657,785	20,217,449	673,915	20,840,383	694,679	24,343,722	811,457	25,727,807	857,593
July.....	20,058,624	647,052	20,090,354	647,108	21,796,457	703,112	25,405,921	819,546	-----	-----
August.....	20,181,118	651,004	20,883,494	673,661	22,467,697	724,764	24,692,246	796,524	-----	-----
September.....	19,095,094	636,503	19,458,805	648,627	21,691,036	723,035	24,094,776	803,159	-----	-----
October.....	19,130,289	617,106	20,520,762	661,960	22,936,688	739,893	24,983,636	805,924	-----	-----
November.....	18,322,302	610,743	19,255,856	641,862	21,502,483	716,749	23,843,330	794,778	-----	-----
December.....	19,714,240	635,943	20,177,107	650,874	22,620,028	729,678	26,340,405	849,690	-----	-----
Year.....	223,405,606	612,070	239,194,185	655,327	254,732,757	697,898	288,188,029	787,399	-----	-----

NOTE.—“Large telephone carriers” comprises a group of 81 carriers, each having annual operating revenues of approximately \$250,000 or more.

AVERAGE REVENUES PER DAY FROM TOLL MESSAGES, AS COMPILED FROM MONTHLY REPORTS FILED BY LARGE TELEPHONE CARRIERS

CHART NO. 5-A



PREPARED IN THE ACCOUNTING, STATISTICAL, AND TARIFF DEPARTMENT, FEDERAL COMMUNICATIONS COMMISSION.

AUGUST 1937

*Number of telephones in service.*—The number of telephones in service, including all telephones except private line telephones and telephones of connecting lines for which local or switching services are rendered, as reported by large telephone carriers on a monthly basis from January 1933 to June 1937, is shown in table XXVI, which follows, and the trend during this period is reflected in chart 6, which follows table XXVI. These statistical representations indicate that the depression low in number of telephones in service for large telephone carriers was reached in August 1933, when 14,150,000 telephones were reported. Since that date there have been substantial increases during most months and the number of telephones in service in June 1937 reached approximately 16,640,000.

TABLE XXVI.—*Number of telephones in service in the United States as reported by large telephone carriers by months, from January 1933 to June 1937, inclusive*<sup>1</sup>

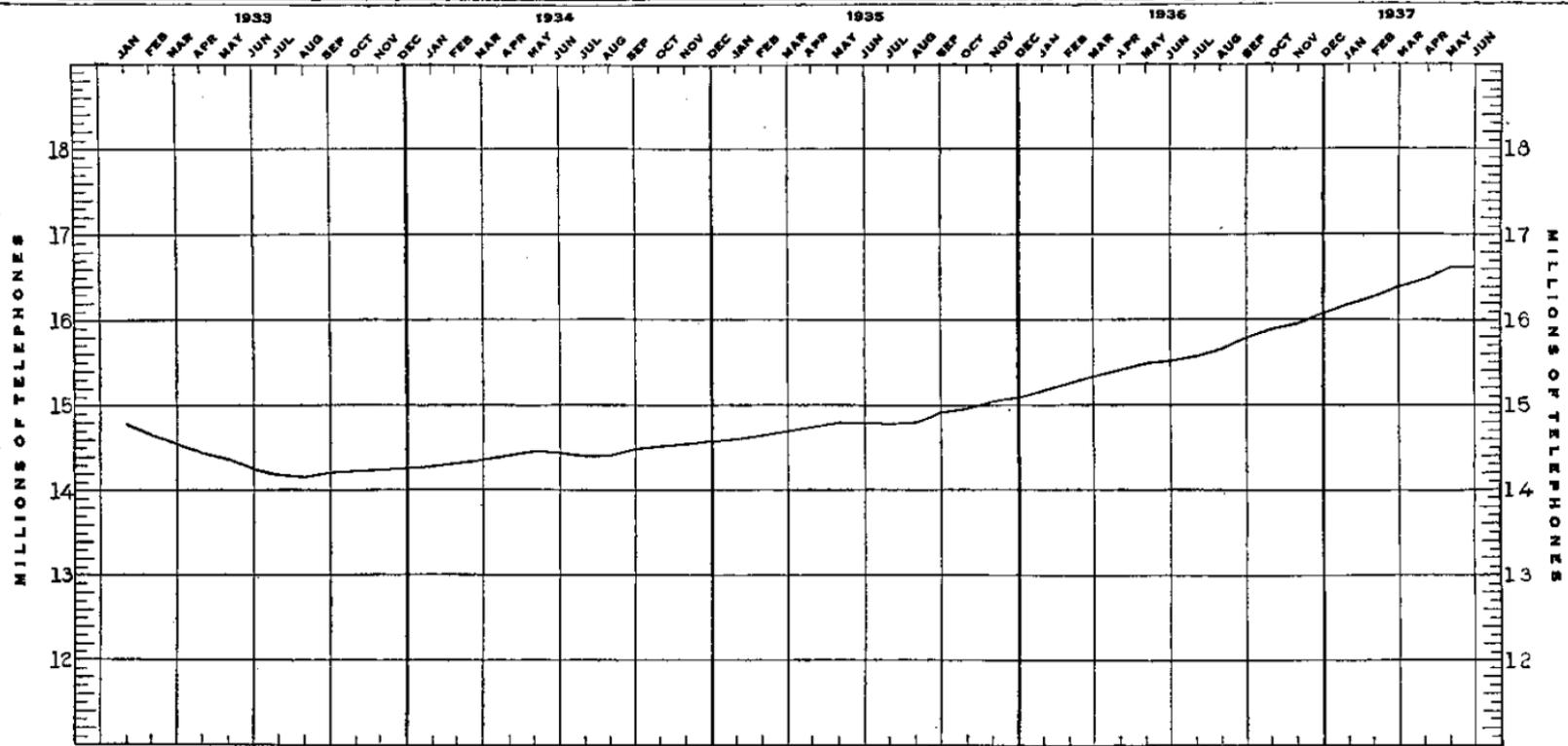
Month	1933	1934	1935	1936	1937
January.....	14,797,971	14,264,856	14,603,957	15,148,401	16,159,942
February.....	14,679,609	14,303,845	14,641,725	15,220,365	16,258,896
March.....	14,553,502	14,360,906	14,695,686	15,305,905	16,374,736
April.....	14,457,781	14,428,981	14,750,749	15,391,384	16,496,638
May.....	14,367,936	14,462,801	14,802,897	15,477,096	16,603,670
June.....	14,263,655	14,446,442	14,793,040	15,499,952	16,641,027
July.....	14,177,038	14,409,932	14,770,549	15,548,762	-----
August.....	14,151,046	14,419,782	14,799,676	15,622,260	-----
September.....	14,209,513	14,488,493	14,902,795	15,761,683	-----
October.....	14,225,119	14,525,177	14,971,898	15,880,057	-----
November.....	14,230,298	14,544,896	15,028,792	15,960,863	-----
December.....	14,241,702	14,566,811	15,084,293	16,066,800	-----

<sup>1</sup> Includes all telephones except private-line telephones and telephones of connecting lines for which local or switching services are rendered.

NOTE.—“Large telephone carriers” comprises a group of 81 carriers, each having annual operating revenues of approximately \$250,000 or more.

NUMBER OF TELEPHONES IN SERVICE\* AS REPORTED BY LARGE TELEPHONE CARRIERS

CHART NO. 6



PREPARED IN THE ACCOUNTING, STATISTICAL, AND TARIFF DEPARTMENT, FEDERAL COMMUNICATIONS COMMISSION.

AUGUST 1937

*Averages per telephone per day of operating revenues and operating expenses.*—The averages per telephone per day of the operating revenues and operating expenses of large telephone carriers, further subdivided as between Bell System carriers and other than Bell System carriers are shown by geographical regions in table XXVII which follows. The data of the American Telephone & Telegraph Co. were excluded from the averages for the geographical regions inasmuch as the operations of the Long Lines Department of this carrier cover the entire country, but the data were included in a separate total for the United States. In computing these averages, the gross operating revenues and expenses were used. The averages are computed on the basis of 325 days to the year which basis is used by the Bureau of the Census in similar computation.

This table indicates, among other facts, that the gross operating revenues per telephone per day for Bell System carriers were \$0.22 and for other than Bell System carriers were \$0.14 in 1936. Gross operating expenses per telephone per day were \$0.15 for Bell System carriers and \$0.09 for other than Bell System carriers.

TABLE XXVII.—Averages per telephone per day of the operating revenues and operating expenses of large telephone carriers, by geographical regions

[Year ended Dec. 31, 1936]

ALL LARGE TELEPHONE CARRIERS

Geographical groupings	Total operating revenues	Total operating expenses	Average number of telephones	Averages	
				Operating revenues per telephone per day	Operating expenses per telephone per day
New England region.....	\$88,429,301	\$62,782,820	1,470,397	\$0.1850	\$0.1314
Middle Atlantic region <sup>1</sup> .....	321,120,339	219,787,817	4,335,609	.2279	.1560
Great Lakes region.....	209,114,395	133,523,008	3,528,844	.1823	.1164
Eastern district <sup>1</sup> .....	618,664,035	416,093,645	9,334,850	.2039	.1372
Chesapeake region.....	39,755,311	26,636,330	710,960	.1721	.1153
Southeastern region.....	62,836,520	40,730,234	1,085,256	.1782	.1155
Southern district.....	102,591,831	67,366,564	1,796,216	.1757	.1154
North Central region.....	42,188,623	29,431,921	826,855	.1570	.1095
South Central region.....	87,204,090	55,650,913	1,448,035	.1853	.1183
Mountain region.....	23,225,269	16,238,205	436,631	.1637	.1144
Pacific region.....	109,110,978	70,371,432	1,731,082	.1939	.1251
Western district.....	261,728,960	171,692,471	4,442,603	.1813	.1189
United States <sup>1</sup> .....	982,984,826	655,152,680	15,573,669	.1942	.1294
United States <sup>2</sup> .....	1,089,905,610	730,000,614	15,573,669	.2153	.1442

BELL SYSTEM CARRIERS

New England region.....	\$71,655,068	\$50,932,217	1,157,415	\$0.1905	\$0.1354
Middle Atlantic region <sup>1</sup> .....	311,983,328	213,544,154	4,138,603	.2319	.1588
Great Lakes region.....	185,623,120	118,775,971	2,951,487	.1935	.1238
Eastern district <sup>1</sup> .....	569,261,516	383,252,342	8,247,505	.2124	.1430
Chesapeake region.....	39,325,381	26,356,162	702,919	.1721	.1154
Southeastern region.....	57,290,777	37,486,839	960,335	.1836	.1201
Southern district.....	96,616,158	63,843,001	1,663,254	.1787	.1181
North Central region.....	39,157,847	27,366,238	749,747	.1607	.1123
South Central region.....	82,046,690	52,269,460	1,322,577	.1909	.1216
Mountain region.....	23,225,269	16,238,205	436,631	.1637	.1144
Pacific region.....	103,276,339	66,901,884	1,585,399	.2004	.1298
Western district.....	247,706,145	162,775,787	4,094,354	.1862	.1223
United States <sup>1</sup> .....	913,583,819	609,871,130	14,005,113	.2007	.1340
United States <sup>2</sup> .....	1,020,504,603	684,719,064	14,005,113	.2242	.1504

See footnotes at end of table.

**TABLE XXVII.—Averages per telephone per day of the operating revenues and operating expenses of large telephone carriers, by geographical regions—**  
 Continued

[Year ended Dec. 31, 1936]

## OTHER THAN BELL SYSTEM CARRIERS

Geographical groupings	Total operating revenues	Total operating expenses	Average number of telephones	Averages	
				Operating revenues per telephone per day	Operating expenses per telephone per day
New England region.....	\$16,774,233	\$11,850,603	312,982	\$0.1649	\$0.1165
Middle Atlantic region.....	9,137,011	6,243,663	197,006	.1427	.0975
Great Lakes region.....	23,491,275	14,747,037	577,357	.1252	.0786
Eastern district.....	49,402,519	32,841,303	1,087,345	.1398	.0929
Chesapeake region.....	429,930	280,168	8,041	.1645	.1072
Southeastern region.....	5,545,743	3,243,395	124,921	.1366	.0799
Southern district.....	5,975,673	3,523,563	132,962	.1383	.0815
North Central region.....	3,030,776	2,065,683	77,108	.1209	.0824
South Central region.....	5,157,400	3,381,453	125,458	.1265	.0829
Mountain region.....					
Pacific region.....	5,834,639	3,469,548	145,683	.1232	.0733
Western district.....	14,022,815	8,916,684	348,249	.1239	.0788
United States.....	69,401,007	45,231,550	1,568,556	.1361	.0888

<sup>1</sup> Excludes figures for American Telephone & Telegraph Co. inasmuch as its operations are not confined to one geographical region.

<sup>2</sup> Includes figures for American Telephone & Telegraph Co.

NOTE.—“Large telephone carriers” comprises a group of 81 carriers, each having annual operating revenues of approximately \$250,000 or more.

*Summary of monthly reports of large telegraph carriers.*—A summary of monthly reports of large wire-telegraph and radiotelegraph carriers, each having annual operating revenues of approximately \$50,000, or more, for December 1936 and for 12 months ended with December 1936 is shown in table XXVIII which follows.

**TABLE XXVIII.—Summary of revenues, expenses, and related items from monthly reports of large telegraph carriers**

FOR THE MONTH OF DECEMBER 1936

Name of carrier	Total operating revenues	Total operating expenses	Operating income	Net income
Northern Telegraph Co.....	\$5,324	\$3,568	\$1,196	\$1,293
Postal Telegraph-Cable Co. (land-line system).....	2,263,005	1,953,300	258,099	19,402
Western Union Telegraph Co.....	9,630,282	7,846,537	1,222,943	904,544
Total, land-line telegraph carriers.....	11,898,611	9,803,405	1,482,238	925,239
All America Cables, Inc.....	488,397	379,778	80,810	132,726
Commercial Cable Co. (New York & Limited).....	410,126	241,831	157,674	73,179
Commercial Pacific Cable Co.....	99,586	63,354	35,156	60,967
French Telegraph Cable Co.....	33,901	62,922	<sup>1</sup> 30,686	<sup>1</sup> 30,684
Mexican Telegraph Co.....	41,671	22,662	15,998	12,948
Total, ocean cable carriers.....	1,073,681	770,547	258,952	248,836
Globe Wireless, Ltd.....	37,451	34,707	<sup>1</sup> 1,827	<sup>1</sup> 2,498
Mackay Radio & Telegraph Co. (California).....	99,529	83,196	14,045	<sup>1</sup> 673
Mackay Radio & Telegraph Co. (Delaware).....	96,664	97,561	2,651	<sup>1</sup> 25,967
Mutual Telephone Co. (wireless department, Hawaii).....	4,986	5,349	<sup>1</sup> 263	56
Press Wireless, Inc.....	38,297	36,460	1,250	1,250
R. C. A. Communications, Inc.....	492,205	330,040	109,551	135,000

<sup>1</sup> Deficit or other reverse item.

TABLE XXVIII.—Summary of revenues, expenses, and related items from monthly reports of large telegraph carriers—Continued

FOR THE MONTH OF DECEMBER 1936—Continued

Name of carrier	Total operating revenues	Total operating expenses	Operating income	Net income
Radiomarine Corporation of America.....	\$87,464	\$67,669	\$13,286	\$13,771
Southern Radio Corporation.....	3,564	12,169	1,836	15,668
Tropical Radio Telegraph Co.....	61,420	48,121	10,630	13,193
U. S., Liberia Radio Corporation.....	6,741	5,225	1,386	1,386
Total, radiotelegraph carriers.....	928,261	720,497	142,073	129,956
Grand total.....	13,900,553	11,294,449	1,883,263	1,304,031

FOR 12 MONTHS ENDED WITH DECEMBER 1936

Northern Telegraph Co.....	\$60,589	\$43,548	\$12,791	\$14,049
Postal Telegraph-Cable Co. (land-line system).....	23,634,923	21,524,462	1,447,314	1,372,768
Western Union Telegraph Co.....	98,420,220	80,229,275	13,460,690	7,199,120
Total, land-line telegraph carriers.....	122,115,732	101,797,285	14,920,795	5,840,403
All America Cables, Inc.....	4,656,562	3,558,968	757,978	786,598
Commercial Cable Co. (New York & Limited).....	4,342,192	3,233,381	977,588	4,746
Commercial Pacific Cable Co.....	830,818	737,865	68,762	229,297
French Telegraph Cable Co.....	359,344	324,927	13,795	10,220
Mexican Telegraph Co.....	360,967	247,928	95,620	60,486
Total, ocean cable carriers.....	10,549,883	8,103,069	1,913,743	1,091,347
Globe Wireless, Ltd.....	420,980	369,715	35,195	34,822
Mackay Radio & Telegraph Co. (California).....	1,023,338	907,929	92,441	1,83,343
Mackay Radio & Telegraph Co. (Delaware).....	985,364	1,136,416	1,163,806	1,496,276
Mutual Telephone Co. (wireless department, Hawaii).....	58,088	47,995	5,115	5,434
Press Wireless, Inc.....	441,533	395,654	36,622	36,622
R. C. A. Communications, Inc.....	4,643,206	4,011,677	3,15,392	496,425
Radiomarine Corporation of America.....	1,038,587	800,634	184,789	186,967
Southern Radio Corporation.....	38,024	67,550	1,29,814	1,28,074
Tropical Radio Telegraph Co.....	651,479	610,050	30,672	59,663
U. S., Liberia Radio Corporation.....	57,773	58,776	1,2,607	1,2,607
Total, radio telegraph carriers.....	9,358,372	8,406,396	514,600	199,633
Grand total.....	142,023,987	118,306,750	17,349,138	7,131,383

NOTE.—“Large telegraph carriers” comprises 3 land-line telegraph carriers, 5 ocean cable carriers, and 10 radiotelegraph carriers, each having annual operating revenues of approximately \$50,000 or more.

*Telegraph operations of large telephone carriers.*—A summary of the monthly reports received from 26 telephone carriers relative to revenues applicable to telegraph operations for December 1936 and for the 12 months ended with December 1936 is contained in table XXIX below. The summary comprises returns from 24 Bell System carriers and from the Cincinnati and Suburban Bell Telephone Co. and Southern New England Telephone Co. This summary reflects only items that are readily available from the carriers' accounts and makes comparison with similar data for 1935.

The volume of telegraph business of the 26 telephone carriers amounted to \$20,900,000 in 1935 and increased to \$24,300,000 in 1936 as shown by this table. Approximately \$7,000,000 of the latter amount were derived from private line Morse service. Most of the balance of telegraph revenues received by telephone carriers was derived from private line teletypewriter and teletypewriter exchange service.

TABLE XXIX.—Summary of monthly reports of telephone carriers<sup>1</sup> relative to available data concerning telegraph operations

Item	December 1936		December 1935	
	Total operating revenues	Amounts applicable to respondents' telegraph operations <sup>2</sup>	Total operating revenues <sup>3</sup>	Amounts applicable to respondents' telegraph operations <sup>2</sup>
<b>OPERATING REVENUES</b>				
Subscribers' station revenues.....	\$54,862,001	\$14,729	\$50,487,166	\$10,164
Public telephone revenues.....	4,005,628		3,702,810	
Miscellaneous local service revenues.....	947,753	230,746	857,663	203,404
Message tolls.....	25,369,072	557,783	21,726,702	371,656
Miscellaneous toll service revenues.....	2,784,983	1,379,855	2,512,232	1,297,593
Revenues from general services and licenses.....	1,189,143		1,104,896	
Sundry miscellaneous revenue.....	3,403,168	4,664	3,337,198	
Uncollectible operating revenues, Dr.....	286,804	1,084	264,948	839
Total.....	92,274,944	2,186,693	83,463,719	1,881,978

Item	1936 cumulative figures		1935 cumulative figures	
	Total operating revenues	Amounts applicable to respondents' telegraph operations <sup>2</sup>	Total operating revenues <sup>3</sup>	Amounts applicable to respondents' telegraph operations <sup>2</sup>
<b>OPERATING REVENUES</b>				
Subscribers' station revenues.....	\$625,108,955	\$146,457	\$591,827,061	\$99,160
Public telephone revenues.....	43,732,688		40,978,319	15,279
Miscellaneous local service revenues.....	10,959,093	2,541,028	10,053,269	2,345,370
Message tolls.....	276,817,267	5,694,311	244,765,139	3,903,002
Miscellaneous toll service revenues.....	32,757,831	15,911,347	29,295,375	14,568,714
Revenues from general services and licenses.....	13,582,542		12,774,878	
Sundry miscellaneous revenues.....	39,708,012	4,698	37,244,639	
Uncollectible operating revenues, Dr.....	3,203,381	13,915	3,853,215	13,557
Total.....	1,039,463,007	24,283,926	963,085,465	20,918,168

<sup>1</sup> Comprises 24 Bell System carriers and the Cincinnati & Suburban Bell Telephone Co. and Southern New England Telephone Co.

<sup>2</sup> Reflects only items which are readily available from carriers' accounts.

<sup>3</sup> Returns in this column reflect adjustments covering estimated refunds.

*Monthly operating statistics of large telegraph carriers, July 1934 to June 1937, inclusive.*—The operating revenues, operating expenses, operating income, and net income of large wire-telegraph and radiotelegraph carriers, covering the period from July 1934 to June 1937, are included in table XXX, which follows, and the trends of these items during this period are indicated in chart 7 which follows table XXX. The table and chart indicate substantial gains in the volume of telegraph business during the period covered by the data. Total operating revenues of the telegraph carriers amounted to approximately \$10,300,000 in July 1934 and to \$12,500,000 in June 1937.

TABLE XXX.—*Monthly operating statistics showing revenues, expenses, operating income, and net income as reported by large telegraph carriers from July 1934 to June 1937, inclusive*

Month	Operating revenues	Operating expenses	Operating income	Net income
<b>1934</b>				
July.....	\$10,288,243	\$9,275,142	\$527,309	<sup>1</sup> \$252,781
August.....	10,886,673	9,326,337	1,074,209	244,478
September.....	10,178,062	9,028,709	668,071	<sup>1</sup> 169,840
October.....	10,725,812	9,225,020	1,075,143	318,698
November.....	9,933,054	9,019,603	438,859	<sup>1</sup> 396,241
December.....	11,004,971	9,458,110	1,330,026	<sup>1</sup> 207,065
Total.....	63,016,815	55,332,921	5,113,617	<sup>1</sup> 442,751
<b>1935</b>				
January.....	10,362,033	9,126,390	778,067	<sup>1</sup> 60,911
February.....	9,611,350	8,686,579	470,181	<sup>1</sup> 463,886
March.....	10,729,707	9,153,476	1,115,485	206,972
April.....	10,878,367	9,130,371	1,280,193	433,001
May.....	11,411,863	9,376,111	1,537,331	637,004
June.....	10,798,585	9,160,096	1,179,070	248,659
July.....	10,710,993	9,286,674	969,419	129,721
August.....	11,086,297	9,314,022	1,314,097	391,400
September.....	10,897,978	9,027,064	1,418,137	523,848
October.....	11,533,959	9,392,056	1,682,661	828,207
November.....	10,666,676	8,179,022	1,039,152	85,278
December.....	11,925,571	9,720,053	1,734,304	996,780
Total.....	130,613,379	110,551,944	14,518,097	3,956,073
<b>1936</b>				
January.....	10,911,897	9,420,527	981,459	131,091
February.....	10,685,074	9,159,483	919,278	<sup>1</sup> 24,895
March.....	11,726,246	9,651,668	1,562,679	622,838
April.....	11,542,789	9,534,459	1,503,698	691,179
May.....	11,574,330	9,681,113	1,385,138	442,004
June.....	12,128,173	9,901,625	1,720,742	834,273
July.....	12,193,309	10,089,727	1,614,552	726,813
August.....	11,708,672	9,961,601	1,255,078	395,406
September.....	11,956,495	9,974,132	1,494,735	630,833
October.....	12,290,679	9,965,431	1,698,630	905,059
November.....	11,505,224	9,669,800	1,332,094	475,974
December.....	13,900,521	11,290,617	1,887,073	1,304,729
Total.....	142,023,409	118,300,173	17,355,156	7,135,304
<b>1937</b>				
January.....	12,140,972	10,229,801	1,216,273	406,098
February.....	11,368,311	9,817,436	878,489	43,463
March.....	13,253,361	10,557,492	1,961,059	1,247,171
April.....	12,313,839	10,463,338	1,154,025	422,284
May.....	12,198,308	10,802,599	709,725	<sup>1</sup> 138,837
June.....	12,514,022	10,879,674	943,770	200,638
Total.....	73,788,813	62,750,340	6,863,341	2,180,817

<sup>1</sup> Deficit or other reverse item.

NOTE.—“Large telegraph carriers” comprises 3 land line telegraph carriers, 5 ocean cable carriers, and 10 radiotelegraph carriers, each having annual operating revenues of approximately \$50,000 or more.

OPERATING REVENUES, OPERATING EXPENSES, OPERATING INCOME, AND NET INCOME OF LARGE TELEGRAPH CARRIERS

CHART NO. 7



PREPARED IN THE ACCOUNTING, STATISTICAL, AND TARIFF DEPARTMENT, FEDERAL COMMUNICATIONS COMMISSION.

AUGUST, 1937

*Percentage relationships of monthly operating revenues of telegraph carriers.*—In tables XXXI and XXXII, which follow, respectively, are shown percentage relationships of monthly operating revenues computed from returns of large wire-telegraph and radiotelegraph carriers, respectively. The data for wire-telegraph carriers are based on the year 1929 for percentage computations only and indicate a substantial trend upward since 1933.

In the case of radiotelegraph carriers, the year 1934 is used as a base for statistical comparisons rather than 1929, inasmuch as data for radiotelegraph carriers for the years 1929 to 1933, inclusive, are not complete. However, the data reflect large increases in radiotelegraph business since 1934. The figure for the most recent month in the table shows that radiotelegraph operating revenues for June 1937 were about 37 percent greater than like data for June 1934.

TABLE XXXI.—Percentage relationships between monthly operating revenues of large wire-telegraph carriers for all months from January 1930 to June 1937, inclusive, and the corresponding months in 1929

Month	1929	1930	1931	1932	1933	1934	1935	1936	1937
	Percent								
January.....	100.00	95.47	80.77	63.84	51.22	61.99	61.01	64.13	71.39
February.....	100.00	96.61	81.96	67.34	52.96	63.09	61.65	67.46	72.34
March.....	100.00	92.62	79.84	65.23	58.17	63.13	60.13	65.66	73.80
April.....	100.00	96.31	81.79	60.97	54.22	60.97	63.35	67.29	71.06
May.....	100.00	92.71	76.69	57.73	60.27	62.17	63.75	64.65	67.76
June.....	100.00	94.90	80.94	61.38	65.04	64.23	62.88	70.62	72.23
July.....	100.00	87.80	75.05	51.37	61.78	57.85	60.40	68.76	-----
August.....	100.00	84.10	69.32	55.36	58.58	59.68	60.90	64.18	-----
September.....	100.00	88.29	73.30	58.27	59.62	57.89	62.02	68.02	-----
October.....	100.00	82.11	67.27	50.85	54.09	56.33	60.46	64.38	-----
November.....	100.00	82.63	69.59	55.84	60.79	60.83	65.29	70.20	-----
December.....	100.00	87.89	72.56	56.36	61.54	62.65	67.98	79.03	-----
For year.....	100.00	90.00	75.64	58.56	58.22	60.84	62.46	67.82	-----

NOTE.—“Large wire-telegraph carriers” comprises 3 land line telegraph carriers and 5 ocean cable carriers, each having annual operating revenues of approximately \$50,000 or more.

TABLE XXXII.—Percentage relationships between monthly operating revenues of large radiotelegraph carriers for all months from January 1935 to June 1937, inclusive, and the corresponding months in 1934

Month	1934	1935	1936	1937
	Percent	Percent	Percent	Percent
January.....	100.00	111.54	120.35	132.50
February.....	100.00	102.07	122.77	134.32
March.....	100.00	105.72	116.89	142.48
April.....	100.00	113.78	118.84	145.90
May.....	100.00	110.10	111.97	127.66
June.....	100.00	104.32	117.05	137.04
July.....	100.00	99.54	113.53	-----
August.....	100.00	98.64	107.68	-----
September.....	100.00	106.74	117.84	-----
October.....	100.00	110.37	118.95	-----
November.....	100.00	108.67	122.49	-----
December.....	100.00	106.53	128.79	-----
For year.....	100.00	106.42	118.06	-----

NOTE.—“Large radiotelegraph carriers” comprises 10 radiotelegraph carriers, each having annual operating revenues of approximately \$50,000 or more.

#### TELEPHONE AND TELEGRAPH STATISTICS

*Employees in service and their compensation.*—The compensation of employees by months, and the number of employees in service at the end of the year, for the years 1935 and 1936 are shown in table XXXIII below. The summary relates to the large telephone, wire-telegraph, and radiotelegraph carriers that report to the Commission on a monthly basis, but the data were obtained from their annual reports. For telephone carriers, the amounts applicable to the

Bell System (excluding the Cincinnati and Suburban Bell Telephone Co. and the Southern New England Telephone Co.) and to the other than Bell System carriers are shown. The table shows substantial increases for 1936 as compared with 1935 both in the number of employees and amount of compensation paid to employees. Employees of all carriers increased in number from 339,840 at the end of 1935 to 362,303 at the end of 1936. The total compensation paid to all employees was about \$482,000,000 for the year 1935, but increased to \$521,000,000 in 1936.

A comparative study of the number of employees of large telephone, land-line telegraph, ocean cable, and radiotelegraph carriers for the years 1935 and 1936, is shown in chart 8, which follows table XXXIII, and the amount of compensation paid to such employees is shown in chart 9 which follows chart 8.

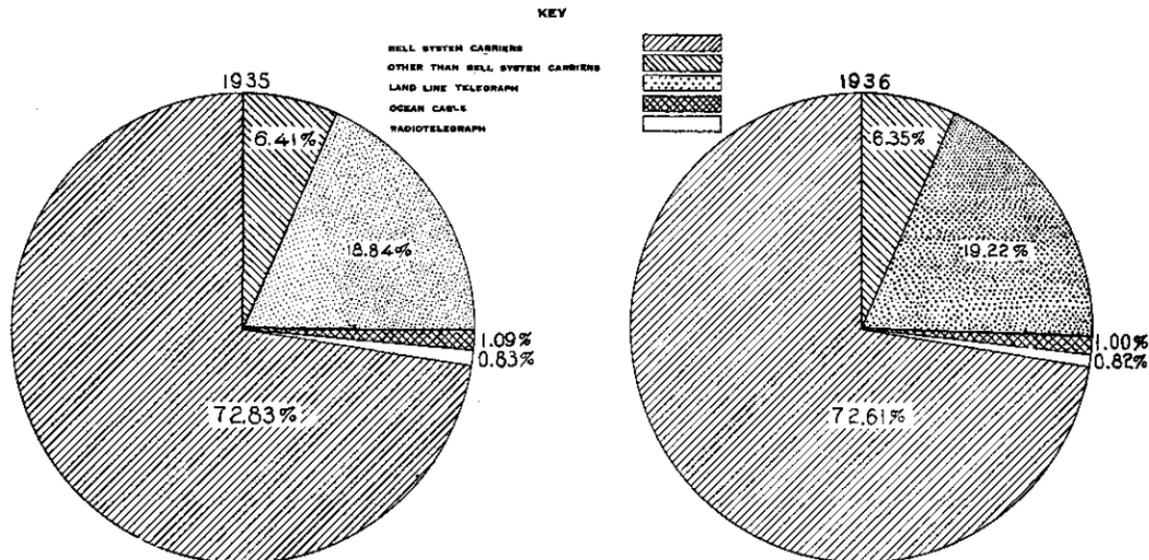
TABLE XXXIII.—Compensation of employees by months, and number of employees in service at the end of the year, as reported by large telephone and telegraph carriers for the years 1935 and 1936

Month	Telegraph carriers				Telephone carriers			Grand total
	Land line telegraph	Ocean cable	Radiotelegraph	Total	Bell system	Other than Bell system	Total	
1935								
January.....	\$5,584,184	\$381,068	\$330,776	\$6,296,028	\$31,915,957	\$2,144,533	\$34,060,490	\$40,536,518
February.....	5,177,774	380,339	324,172	5,882,285	29,327,863	1,974,217	31,302,080	37,184,365
March.....	5,552,495	383,126	334,506	6,270,127	30,783,277	2,096,432	32,879,709	39,149,836
April.....	5,563,922	382,121	339,400	6,285,443	31,003,517	2,118,013	33,121,530	39,406,973
May.....	5,732,341	378,168	349,059	6,459,568	32,543,873	2,196,048	34,739,921	41,199,489
June.....	5,584,818	379,324	341,402	6,305,544	30,611,689	2,097,287	32,708,976	39,014,520
July.....	5,726,054	377,819	351,608	6,455,481	33,054,371	2,260,451	35,314,822	41,770,303
August.....	5,775,926	372,908	349,732	6,498,566	32,164,126	2,193,739	34,357,865	40,856,431
September.....	5,528,900	368,333	343,815	6,241,048	31,632,702	2,144,042	33,776,744	40,017,792
October.....	5,764,265	369,277	347,785	6,481,327	32,717,780	2,228,614	34,946,394	41,427,721
November.....	5,547,895	375,963	347,586	6,271,444	31,942,032	2,141,442	34,083,474	40,354,918
December.....	6,071,254	382,438	351,855	6,805,547	32,894,773	2,216,365	34,911,138	41,716,685
Total.....	67,609,828	4,530,884	4,111,696	76,252,408	380,391,960	25,811,183	406,203,143	482,455,551
Number of employees in service as of Dec. 31, 1935.....	64,020	3,725	2,817	70,562	247,505	21,773	269,278	339,840
1936								
January.....	\$5,787,500	\$389,094	\$357,961	\$6,534,555	\$33,332,968	\$2,243,381	\$35,576,349	\$42,110,904
February.....	5,534,771	392,856	351,051	6,278,678	31,495,518	2,113,441	33,608,959	39,887,637
March.....	5,952,906	381,881	353,343	6,688,130	33,326,406	2,326,356	35,652,762	42,340,892
April.....	5,942,554	385,525	361,447	6,689,526	33,153,022	2,312,246	35,465,268	42,154,794
May.....	6,047,327	385,936	367,794	6,801,057	33,691,575	2,289,587	35,981,162	42,782,219
June.....	6,190,331	383,379	372,106	6,945,816	33,713,922	2,313,026	36,026,948	42,972,764
July.....	6,293,499	387,426	386,205	7,067,130	35,344,894	2,409,008	37,753,902	44,821,032
August.....	6,238,709	385,810	379,143	6,888,162	33,986,181	2,327,786	36,313,967	43,317,129
September.....	6,251,972	379,386	374,598	7,005,956	35,055,625	2,369,790	37,425,405	44,431,361
October.....	6,382,984	395,733	378,301	7,157,018	35,506,615	2,393,226	37,899,841	45,056,859
November.....	6,040,083	389,577	372,222	6,801,882	34,722,627	2,361,617	37,084,244	43,886,126
December.....	7,123,795	409,304	384,417	7,917,516	36,748,730	2,456,378	39,205,108	47,122,624
Total.....	73,786,431	4,665,407	4,438,588	82,890,426	410,078,083	27,915,832	437,993,915	520,884,341
Number of employees in service as of Dec. 31, 1936.....	69,638	3,630	2,953	76,221	263,054	23,028	286,082	362,303

NOTE.—“Large telephone carriers” comprises a group of 81 carriers, each having annual operating revenues of approximately \$250,000 or more. “Large telegraph carriers” comprises 3 land line telegraph carriers, 5 ocean cable carriers, and 10 radiotelegraph carriers, each having annual operating revenues of approximately \$50,000 or more.

NUMBER OF EMPLOYEES IN SERVICE OF ALL LARGE REPORTING COMMUNICATION CARRIERS AS OF DECEMBER 31, 1935, AND DECEMBER 31, 1936:

CHART NO. 8

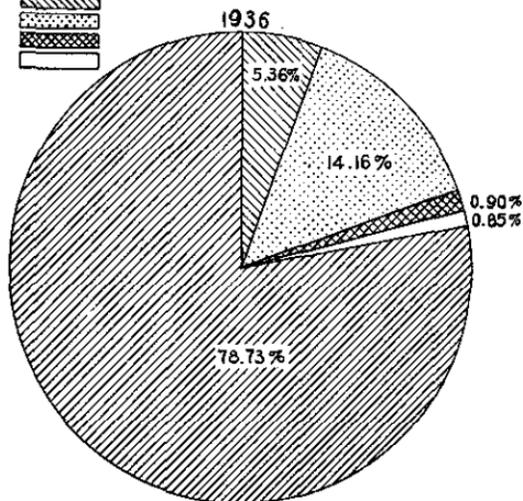
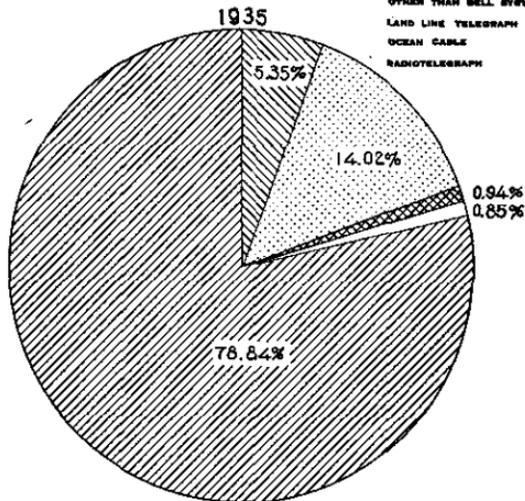


	EMPLOYEES	
BELL SYSTEM CARRIERS	247,505	
OTHER THAN BELL SYSTEM CARRIERS	21,775	269,278
ALL LARGE TELEPHONE CARRIERS		
LAND LINE TELEGRAPH	64,020	
OCEAN CABLE	3,725	
RADIOTELEGRAPH	2,517	
ALL LARGE LAND LINE TELEGRAPH, OCEAN CABLE, & RADIOTELEGRAPH CARRIERS	70,562	
ALL LARGE REPORTING CARRIERS	339,840	

	EMPLOYEES	
BELL SYSTEM CARRIERS	263,054	
OTHER THAN BELL SYSTEM CARRIERS	23,028	286,082
ALL LARGE TELEPHONE CARRIERS		
LAND LINE TELEGRAPH	69,638	
OCEAN CABLE	3,630	
RADIOTELEGRAPH	2,953	
ALL LARGE LAND LINE TELEGRAPH & RADIOTELEGRAPH CARRIERS	76,221	
ALL LARGE REPORTING CARRIERS	362,303	

KEY

BELL SYSTEM CARRIERS  
 OTHER THAN BELL SYSTEM CARRIERS  
 LAND LINE TELEGRAPH  
 OCEAN CABLE  
 RADIOTELEGRAPH



BELL SYSTEM CARRIERS	\$380,591,960	
OTHER THAN BELL SYSTEM CARRIERS	25,811,183	\$405,203,143
ALL LARGE TELEPHONE CARRIERS	67,609,828	
LAND LINE TELEGRAPH	4,530,881	
OCEAN CABLE	4,111,696	
RADIOTELEGRAPH		
ALL LARGE LAND LINE TELEGRAPH, OCEAN CABLE, & RADIOTELEGRAPH CARRIERS	76,252,406	
ALL LARGE REPORTING CARRIERS	452,455,551	

BELL SYSTEM CARRIERS	\$410,078,085	
OTHER THAN BELL SYSTEM CARRIERS	27,915,890	\$437,993,975
ALL LARGE TELEPHONE CARRIERS	73,786,131	
LAND LINE TELEGRAPH	4,665,107	
OCEAN CABLE	4,130,586	
RADIOTELEGRAPH		
ALL LARGE LAND LINE TELEGRAPH, OCEAN CABLE, & RADIOTELEGRAPH CARRIERS	82,581,824	
ALL LARGE REPORTING CARRIERS	520,681,311	

## TABLE SHOWING INTERCORPORATE RELATIONS

*Intercorporate relations of communication carriers and the controlling companies.*—In table XXXIV, below, are shown the names of the telephone, wire-telegraph, and radiotelegraph carriers filing annual reports with the Commission for the year 1936, and the intercorporate relations between these carriers and the controlling companies. The returns were incomplete at the date of the preparation of this report and consequently the table does not show the names of all communication carriers and holding companies subject to the act.

The independent or top companies are arranged in alphabetical order and are shown flush with the margin. Each subsidiary is indented beneath the controlling company to indicate the intercorporate relation existing at December 31, 1936. An index, pertaining to intercorporate relations and listing alphabetically the names of all companies, appears at the end of this table for reference purposes. The number in the first column of the table opposite the name of each company corresponds with the number following the name of the same company in the index.

To assist in determining the nature of the companies listed, certain symbols appear in the third column of the table. The following is a key to the symbols used:

M-A—Class A telephone carriers filing annual report Form M.

M-B—Class B telephone carriers filing annual report Form M.

O—Wire-telegraph and radiotelegraph carriers filing annual report Form O.

H—Holding companies having large interests in communication carriers and filing annual report Form H.

Cir.—Holding companies having nominal interests in communication carriers and filing statistical circular No. 1.

The operating revenues of the communication carriers for the year 1936 are shown in the fourth column of the table.

TABLE XXXIV.—*Summary showing the intercorporate relations of communication carriers and the controlling companies reporting to the Commission for the year 1936*

No.	Name of company	Form of annual report	Operating revenues
1	Alleghany Corporation.....	Cir. <sup>1</sup> .....	
2	Chesapeake Corporation.....	Cir. <sup>1</sup> .....	
3	Chesapeake & Ohio Ry. Co.....	Cir. <sup>1</sup> .....	
4	Pere Marquette Ry. Co.....	Cir. <sup>1</sup> .....	
5	Central Land Co.....	Cir. <sup>1</sup> .....	
6	Pere Marquette Radio Corporation.....	O.....	\$9,948
7	American Newspapers, Inc.....	Cir.....	
8	Hearst Radio, Inc.....	O.....	23,446
9	American Telephone & Telegraph Co.....	M-A.....	106,920,784
10	Bell Telephone Co. of Pennsylvania.....	M-A.....	65,483,420
11	Chesapeake & Potomac Telephone Co.....	M-A.....	10,597,013
12	Chesapeake & Potomac Telephone Co. of Baltimore City.....	M-A.....	13,995,545
13	Chesapeake & Potomac Telephone Co. of Virginia.....	M-A.....	8,833,167
14	Chesapeake & Potomac Telephone Co. of West Virginia.....	M-A.....	5,899,656
15	Diamond State Telephone Co.....	M-A.....	2,079,955
16	Illinois Bell Telephone Co.....	M-A.....	81,371,162
17	Crown Point Telephone Co.....	M-B.....	54,442
18	Indiana Bell Telephone Co.....	M-A.....	11,849,094
19	Lebanon Telephone Co.....	M-B.....	48,952
20	Michigan Bell Telephone Co.....	M-A.....	36,655,925
21	Mountain States Telephone & Telegraph Co.....	M-A.....	22,191,272
22	New England Telephone & Telegraph Co.....	M-A.....	71,655,068
23	Eastern Telephone & Telegraph Co. (Maine).....	M-A.....	133,009
24	Moosehead Telephone & Telegraph Co.....	M-B.....	91,165
25	Westerly Automatic Telephone Co.....	M-A.....	143,547
26	Western New England Telephone Co.....	M-B.....	89,316
27	White River Valley Telephone Co.....	M-B.....	51,733
28	New Jersey Bell Telephone Co.....	M-A.....	45,307,182
29	New York Telephone Co.....	M-A.....	189,112,762
30	Northwestern Bell Telephone Co.....	M-A.....	32,143,957
31	Dakota Central Telephone Co.....	M-A.....	1,271,863
32	Tri-State Telephone & Telegraph Co.....	M-A.....	5,742,027
33	Fulda Telephone Co. <sup>2</sup> .....	M-B.....	25,461
34	Nicollet County Telephone & Telegraph Co.....	M-B.....	54,376
35	Peoples Telephone Co. (Minnesota) <sup>3</sup> .....	M-B.....	22,734
36	Ohio Bell Telephone Co.....	M-A.....	39,270,876

See footnotes at end of table.

TABLE XXXIV.—Summary showing the intercorporate relations of communication carriers and the controlling companies reporting to the Commission for the year 1936—Continued

No.	Name of company	Form of annual report	Operating revenues
<b>American Telephone &amp; Telegraph Co.—Continued.</b>			
37	Pacific Telephone & Telegraph Co.	M-A	\$62,552,656
38	Bell Telephone Co. of Nevada	M-A	1,033,996
39	Southern California Telephone Co.	M-A	40,723,683
40	Southern Bell Telephone & Telegraph Co.	M-A	57,290,777
41	Christian-Todd Telephone Co.	M-A	194,962
42	Southwestern Bell Telephone Co.	M-A	79,917,477
43	Emporia Telephone Co. <sup>1</sup>	M-A	112,530
44	Rio Grande Valley Telephone Co. <sup>2</sup>	M-A	437,452
45	United Telephone Co. (Kansas)	M-A	1,691,762
46	Wisconsin Telephone Co.	M-A	16,476,062
	Bell System, total		1,021,528,829
47	American Utilities Service Corporation	Cir. <sup>1</sup>	
48	Bluefield Telephone Co.	M-A	429,930
49	Bangor & Aroostook R. R. Co.	Cir	
50	Northern Telegraph Co.	O	60,589
51	Byllesby Corporation	Cir. <sup>1</sup>	
52	Byllesby, H. M., & Co.	Cir. <sup>1</sup>	
53	Standard Power & Light Corporation <sup>6</sup>	Cir. <sup>1</sup>	
54	Standard Gas & Electric Co.	Cir. <sup>1</sup>	
55	Northern States Power Co. (Delaware)	Cir. <sup>1</sup>	
56	Northern States Power Co. (Minnesota) <sup>7</sup>	M-A	109,339
57	Canadian Northern Ry. Co.	Cir	
58	Canadian National Telegraph Co.	Cir. <sup>1</sup>	
59	Great North Western Telegraph Co. of Canada	O	( <sup>8</sup> )
60	Minnesota & Manitoba R. R. <sup>9</sup>	O	6,701
61	Canadian Pacific Ry. Co. (lines in United States)	O	4,648
62	Carolina Telephone & Telegraph Co.	M-A	1,402,050
63	Champaign Telephone Co.	M-B	73,516
64	Chenango & Unadilla Telephone Corporation	M-A	221,895
65	Chicago, Milwaukee, St. Paul & Pacific R. R. Co. (in trusteeship)	Cir	
66	Continental Telephone Co.	O	16,256
67	Cincinnati & Suburban Bell Telephone Co.	M-A	9,440,552
68	Citizens Utilities Co.	Cir	
69	Public Utilities California Corporation	M-A	148,360
70	City of Seattle, harbor department	O	5,292
71	Colorado Fuel & Iron Corporation	Cir. <sup>1</sup>	
72	Colorado & Wyoming Telegraph Co.	O	18,061
73	Colusa County Telephone Co.	M-B	55,949
74	Commercial Pacific Cable Co. <sup>10</sup>	O	830,818
75	Del Rio & Winter Garden Telephone Co.	M-A	231,544
76	Dollar, Robert, Co.	Cir	
77	Globe Wireless Ltd.	O	420,980
78	First-Chicago Corporation	Cir	
79	North-Western Indiana Telephone Co.	M-A	146,152
80	Firestone Plantations Co.	Cir	
81	United States-Liberia Radio Corporation	O	57,715
82	French Telegraph Cable Co.	O	340,851
83	General Telephone Corporation	H	
84	Indiana Associated Telephone Corporation	M-A	1,205,039
85	Indiana Central Telephone Co. (in trusteeship)	H	
86	Interstate Telephone Co.	M-A	779,976
87	Michigan Associated Telephone Co.	M-A	1,120,785
88	Southwestern Associated Telephone Co.	M-A	977,607
89	Ohio Associated Telephone Co.	M-A	688,375
90	Pennsylvania Telephone Corporation	M-A	2,144,868
91	United Telephone Co. (Delaware)	H	
92	Tri-State Associated Telephone Corporation	M-B	96,133
	System total		7,012,783
93	General & Telephone Investments, Inc.	H	
94	Gary, Theodore, & Co.	H	
95	Telephone Bond & Share Co.	H	
96	Continental Telephone Co.	H	
97	Nebraska Continental Telephone Corporation	M-A	334,933
98	Home Telephone & Telegraph Co. (Indiana)	M-A	1,270,069
99	Imperial Securities Co.	H	
100	Telephone Securities, Inc.	H	
101	Keystone Telephone Co. of Philadelphia	M-A	1,822,687
102	Eastern Telephone & Telegraph Co. (Pennsylvania)	M-A	149,319
	System total		3,577,008
103	Greenville Telephone Co.	M-B	89,485
104	Gulf Radio Service (George Collins Warner, Jr.) <sup>11</sup>	O	
105	Home Telephone Co. of Ridgway	M-A	155,723

See footnotes at end of table.

TABLE XXXIV.—Summary showing the intercorporate relations of communication carriers and the controlling companies reporting to the Commission for the year 1936—Continued

No.	Name of company	Form of annual report	Operating revenues
106	Home Telephone & Telegraph Co. of Virginia.....	M-B.....	\$99,963
107	Inter-Mountain Telephone Co.....	M-A.....	606,456
108	International Telephone & Telegraph Corporation.....	H.....	
109	All America Cables, Inc.....	O.....	4,656,562
110	Postal Telegraph & Cable Corporation (in trusteeship).....	H.....	
111	Mackay Companies.....	H.....	
112	Commercial Cable Co.....	O.....	4,342,192
113	Mackay Radio & Telegraph Co. (California).....	O.....	1,023,338
114	Postal Telegraph-Cable Co. (Land Line System).....	O.....	23,634,923
115	Interstate Telephone & Telegraph Co. (Oregon) <sup>12</sup> .....	O.....	
116	Radio Communication Co., Inc. <sup>13</sup> .....	O.....	
117	Mackay Radio & Telegraph Co. (Delaware).....	O.....	985,364
	System total.....		34,642,379
118	Investments & Utilities Corporation.....	H <sup>1</sup> .....	
119	Loveland & Co., Ltd.....	H.....	
120	West Coast Utilities Corporation.....	H.....	
121	West Coast Telephone Co.....	M-A.....	1,297,953
122	Investors Telephone Co. <sup>14</sup> .....	H <sup>1</sup> .....	
123	Platte Valley Telephone Corporation.....	M-A.....	199,247
124	Jamestown Telephone Corporation <sup>7</sup> .....	M-A.....	463,935
125	Kansas State Telephone Co.....	M-B.....	47,572
126	Lee Telephone Co.....	M-B.....	124,105
127	Lincoln Telephone Securities Co.....	H <sup>1</sup> .....	
128	Lincoln Telephone & Telegraph Co. <sup>7</sup> .....	M-A.....	2,695,843
129	Mayor and City Council of Baltimore, Md.....	O.....	5,732
130	Meadville Telephone Co.....	M-A.....	179,756
131	Michigan Alkali Co.....	Cir. <sup>1</sup> .....	
132	Wyandotte Transportation Co., 50 percent.....	(Cir.....	
133		O.....	6,707
134	Huron Portland Cement Co.....	(Cir. <sup>1</sup> .....	
135	Huron Transportation Co., 50 percent.....	(Cir.....	
136	Middle Western Telephone Co. (in trusteeship).....	H.....	
137	La Crosse Telephone Corporation.....	M-A.....	319,294
138	Middle States Telephone Co. of Illinois.....	M-A.....	395,396
	System total.....		714,690
139	Mid-West States Utilities Co. (in trusteeship) <sup>7</sup> .....		
140	Kansas Telephone Co. (in receivership) <sup>7</sup> .....	M-A.....	143,500
141	Nevada-California Electric Corporation.....	Cir.....	
142	Interstate Telegraph Co.....	M-A.....	143,175
143	Norfolk & Carolina Telephone & Telegraph Co.....	M-A.....	137,290
144	North-West Telephone Co.....	M-A.....	178,286
145	Northwestern Telephone Co.....	M-A.....	326,376
146	Olympic Radio Co.....	O.....	1,927
147	Oregon-Washington Telephone Co.....	M-A.....	166,841
148	Oxnard Home Telephone Co.....	M-B.....	62,042
149	Ozark Central Telephone Co.....	M-A.....	149,923
150	Palestine Telephone Co.....	M-B.....	69,388
151	Phillips Petroleum Co.....	Cir.....	
152	Western Radio Telegraph Co.....	O.....	26,605
153	Press Wireless, Inc.....	O.....	438,634
154	Radio Corporation of America.....	H.....	
155	R. C. A. Communications, Inc.....	O.....	4,643,206
156	Radiomarine Corporation of America.....	O.....	473,428
	System total.....		5,116,634
157	Red River Valley Telephone Co.....	M-B.....	39,331
158	Rochester Telephone Corporation.....	M-A.....	4,761,701
159	San Angelo Telephone Co.....	M-A.....	470,100
160	Santa Barbara Telephone Co.....	M-A.....	605,913
161	Santa Paula Home Telephone Co.....	M-B.....	50,837
162	Socony-Vacuum Oil Co., Inc.....	Cir.....	
163	Magnolia Petroleum Co.....	Cir.....	
164	Magnolia Radio Corporation.....	O.....	3,912
165	South Porto Rico Sugar Co. (New Jersey).....	Cir.....	
166	South Porto Rico Sugar Co. (of Puerto Rico).....	O.....	7,012
167	Southeast Missouri Telephone Co.....	M-A.....	703,703
168	Southern New England Telephone Co.....	M-A.....	16,774,233
169	Southwest Telephone Co. (Kansas).....	M-A.....	173,874
170	Standard Oil Co. (New Jersey).....	Cir.....	
171	Southern Radio Corporation.....	O.....	38,024
172	Telephone Utility & Investment Co.....	Cir. <sup>1</sup> .....	
173	Eastern Kansas Telephone Co. <sup>7</sup> .....	M-B.....	70,756
174	Tidewater Wireless Telegraph Co.....	O.....	5,618

See footnotes at end of table.

TABLE XXXIV.—Summary showing the intercorporate relations of communication carriers and the controlling companies reporting to the Commission for the year 1936—Continued

No.	Name of company	Form of annual report	Operating revenues
175	Two States Telephone Co.....	M-A.....	\$280,311
176	United Fruit Co.....	Cir.....	
177	Tropical Radio Telegraph Co.....	O.....	651,479
178	United States Rubber Co.....	Cir. <sup>1</sup> .....	
179	Meyer Rubber Co.....	Cir.....	
180	Central Idaho Telegraph & Telephone Co. <sup>14</sup> .....	O <sup>1</sup> .....	
181	United States Steel Corporation <sup>15</sup> .....		
182	Michigan Limestone & Chemical Co.....	Cir.....	
183	Central Radio Telegraph Co.....	O.....	8,881
184	United Telephone Co. (Texas).....	M-B.....	88,166
185	United Telephone Co. (Wisconsin).....	M-B.....	85,199
186	United Telephone & Electric Co. (in trusteeship) <sup>17</sup> .....	H.....	
187	Clair Telephone Co. <sup>18</sup> .....	M-B.....	28,685
188	New Jersey Telephone Co.....	M-A.....	136,368
189	United Telephone Co. of Pennsylvania.....	M-A.....	717,840
190	United Telephone & Telegraph Co.....	H.....	
191	American Telephone Co.....	M-A.....	445,190
192	United Telephone Co. (Missouri).....	M-A.....	365,310
193	United Telephone & Telegraph Corporation.....	H.....	
194	Interstate Telephone & Telegraph Co. (Indiana).....	H.....	
195	Ohio Telephone Service Co.....	M-A.....	214,754
196	United Telephone Cos., Inc.....	M-A.....	657,780
197	United Telephone Investment Corporation.....	H.....	
198	Union Telephone Co. (Indiana).....	M-A.....	157,023
	System total.....		2,722,950
199	Utilities Holding Corporation.....	H.....	
200	Middle States Utilities Co. (Delaware).....	H.....	
201	Middle States Utilities Co. of Iowa.....	M-B.....	84,391
202	Middle States Utilities Co. of Missouri.....	M-A.....	148,535
	System total.....		232,926
203	Victor-American Fuel Co.....	Cir.....	
204	Mountain Telegraph Co.....	O.....	5,204
205	Wabash Ry. Co. (in receivership).....	Cir.....	
206	Ann Arbor R. R. Co. (in receivership).....	Cir.....	
207	Wabash Radio Corporation.....	O.....	11,004
208	Western Arkansas Telephone Co.....	M-B.....	70,662
209	Western Light & Telephone Co.....	Cir.....	
210	Western Telephone Corporation (Kansas).....	M-A.....	213,169
211	Western Telephone Corporation of Nebraska.....	M-B <sup>1</sup> .....	
212	Western Telephone Corporation of Oklahoma.....	M-A.....	134,607
213	Western Telephone Corporation of Texas <sup>19</sup> .....	M-B.....	34,308
	System total.....		382,034
214	Western Union Telegraph Co.....	O.....	98,420,220
215	Great North Western Telegraph Co. of Canada <sup>20</sup> .....	O.....	( <sup>2</sup> )
216	Mexican Telegraph Co.....	O.....	380,967
	System total.....		98,781,187

<sup>1</sup> Report for 1936 not received.<sup>2</sup> Merged with Tri-State Telephone & Telegraph Co. Aug. 31, 1936.<sup>3</sup> Merged with Tri-State Telephone & Telegraph Co. June 30, 1936.<sup>4</sup> Merged with Southwestern Bell Telephone Co. July 31, 1936.<sup>5</sup> Merged with Southwestern Bell Telephone Co. Dec. 31, 1936.<sup>6</sup> Controlled jointly by H. M. Byllesby & Co. and the United States Electric Power Corporation through ownership of majority of voting capital stock.<sup>7</sup> Subject only to secs. 201-205 of the act.<sup>8</sup> None reported, lessor company.<sup>9</sup> Telegraph facilities leased to and operated by the Canadian Northern Ry. Co.<sup>10</sup> The Commercial Pacific Cable Co. is closely affiliated with the Mackay companies.<sup>11</sup> Not included in tabulations, as returns were incomplete.<sup>12</sup> Independent. Leased by the Postal Telegraph-Cable Co. (land-line system).<sup>13</sup> Inactive company, files no report; inserted to show intercorporate relation of subsidiary carrier.<sup>14</sup> Formerly Standard Telephone Co. of Delaware, which was reorganized during 1936.<sup>15</sup> Operated by the Union Pacific R. R.<sup>16</sup> Files no report. Inserted to show intercorporate relation of subsidiary carrier.<sup>17</sup> Jointly controlled by the United Trust Co. as trustee for Brown Memorial Foundation and C. L. Brown Estate.<sup>18</sup> Merged with the United Telephone Co. of Pennsylvania July 1, 1936.<sup>19</sup> Merged with Southwestern Associated Telephone Co. Oct. 1, 1936.<sup>20</sup> Lines in the United States, in New England and northern New York State, leased by the Western Union Telegraph Co. For control see No. 59.

NOTE.—Annual report form M-A is filed by telephone carriers having average annual operating revenues exceeding \$100,000; annual report form M-B is filed by telephone carriers having average annual operating revenues exceeding \$50,000 but not more than \$100,000; annual report form O is filed by all wire-telegraph and radiotelegraph carriers; annual report form H and statistical circular No. 1 are filed by holding companies as described in the text on p. —.

INDEX PERTAINING TO INTERCORPORATE RELATIONS

[For use in connection with table XXXIV]		Number
	<i>Number</i>	
All America Cables, Inc.-----	109	Home Telephone & Telegraph Co. (Indiana)-----
Alleghany Corporation-----	1	Home Telephone & Telegraph Co. of Virginia-----
American Newspapers, Inc.-----	7	Huron Portland Cement Co.-----
American Telephone Co.-----	191	Huron Transportation Co.-----
American Telephone & Telegraph Co.-----	9	Illinois Bell Telephone Co.-----
American Utilities Service Corporation-----	47	Imperial Securities Co.-----
Ann Arbor Railroad Co.-----	206	Indiana Associated Telephone Corporation-----
Baltimore, Md., Mayor and City Council of-----	129	Indiana Bell Telephone Co.-----
Bangor & Aroostook Railroad Co.-----	49	Indiana Central Telephone Co.-----
Bell Telephone Co. of Nevada-----	38	Inter-Mountain Telephone Co.-----
Bell Telephone Co. of Pennsylvania-----	10	International Telephone & Telegraph Corporation-----
Bluefield Telephone Co.-----	48	Interstate Telegraph Co.-----
Byllesby, H. M., & Co.-----	52	Interstate Telephone Co.-----
Byllesby Corporation-----	51	Interstate Telephone & Telegraph Co. (Indiana)-----
Canadian National Telegraph Co.-----	58	Interstate Telephone & Telegraph Co. (Oregon)-----
Canadian Northern Railway Co.-----	57	Investments & Utilities Corporation-----
Canadian Pacific Railway Co. (lines in United States)-----	61	Investors Telephone Co.-----
Carolina Telephone & Telegraph Co.-----	62	Jamestown Telephone Corporation-----
Central Idaho Telegraph & Telephone Co.-----	180	Kansas State Telephone Co.-----
Central Land Co.-----	5	Kansas Telephone Co.-----
Central Radio Telegraph Co.-----	183	Keystone Telephone Co. of Philadelphia-----
Champaign Telephone Co.-----	63	La Crosse Telephone Corporation-----
Chenango & Unadilla Telephone Corporation-----	64	Lebanon Telephone Co.-----
Chesapeake Corporation-----	2	Lee Telephone Co.-----
Chesapeake & Ohio R. Co.-----	3	Lincoln Telephone & Telegraph Co.-----
Chesapeake & Potomac Telephone Co.-----	11	Lincoln Telephone Securities Co.-----
Chesapeake & Potomac Telephone Co. of Baltimore City-----	12	Loveland & Co., Ltd.-----
Chesapeake & Potomac Telephone Co. of Virginia-----	13	Mackay Cos-----
Chesapeake & Potomac Telephone Co. of West Virginia-----	14	Mackay Radio & Telegraph Co. (California)-----
Chicago, Milwaukee, St. Paul & Pacific R. R. Co.-----	65	Mackay Radio & Telegraph Co. (Delaware)-----
Christian-Todd Telephone Co.-----	41	Magnolia Petroleum Co.-----
Cincinnati & Suburban Bell Telephone Co.-----	67	Magnolia Radio Corporation-----
Citizens Utilities Co.-----	68	Mayor and City Council of Baltimore, Md.-----
City of Seattle, harbor department-----	70	Meadville Telephone Co.-----
Claar Telephone Co.-----	187	Mexican Telegraph Co.-----
Colorado Fuel & Iron Corporation-----	71	Meyer Rubber Co.-----
Colorado and Wyoming Telegraph Co.-----	72	Michigan Alkali Co.-----
Colusa County Telephone Co.-----	73	Michigan Associated Telephone Co.-----
Commercial Cable Co.-----	112	Michigan Bell Telephone Co.-----
Commercial Pacific Cable Co.-----	74	Michigan Limestone & Chemical Co.-----
Continental Telegraph Co.-----	66	Michigan Wireless Telegraph Co.-----
Continental Telephone Co.-----	90	Middle States Telephone Co. of Illinois-----
Crown Point Telephone Co.-----	17	Middle States Utilities Co. (Delaware)-----
Dakota Central Telephone Co.-----	31	Middle States Utilities Co. of Iowa-----
Del Rio & Winter Garden Telephone Co.-----	75	Middle States Utilities Co. of Missouri-----
Diamond State Telephone Co.-----	15	Middle Western Telephone Co.-----
Dollar, Robert, Co.-----	76	Mid-West States Utilities Co.-----
Eastern Kansas Telephone Co.-----	173	Minnesota & Manitoba Railroad-----
Eastern Telephone & Telegraph Co. (Maine)-----	23	Moosehead Telephone & Telegraph Co.-----
Eastern Telephone & Telegraph Co. (Pennsylvania)-----	102	Mountain States Telephone & Telegraph Co.-----
Emporia Telephone Co.-----	43	Mountain Telephone Co.-----
First Chicago Corporation-----	78	Nebraska Continental Telephone Corporation-----
Pirestone Plantations Co.-----	80	Nevada-California Electric Corporation-----
French Telegraph Cable Co.-----	82	New England Telephone & Telegraph Co.-----
Fulda Telephone Co.-----	33	New Jersey Telephone Co.-----
Gary, Theodore, & Co.-----	94	New Jersey Bell Telephone Co.-----
General & Telephone Investments, Inc.-----	93	New York Telephone Co.-----
General Telephone Corporation-----	83	Nicollet County Telephone & Telegraph Co.-----
Globe Wireless Ltd-----	77	Norfolk & Carolina Telephone & Telegraph Co.-----
Great North Western Telegraph Co. of Canada-----	59, 215	North-West Telephone Co.-----
Greenville Telephone Co.-----	103	North-Western Indiana Telephone Co.-----
Gulf Radio Service (George Collins Warner, Jr.)-----	104	Northern States Power Co. (Delaware)-----
H. M. Byllesby & Co.-----	52	
Hearst Radio, Inc.-----	8	
Home Telephone Co. of Ridgway-----	105	

	<i>Number</i>		<i>Number</i>
Northern States Power Co. (Minnesota)-----	56	Standard Power & Light Corporation-----	53
Northern Telegraph Co-----	50	Telephone Bond & Share Co-----	95
Northwestern Bell Telephone Co-----	30	Telephone Securities, Inc-----	100
Northwestern Telephone Co-----	145	Telephone Utility & Investment Co-----	172
Ohio Associated Telephone Co-----	89	Theodore Gary & Co-----	94
Ohio Bell Telephone Co-----	36	Tidewater Wireless Telegraph Co-----	174
Ohio Telephone Service Co-----	195	Tri-State Associated Telephone Corporation-----	92
Olympic Radio Co-----	146	Tri-State Telephone & Telegraph Co-----	32
Oregon-Washington Telephone Co-----	147	Tropical Radio Telegraph Co-----	177
Oxnard Home Telephone Co-----	148	Two States Telephone Co-----	175
Ozark Central Telephone Co-----	149	Union Telephone Co. (Indiana)-----	198
Pacific Telephone & Telegraph Co-----	37	United Fruit Co-----	176
Palestine Telephone Co-----	150	United States Rubber Co-----	178
Pennsylvania Telephone Corporation-----	90	United States-Liberia Radio Corporation-----	81
Peoples Telephone Co. (Minnesota)-----	35	United States Steel Corporation-----	181
Pere Marquette Radio Corporation-----	6	United Telephone Co. (Delaware)-----	91
Pere Marquette Ry. Co-----	4	United Telephone Co. (Kansas)-----	45
Phillips Petroleum Co-----	151	United Telephone Co. (Missouri)-----	192
Platte Valley Telephone Corporation-----	123	United Telephone Co. (Texas)-----	184
Postal Telegraph-Cable Co. (Land Line System)-----	114	United Telephone Co. (Wisconsin)-----	185
Postal Telegraph & Cable Corporation-----	110	United Telephone Cos., Inc-----	198
Press Wireless, Inc-----	153	United Telephone Co. of Pennsylvania-----	189
Public Utilities California Corporation-----	69	United Telephone & Electric Co-----	186
R. C. A. Communications, Inc-----	155	United Telephone Investment Corporation-----	197
Radio Communications Co., Inc-----	116	United Telephone & Telegraph Co-----	190
Radio Corporation of America-----	154	United Telephone & Telegraph Corporation-----	193
Radiomarine Corporation of America-----	156	Utilities Holding Corporation-----	199
Red River Valley Telephone Co-----	157	Victor-American Fuel Co-----	203
Rio Grande Valley Telephone Co-----	44	Wabash Radio Corporation-----	207
Robert Dollar Co-----	76	Wabash Railway Co-----	205
Rochester Telephone Corporation-----	158	Warner, Jr., George Collins (Gulf Radio Service)-----	104
San Angelo Telephone Co-----	159	West Coast Telephone Co-----	121
Santa Barbara Telephone Co-----	160	West Coast Utilities Corporation-----	120
Santa Paula Home Telephone Co-----	161	Westerly Automatic Telephone Co-----	25
Seattle, City of, harbor department-----	70	Western Arkansas Telephone Co-----	208
Socony-Vacuum Oil Co., Inc-----	162	Western New England Telephone Co-----	26
South Porto Rico Sugar Co. (of Puerto Rico)-----	166	Western Light & Telephone Co-----	209
South Porto Rico Sugar Co. (New Jersey)-----	165	Western Radio Telegraph Co-----	152
Southeast Missouri Telephone Co-----	167	Western Telephone Corporation (Kansas)-----	210
Southern Bell Telephone & Telegraph Co-----	40	Western Telephone Corporation of Nebraska-----	211
Southern California Telephone Co-----	39	Western Telephone Corporation of Oklahoma-----	212
Southern New England Telephone Co-----	168	Western Telephone Corporation of Texas-----	213
Southern Radio Corporation-----	171	Western Union Telegraph Co-----	214
Southwest Telephone Co. (Kansas)-----	169	White River Valley Telephone Co-----	27
Southwestern Associated Telephone Co-----	88	Wisconsin Telephone Co-----	46
Southwestern Bell Telephone Co-----	42	Wyandotte Transportation Co-----	132
Standard Gas & Electric Co-----	54		
Standard Oil Co. (New Jersey)-----	170		

## APPENDIX B

### FIFTH MEETING OF THE INTERNATIONAL CONSULTING COMMITTEE ON TELEGRAPH (C. C. I. T.)

*Table showing position of various governments with respect to the four main proposals on code language*

#### EXTRA-EUROPEAN REGIME

Ordinary telegrams in all languages (clear, code, cipher)	Deferred telegrams (L. C.)	Letter telegrams	Adhering administrations
60 percent of present rate.....	Deleted.....	Present rate.....	Germany, Spain, Finland, Japan, Norway, Poland, Sweden, Switzerland, Czechoslovakia. Austria, Denmark, Great Britain, Iceland, Union Soviet Socialist Republics. France.
¾ (66¾ percent) of present rate.....	Present rate.....	do.....	
Do.....	Deleted.....	½ of new tax on ordinary telegrams.	
Status quo, but application of C. D. E. rate to cipher telegrams is proposed.	.....	.....	Belgium, Hungary, Dutch East Indies, Italy, Netherlands, Portugal.

#### EUROPEAN REGIME

Ordinary telegrams in all languages (clear, code, cipher)	Letter telegrams	Adhering administrations
92 percent of present rate.....	Present rate.....	Germany, Austria, Denmark, Spain, Finland, France, Great Britain, Hungary, Iceland, Italy, Norway, Poland, Sweden, Switzerland, Czechoslovakia. Belgium, Netherlands, Portugal.
Status quo.....	Status quo.....	

NOTE.—For both regimes the minimum of words is established at 5 for ordinary and urgent telegrams in all languages except in the case of countries that desire the status quo. For urgent telegrams (in both regimes) the administrations of Austria, Denmark, Great Britain, Iceland, Poland, and the Union of Soviet Socialist Republics propose a rate of 1½ times the new rate for ordinary telegrams, while the other administrations propose maintaining the present relationship. The rates of press telegrams and meteorological telegrams are to be examined by the Cairo conference. The proposals listed above are not applicable to rates for coastal and mobile stations. The declarations of private enterprises concerning rates are contained in documents Nos. 49, 71, 72, and 96 and in the report of the seventh meeting of the Committee on operations, regulations, and rates.

## APPENDIX C

### AGENDA FOR THE HABANA PRELIMINARY RADIO CONFERENCE

1. Consideration of the possibility and necessity of resolving a new and proper distribution of the channels corresponding to the broadcast band ranging between 550 and 1600 kilocycles, especially with reference to the North and Central American regions and the West Indies, and also of the possibility of determining the assignment of exclusive, shared, and local channels.

2. Examination of the principles regulating the assignment of broadcast bands in the Americas for short-wave bands.

3. Consideration of the convenience of revising the North and Central American agreement, signed in Mexico City in July 1933, and referring to the bands of frequencies from 1500 to 6000 kilocycles.

4. Exchange of opinions concerning the allocation of frequencies in waves below 10 meters and especially concerning interference with those frequencies from an international standpoint.

5. Proposal of measures, even if they are of a temporary nature, which may contribute to the alleviation of the interference situation that is being produced in the nations of North and Central America in relation to the broadcast service in general.

6. Exchange of opinions concerning other problems confronting the Americas in the different features of radio communication, and, if possible, the adoption of practical resolutions, such as the use of directed waves and the proper geographical separation between stations.

7. Proposal of new bases concerning classification and width of bands, classification of stations according to their power, definition of service areas of the different classes of stations, etc.

8. Consideration of the problems presented in the amateur radio bands of 20 and 40 meters. Study of the possibility of extending these bands and, especially, the bands corresponding to those used in the radiotelephone communication.

9. Adoption of practical coordination measures and mutual aid among neighboring nations through radio communication in cases of national calamities, such as floods, earthquakes, hurricanes, etc.

10. Study of what should, in general, be understood in radio communication as "good engineering standards."

11. Examination of the convenience of proposing and considering in a regional conference of the Americas any other matters deemed useful in avoiding the existing conflicts, or those which may appear in the future, in radio communication in the American countries.

12. Consideration of the convenience of calling, for the month of November 1937, and at such place as may be decided upon, a regional radio conference for the purpose of defining and studying, at a meeting of all the American nations, their point of view in connection with the telecommunication conference to be held at Cairo in 1938.

During the course of the conference a thirteenth question was added, reading as follows:

13. Study of means to suppress inductive interference, with special reference to diathermic and similar apparatus.

## APPENDIX D

TABLE I.—*Ship stations—inspections and notices*

District No. and location	Stations inspected				Notices served			
	Ships, under act	Ships, voluntary equipment	Ships, for license	Ships, safety convention <sup>1</sup>	Violation of laws	Violation of rules and regulations	Informative notices	Cleared during inspection
1. Boston, Mass.....	171	204	45	496	155	73	127	19
2. New York, N. Y.....	1,314	125	75	765	169	211	152	171
3. Philadelphia, Pa.....	92	160	41	355	106	59	27	53
4. Baltimore, Md.....	189	247	73	665	242	145	67	101
5. Norfolk, Va.....	33	117	18	119	27	38	31	9
6. Atlanta, Ga.....	0	0	0	10	0	10	0	6
7. Miami, Fla.....	53	21	1	27	9	23	19	30
8. New Orleans, La.....	174	56	32	165	19	56	33	62
9. Galveston, Tex.....	13	147	23	211	12	100	158	71
10. Dallas, Tex.....	0	0	0	0	0	0	0	0
11. Los Angeles, Calif.....	236	207	42	403	73	65	30	107
12. San Francisco, Calif.....	204	104	81	229	23	91	27	45
13. Portland, Ore.....	50	87	16	133	52	35	5	0
14. Seattle, Wash.....	177	88	17	95	4	30	9	226
15. Denver, Colo.....	0	0	0	0	0	0	0	0
16. St. Paul, Minn.....	0	0	0	0	0	0	0	0
17. Kansas City, Mo.....	0	4	0	0	0	0	0	0
18. Chicago, Ill.....	8	2	0	0	0	0	0	0
19. Detroit, Mich.....	29	35	0	0	0	1	0	0
20. Buffalo, N. Y.....	9	17	6	0	0	1	0	0
21. Honolulu, Hawaii.....	123	26	8	130	25	25	4	0
<b>Total.....</b>	<b>2,875</b>	<b>1,647</b>	<b>478</b>	<b>3,803</b>	<b>916</b>	<b>961</b>	<b>689</b>	<b>900</b>

<sup>1</sup> Effective Nov. 7, 1936.

TABLE II.—Land station inspections and frequency measurements

District No. and location	Land-station inspections										Frequency measurements							
	Coastal	Air-craft	Aero-nautical	Police	Special emer-gency	Ma-rine fire	Broad-cast	Ama-teur	Others	Discrep-ancy notices served as result of inspec-tions	United States broadcast		United States other than broadcast		Foreign		Discrep-ancy notices served as result of moni-toring	Har-monic notices served as result of moni-toring
											Meas-ure-ments	Devi-ations	Meas-ure-ments	Devi-ations	Meas-ure-ments	Devi-ations		
1. Boston, Mass.....	6	8	9	43	0	1	107	2	6	53	1,586	10	1,912	194	11	9	348	4
2. New York, N. Y.....	0	80	3	8	0	0	51	14	10	11	0	0	0	0	0	0	0	0
3. Philadelphia, Pa.....	2	19	6	9	2	0	53	11	59	53	0	0	0	0	0	0	0	0
4. Baltimore, Md.....	1	5	8	6	0	0	34	4	12	12	2,117	12	853	50	22	10	161	0
5. Norfolk, Va.....	0	4	5	32	0	0	42	0	6	12	0	0	0	0	0	0	0	0
6. Atlanta, Ga.....	5	18	47	29	4	0	106	4	84	104	1,529	48	1,156	26	31	9	54	15
7. Miami, Fla.....	5	66	17	40	14	0	31	0	19	65	0	0	0	0	0	0	3	1
8. New Orleans, La.....	2	9	20	10	0	0	54	21	8	18	0	0	0	0	0	0	1	0
9. Galveston, Tex.....	10	18	16	10	0	0	16	2	1	4	0	0	0	0	0	0	0	0
10. Dallas, Tex.....	0	45	50	46	0	0	133	4	26	62	0	0	0	0	0	0	1	0
11. Los Angeles, Calif.....	4	51	39	18	14	0	66	4	54	99	1,194	1	1,258	142	92	69	156	7
12. San Francisco, Calif.....	11	28	16	42	3	0	51	7	52	59	0	0	0	0	0	0	6	0
13. Portland, Ore.....	3	5	5	10	0	0	41	4	0	23	1,005	4	4,558	201	21	17	361	5
14. Seattle, Wash.....	5	21	13	37	3	0	52	0	16	28	0	0	0	0	0	0	62	1
15. Denver, Colo.....	0	14	22	4	0	0	51	1	4	20	0	0	0	0	0	0	3	0
16. St. Paul, Minn.....	9	3	11	11	1	0	91	3	11	44	0	0	0	0	0	0	4	0
17. Kansas City, Mo.....	1	31	16	24	0	0	100	9	19	30	0	0	0	0	0	0	0	0
18. Chicago, Ill.....	1	61	31	101	0	0	118	0	3	87	0	0	0	0	0	0	0	0
19. Detroit, Mich.....	16	32	40	48	3	1	107	23	143	86	0	0	0	0	0	0	158	0
20. Buffalo, N. Y.....	3	3	11	22	3	0	98	12	49	30	0	0	0	0	0	0	12	0
21. Honolulu, Hawaii.....	2	3	2	1	0	0	6	0	19	14	0	0	0	0	0	0	51	0
Grand Island, Nebr.....	0	0	0	0	0	0	0	0	0	0	4,697	16	19,814	773	648	42	342	84
Great Lakes, Ill.....	0	0	0	0	0	0	0	0	0	0	3,205	13	2,062	116	23	14	161	11
Total.....	86	522	387	551	47	2	1,408	125	601	914	15,333	104	31,613	1,492	848	170	1,884	128

## APPENDIX E

**TABLE I.—New broadcast stations authorized in fiscal year 1937 (total 51)**

Call letters	Applicant and location	Fre-	Power	Hours of operation
		quency		
KAND.....	Navarro Broadcasting Association, J. C. West, president, Corsicana, Tex.	<i>Kilo-</i> cycles 1310	<i>Watts</i> 100	Daytime.
KATE.....	Albert Lea Broadcasting Corporation, Albert Lea, Minn.	1200	100	Do.
KAWM.....	A. W. Mills, Gallup, N. Mex.	1500	100	Unlimited.
KELO.....	Sioux Falls Broadcast Association, Inc., Sioux Falls, S. Dak.	1200	100	Do.
KGLO.....	Mason City Globe Gazette Co., Mason City, Iowa.	1210	100	Do.
KGVL.....	Hunt Broadcasting Association, Fred Horton, president, Greenville, Tex.	1200	100	Daytime.
KHBG.....	Okmulgee Broadcasting Corporation, Okmulgee, Okla.	1210	100	Do.
KHUB.....	F. W. Atkinson, Watsonville, Calif.	1310	250	Do.
KLAH.....	Barney Hubbs, A. J. Crawford, Jack Hawkins and Harold Miller, doing business as Carlsbad Broadcasting Co., Carlsbad, N. Mex.	1210	100	Unlimited.
KLBM.....	Harold M. Finlay and Mrs. Eloise Finlay, La Grande, Oreg.	1420	100, 250-LS	Daytime.
KOAM.....	A. Stanest Graham, E. V. Baxter and Norman Baxter, doing business as Pittsburg Broadcasting Co., Pittsburg, Kans.	790	1kw	Do.
KOBH.....	Black Hills Broadcast Co., Robert Lee Dean, executive president, Rapid City, S. Dak.	1370	100	Unlimited.
KOCA.....	Oil Capital Broadcasting Association, James G. Ulmer, president, Kilgore, Tex.	1210	100	Do.
KOKO.....	The Southwest Broadcasting Co., La Junta, Colo.	1370	100	Do.
KPFA.....	The People's Forum of the Air, Helena, Mont.	1210	100	Do.
KRIS.....	Gulf Coast Broadcasting Co., Corpus Christi, Tex.	1330	250, 500-LS	Do.
KRMC.....	Roberts MacNab Co., Arthur L. Roberts, R. B. MacNab, A. J. Breitbach, general manager, Jamestown, N. Dak.	1310	100	Simultaneous, day; share, night KVOX.
KROD.....	Dorrance D. Roderick, El Paso, Tex.	1500	100	Unlimited.
KROY.....	Royal Miller, Sacramento, Calif.	1210	100	Daytime.
KSAL.....	R. J. Laubengayer, Salina, Kans.	1500	100	Unlimited.
KSRO.....	The Press Democrat Publishing Co., Santa Rosa, Calif.	1310	250	Daytime.
KSUB.....	Harold Johnson and Leland M. Perry, doing business as Johnson and Perry, Cedar City, Utah.	1310	100	Unlimited.
KTEM.....	Bell Broadcasting Co., Temple, Tex.	1370	100	Daytime.
KTKO.....	Tulare-Kings Counties Radio Associates, Charles A. Whitmore, president, Visalia, Calif.	1190	250	Do.
KTMS.....	The News Press Publishing Co., Santa Barbara, Calif.	1220	500	Unlimited.
KVEC.....	Christiana M. Jacobson, doing business as The Valley Electric Co., San Luis Obispo, Calif.	1200	250	Daytime.
KVGB.....	Ernest Edward Ruehlen, Great Bend, Kans.	1370	100	Unlimited.
KVOX.....	Robert K. Herbst, Moorhead, Minn.	1310	100	Simultaneous, day; share, night Krmc.
KWNO.....	Harry Dahl, Otto M. Schlabach, Maxwell H. White and Hermann R. Wiecking, doing business as Winona Radio Service, Winona, Minn.	1200	100	Daytime.
KWOS.....	Tribune Printing Co., Jefferson City, Mo.	1310	100	Do.
KXOK.....	Star-Times Publishing Co., St. Louis, Mo. (Issues being determined by Court of Appeals.)	1250	1 kw	Unlimited.
KYOS.....	Merced Star Publishing Co., Merced, Calif.	1040	250	Daytime.
WAIR.....	C. G. Hill, George D. Walker and Susan H. Walker, Winston-Salem, N. C.	1250	250	Do.
WBHP.....	Wilton Harvey Pollard, Hunstville, Ala.	1200	100	Unlimited.
WBLK.....	The Exponent Co., Clarksburg, W. Va.	1370	100	Daytime.
WDSM.....	Fred A. Baxter, Superior, Wis.	1200	100	Unlimited.

TABLE I.—New broadcast stations authorized in fiscal year 1937 (total 51)—Con.

Call letters	Applicant and location	Frequency	Power	Hours of operation
WEAU.....	Central Broadcasting Co., Eau Claire, Wis.....	1050	250	Daytime.
WFTC.....	Jonas Weiland, Kinston, N. C.....	1200	100, 250-LS	Unlimited.
WGTM.....	H. W. Wilson and Ben Farmer, Wilson, N. C.....	1310	100	Daytime.
WGVA.....	Glenn Van Auken, Indianapolis, Ind.....	1050	1 kw	Do.
WHAL.....	Harold F. Gross and Edmund C. Shields, Saginaw, Mich.	950	500	Do.
WHIP.....	Hammond-Calumet Broadcasting Corp., Hammond, Ind.	1480	5 kw	Daytime, Buffalo.
WICA.....	C. A. Rowley, Ashtabula, Ohio.....	940	250	Daytime.
WKAT.....	A. Frank Katzentine, Miami Beach, Fla.....	1500	100	Unlimited.
WMBS.....	Fayette Broadcasting Corporation, Union- town, Pa.	1420	250	Daytime.
WOLS.....	O. Lee Stone, Florence, S. C.....	1200	100	Do.
WOMI.....	Owensboro Broadcasting Co., Owensboro, Ky.	1500	100	Unlimited.
WPRA.....	Puerto Rico Advertising Co., Mayaguez, P. R.	1370	100, 250-LS	Specified hours.
WRTD.....	The Times Dispatch Publishing Co., Inc., Richmond, Va.	1500	100	Unlimited.
WSAU.....	Northern Broadcasting Co., Inc., Wausau, Wis.	1370	100	Daytime.
WSNJ.....	Eastern States Broadcasting Corporation, Bridgeton, N. J.	1210	100	Do.

## Broadcast stations deleted in fiscal year 1937 (total 7)

Call letters	Licensee and location	Date of deletion
KELW.....	Evening Herald Publishing Co., Burbank, Calif. (Voluntarily relinquished facilities to Station KEHE, effective Jan. 5, 1937.)	Jan. 5, 1937
KFJR.....	KALE, Inc., Portland, Oreg. (Voluntarily relinquished facilities to Station KALE, effective Feb. 2, 1937.)	Feb. 2, 1937
KFPM.....	Dave Ablowich, trading as The New Furniture Co., Greenville, Tex. (Licensee voluntarily surrendered license Apr. 2, 1935. Application for assignment and renewal for reinstatement filed by Voice of Greenville, dismissed Jan. 26, 1937, effective Mar. 2, 1937.)	Mar. 2, 1937
KGBZ.....	KGBZ Broadcasting Co., York, Nebr. (Application for renewal of license denied. Decision Apr. 7, 1936.)	July 23, 1936
KWEA.....	International Broadcasting Corporation, Shreveport, La. (Application for renewal of license denied July 2, 1936, effective Aug. 1, 1936.)	Aug. 1, 1936
WEHS.....	WEHS, Inc., Cicero, Ill. (Voluntarily relinquished facilities to Station WHFC, effective Nov. 10, 1936.)	Nov. 10, 1936
WKBI.....	WKBI, Inc., Cicero, Ill. (Voluntarily relinquished facilities to Station WHFC, effective Nov. 10, 1936.)	Do.

CHART 1

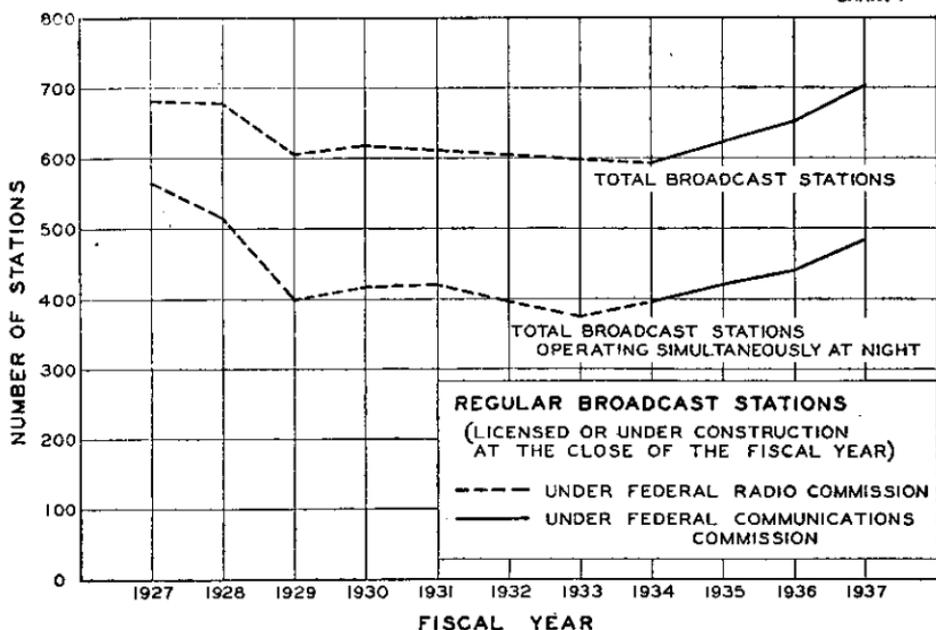
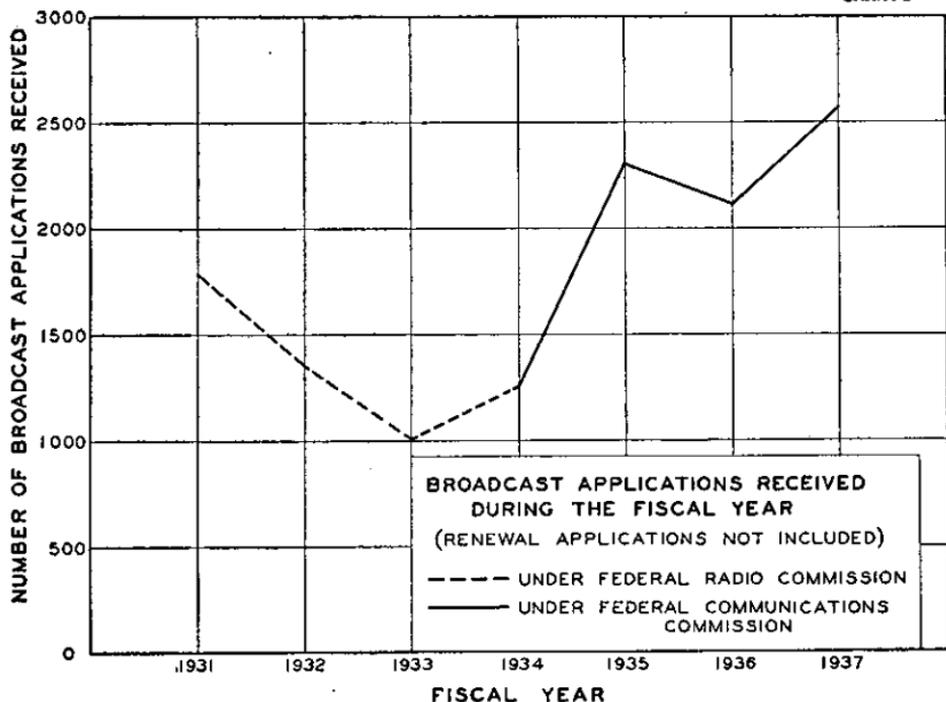


CHART 2



## APPENDIX E

**TABLE II.—Distribution of broadcast facilities to cities according to size**

Size of town	Number of cities in United States	Number of cities with radio stations	Number of stations, including all classes—Unlimited time and others								Total stations for population group	Percentage of total number of stations
			Clear		Regional		Local		Total			
			U	Others	U	Others	U	Others	U	Others		
Under 10,000.....	15, 616	<sup>1</sup> 87	0	0	11	27	36	15	47	42	89	12.7
10,000 to 24,999.....	606	<sup>2</sup> 136	0	1	15	25	57	40	72	66	138	19.7
25,000 to 49,999.....	185	<sup>3</sup> 81	0	1	25	9	38	17	63	27	90	12.9
50,000 to 99,999.....	98	<sup>4</sup> 67	2	4	29	17	22	11	53	32	85	12.2
100,000 to 199,999.....	52	<sup>5</sup> 48	4	4	41	15	24	6	69	25	94	13.4
200,000 to 299,999.....	16	16	3	3	27	7	7	2	37	12	49	7.0
300,000 to 399,999.....	7	7	3	1	14	7	1	4	18	12	30	4.3
400,000 to 499,999.....	5	5	3	1	8	4	1	2	12	7	19	2.7
500,000 and over.....	13	13	17	5	32	30	10	12	59	47	106	15.1
<b>Total.....</b>	<b>16, 598</b>	<b><sup>6</sup> 460</b>	<b>32</b>	<b>20</b>	<b>202</b>	<b>141</b>	<b>196</b>	<b>109</b>	<b>430</b>	<b>270</b>	<b>700</b>	<b>100.0</b>

<sup>1</sup> 3 cities in Alaska.

<sup>2</sup> 1 city in Hawaiian Islands.

<sup>3</sup> 1 city in Puerto Rico.

<sup>4</sup> 1 city in Puerto Rico.

<sup>5</sup> 1 city in Hawaiian Islands and 1 city in Puerto Rico.

<sup>6</sup> In the continental United States there are 982 cities above 10,000, of which 614 have no stations and 368 cities have stations. However, from the tabulation of stations in cities of various population groups we have 373 cities above 10,000, with radio stations. This includes 5 outside the continental limits of the United States. These are: Hilo, Territory of Hawaii, with a population of 19,468; Mayaguez, P. R., with a population of 37,990; Ponce, P. R., with a population of 53,430; San Juan, P. R., with a population of 114,715; Honolulu, Territory of Hawaii, with a population of 137,582.

TABLE III.—Distribution of broadcast stations of all classes to States and possessions

State or possession	Clear			Regional					Local				Totals					
	Unlimited time	Share time	Total	Unlimited time	Daytime		Limited time (clear)	Share time and specified hours	Total	Unlimited time	Day-time	Share time and specified hours	Total	Unlimited time	Day-time	Limited time	Share time and specified hours	Total
					Clear	Regional												
Alabama		1	1	3					3	4	4		8	7	4		1	12
Alaska				1				1	2	1			1	2			1	3
Arizona				3					3	3		1	4	6			1	7
Arkansas		1	1	2		2			4	3	2		5	5	4		1	10
California	2		4	23	5		3	2	33	10	4	2	16	37	9	3	4	53
Colorado	1		1	3				2	7	3		3	6	7			7	14
Connecticut	1	1	1	3		2	1	4	6	1	1		2	4	3	1	1	9
Delaware				1					1			1	1	1			1	2
District of Columbia				4					4				4	4				4
Florida				7			1		8	7			7	14		1		15
Georgia	1		1	3			1		4	6	2		8	10	2	1		13
Hawaiian Islands				2			1		3				2	2		1		3
Idaho				5					5	1			1	6				6
Illinois	3	3	6	2	1	3	3	1	10	5	2	8	15	10	6	3	12	31
Indiana		1	1	3	1	1		3	8	6	1	3	10	9	3		7	19
Iowa	1		1	6	1			3	10	3		1	4	10	1		4	15
Kansas				2	1		1	5	9	6			6	8	1	1	5	15
Kentucky	1		1	2				2	2	4			4	7				7
Louisiana		2	2	4				4	4	5		2	7	9			4	13
Maine				2			1		3	2		1	3	4		1	6	
Maryland		1	1	2		1	1		4	1	1		2	3	2	1	7	
Massachusetts	1		1	15	1	2	1		11	4			12	3	1		16	
Michigan	1		1	4	1	1		2	8	9		3	12	14	2		5	21
Minnesota	1		1	2			1	3	6	6	2	1	9	9	2	1	4	16
Mississippi				2		1			3	5			5	7	1			8
Missouri	1		1	6	3	1		3	13	3	1	1	5	10	5		4	19
Montana				5					5	3			3	8				8
Nebraska		1	1	2	1	1	2		6	3			3	5	2	2	1	10

<sup>1</sup> Includes KTHS, 1040 kc, S-KRLD S. A. Exp-Simul. Day with WBAL, 1060 kc, S. H.-N.

<sup>2</sup> Includes KGO, 790 kc, 7½ kw, U.

<sup>3</sup> Includes WTIC, 1030 kc, S-WBAL S. A. Expt.-1040 kc, Simul.-KRLD.

<sup>4</sup> Includes WCFL, 970 kc, 5 kw, U.

<sup>5</sup> Includes WBBM, 770 kc, Simul. Day, S-KFAB-N S. A. Exp.-Synchronize KFAB-N.

<sup>6</sup> Includes WCBD, L-WBT, S-WMBI and WMBI, L-WBT, S-WCBD.

<sup>7</sup> Includes WCAZ, 100 w, Day, Clear.

<sup>8</sup> Includes KGCA, D-S-KWLC and KWLC, D-S-KGCA.

<sup>9</sup> Includes WWL, 850 kc, S. H. (KWKH); S. A. Exp.-U and KWKH, 850 kc, S. H. (WWL); S. A. Exp.-U, 1100 kc.

<sup>10</sup> Includes WBAL, 1060 kc, S-WTIC S. A. Exp.-Simul. Day with KTHS, 1060 kc. S. H. to 9 p. m., Synchronize with WJZ, 760 kc, from 9 p. m.

<sup>11</sup> Includes WJEJ, 1210 kc, 100 w, Day; \*\* S. H.-N with 50 w.

<sup>12</sup> Includes WBZ, 990 kc, 50 kw, Synchronize with WBZA.

<sup>13</sup> Includes WBZA, 990 kc, 1 kw, Synchronized with WBZ.

<sup>14</sup> Includes KFAB, 770 kc, Simul. Day, S-WBBM-N S. A. Exp.-Synchronize WBBM-N.

TABLE III.—Distribution of broadcast stations of all classes to States and possessions—Continued

State or possession	Clear			Regional					Local				Totals					
	Unlimited time	Share time	Total	Unlimited time	Daytime		Limited time (clear)	Share time and specified hours	Total	Unlimited time	Day-time	Share time and specified hours	Total	Unlimited time	Day-time	Limited time	Share time and specified hours	Total
					Clear	Regional												
Nevada				1					1					1				1
New Hampshire				1	1				2					2				3
New Jersey	1	1	2	1		1		5	7		1	1	2	2	2		7	11
New Mexico		1	1	1					1	3		2	5	4			3	7
New York	5	1	6	10	3	2	1	11	27	7	1	8	16	22	6	1	20	49
North Carolina	1		1	2		1	1	1	4	5	3	1	9	8	4	1	1	14
North Dakota				3				2	5	3		3	6	6			2	8
Ohio	2		2	8		2	1	3	14	6	1	7	16	3	1		3	23
Oklahoma		1	1	4				1	5	7	1	8	11	1			2	14
Oregon		1	1	5			1		6	5	1	2	8	10	1	1	3	15
Pennsylvania	3		3	6	1	1		7	15	7	16	10	19	16	4		17	37
Puerto Rico				2				2	2			2	2	2			2	4
Rhode Island				3				3	3			3	3				3	3
South Carolina				3		1		4		1	1	2	4	2			6	6
South Dakota				1		1	1	3	6	4		1	5	5	1	1	4	11
Tennessee	1		1	6				6	6	5	1	6	12	1			13	13
Texas	1	17	4	11		1		13	16	10	18	30	28	11			8	47
Utah	1		1	2				2	2	3		3	6				6	6
Vermont								1	3			2	2				3	5
Virgin Islands														2				5
Virginia	1		1	3		2		5	4		2	6	8	2			2	12
Washington	1		1	8		1	2	2	13	6		8	15	1	2	4	22	
West Virginia		1	1	3		3	1	4	4	1	1	2	4	1	1	1	7	7
Wisconsin				6	1	2		9	7	2		9	13	5			18	18
Wyoming				1				1	1	1		1	2				2	2
Total	32	20	52	202	21	35	25	63	343	196	45	64	305	430	98	25	147	700

<sup>13</sup> Includes WPTF, L-KPO S. A. Exp. to 11 p. m. EST.<sup>14</sup> Includes WIBG, 100 w. Day, Clear.<sup>15</sup> Includes KRLD, S-KTHS S. A. Exp.-Simul. with WTIC.<sup>16</sup> Includes KTSM, S-WDAH Permanent authority to carry WDAH's schedule.<sup>17</sup> Includes WNBX, D-LS at Erie, Pa. S. A. Exp.-U.<sup>18</sup> Includes KJR, 970 kc, 5 kw, U.<sup>19</sup> Includes KIRO, 650 kc, L-WSM S. A. Exp.-710 kc, U.

## APPENDIX F

*New stations authorized during the year, stations deleted, and total at close of year*

Nature of service and class of station	New stations authorized	Stations deleted	Total number of stations, June 30, 1937
Agriculture: Point-to-point telegraph.....	0	0	7
Amateur: Amateur.....	4,511	1,617	47,444
<b>Aviation:</b>			
Aeronautical.....	57	6	298
Aeronautical point-to-point.....	28	2	133
Aircraft.....	500	237	734
Airport.....	21	1	43
Obstruction-marker beacon.....	1	1	4
<b>Broadcast:</b>			
Regular.....	51	7	704
High frequency <sup>1</sup> .....	11	1	40
Television <sup>2</sup> .....	3	0	18
Facsimile.....	1	0	5
Experimental.....	4	0	13
<b>Emergency:</b>			
Marine fire.....	2	1	3
Police, municipal.....	71	12	302
Police, State.....	44	9	136
Police, zone.....	14	0	14
Police, interzone.....	14	0	14
Special emergency.....	17	8	66
<b>Experimental:</b>			
General experimental.....	785	229	1,833
Special experimental.....	65	36	138
<b>Fixed public:</b>			
Point-to-point telegraph.....	33	14	439
Point-to-point telephone.....	58	7	199
Fixed public press: Point-to-point telegraph.....	0	0	75
Geophysical: Geophysical.....	49	27	201
Marine relay: Marine relay.....	0	2	40
Mobile press: Mobile press.....	0	0	5
<b>Public coastal:</b>			
Coastal telegraph.....	4	10	101
Coastal telephone.....	2	1	4
Coastal harbor.....	31	0	79
<b>Private coastal:</b>			
Coastal telegraph.....	0	0	3
Coastal harbor.....	1	1	2
Ship: Ship.....	335	162	2,193
<b>Temporary:</b>			
Relay broadcast.....	44	1	102
Experimental relay broadcast.....	96	7	228
Motion picture.....	5	1	8
<b>Total.....</b>	<b>6,858</b>	<b>7,400</b>	<b>55,628</b>

<sup>1</sup> Total eliminations—offset considerably by delayed renewals, etc.

<sup>2</sup> Does not include new stations authorized and deletions for period July 1, 1936, to September 15, 1936.

## APPENDIX H

### Amateur

Amateur radio applications, licences, and call assignments continued in number to exceed greatly those of all other classes combined. Special effort was made to bring action on the applications current. Except for those held over under the provisions of section 307 (e) of the act, virtually every application was handled that had reached the Commission by the morning of June 30.

#### Amateur radio applications

<i>Receipts:</i>	
Pending July 1, 1936-----	717
Received during the fiscal year-----	33, 433
	34, 150
<i>Disposals:</i>	
Approved-----	21, 697
Returned to applicants-----	6, 234
Referred to other Federal agencies, etc-----	395
Failed required examinations-----	5, 288
	33, 614
Pending, close of fiscal year, June 30, 1937-----	536
Held by law—section 307 (e) of the act-----	284
Held by special cause-----	10
Licenses pending approval-----	145
Applications received June 30, 1937, awaiting grading of examinations-----	33
Other applications received June 30, 1937-----	64
	536

Ordinarily the applications for both operator and station licenses were submitted on a joint application form, and the two were counted as one. On the other hand, a much smaller number of returned and referred applications were received and counted a second time. Many of the applications were for the renewal of expiring licenses or for modifications on account of changed location. Of those involving an examination for operator license or change in class of operating privileges a substantially larger portion failed than during the previous year. This was particularly true of code tests, in which the required speed had been increased from 10 to 13 words per minute just before the fiscal year began.

#### Amateur Examinations

Nature	Number	Passed	Failed	Percent failed
Code tests-----	8, 580	5, 640	2, 940	34
Written tests:				
Class A envelope <sup>1</sup> -----	2, 400	1, 727	673	28
Class B envelope <sup>1</sup> -----	3, 754	2, 697	1, 057	28
Class C envelope-----	1, 782	1, 311	471	26
Abridged (rules 405-406)-----	684	507	177	26
Total-----	8, 620	6, 242	2, 378	28

<sup>1</sup> In 238 instances the examination included both A and B envelopes.

The operator and station licenses actually issued are separately counted, including the reissues, for the purpose of keeping together on joint-card form the amateur's operator and station licenses. All issues exceeded 100 per day.

#### Amateur radio authorizations

<i>Station licenses:</i>	
New-----	4, 511
Renewed-----	7, 343
Modified and reissued-----	7, 335
	19, 189
Operator licenses-----	19, 108
Operator license endorsements-----	1, 792
Duplicates of lost or destroyed licenses-----	686
	21, 586
Total-----	40, 775

Regulations governing radio amateurs were amended during the year in several particulars in order to aid examination, operation, and regulation. Due to infractions of the regulations, the licenses of three amateur operators were suspended, two amateur station licenses were revoked, and eight individuals were debarred from examination for periods from 6 months to 2 years. In much larger numbers licenses were deleted from the records following expiration, or because of the cancelation of surplus issues, but renewals together with other issues caused a net increase in the total number valid of record.

*Amateur station licenses valid of record*

Valid at close of fiscal year 1936-----	46,850
Plus:	
Expired but not deleted June 30, 1936-----	2,700
New issues, fiscal year 1937-----	4,511
	7,211
	54,061
Less eliminations, fiscal year 1937:	
Revocations-----	2
Cancelations-----	141
Deletions-----	5,138
Expirations (renewal yet possible)-----	1,336
	6,617
Valid of record at close of fiscal year 1937-----	47,444

The year was one of unusual service and recognition for amateur radio. Two annual awards were inaugurated for recognition of outstanding individuals. Amateurs continued their record of public service during emergencies, notably during the Ohio Valley flood. During the height of the flood the Commission was informed that the only contact with many flooded areas was by amateur radio and ordered that until the emergency passed the lower bands of frequencies assigned to amateurs be reserved for their communication relating to relief work or other emergency items.

The opportunity for public service by amateurs is enhanced by their number and wide distribution. Wherever the flag flies, there are likely to be radio amateurs maintaining communication that may become vital in times of emergency. As of June 30, 1937, the record of 47,444 amateur station licenses indicates their distribution (in round figures) as follows:

*Amateur stations June 30, 1937*

State, etc.	Stations	State, etc.	Stations
Alabama-----	375	Nebraska-----	475
Alaska-----	191	Nevada-----	67
Arizona-----	335	New Hampshire-----	230
Arkansas-----	310	New Jersey-----	2,575
California-----	5,800	New Mexico-----	114
Colorado-----	470	New York-----	4,950
Connecticut-----	890	North Carolina-----	470
Delaware-----	81	North Dakota-----	240
District of Columbia-----	235	Ohio-----	2,780
Florida-----	750	Oklahoma-----	530
Georgia-----	390	Oregon-----	900
Guam-----	9	Pennsylvania-----	3,150
Hawaii-----	263	Puerto Rico-----	43
Idaho-----	280	Rhode Island-----	330
Illinois-----	3,200	South Carolina-----	180
Indiana-----	1,060	South Dakota-----	230
Iowa-----	925	Tennessee-----	380
Kansas-----	750	Texas-----	1,625
Kentucky-----	330	Utah-----	265
Louisiana-----	320	Vermont-----	109
Maine-----	500	Virginia-----	450
Maryland-----	500	Virgin Islands-----	8
Massachusetts-----	2,625	Wake-----	2
Michigan-----	1,680	Washington-----	1,300
Minnesota-----	885	West Virginia-----	290
Mississippi-----	185	Wisconsin-----	1,030
Missouri-----	1,025	Wyoming-----	121
Montana-----	320		

## RADIO OPERATORS, PROFESSIONAL CLASSES

There is maintained in the Commission a central record of licenses of the various professional classes required to qualify as radio operators for service at any of the numerous kinds of transmitting stations operated by commercial interests. Nearly 30,000 individuals hold such licenses.

To permit quick service in connection with sea, air, and land stations, the licensing in such cases is to a large extent decentralized, with 22 offices of issue, including Washington. Examinations, failures, license issues, renewals, endorsements, etc., are reported for posting on the one complete record.

During the fiscal year 18,389 such reports were received for record. A large number of the licenses were for radiotelephone third-class operators, for which licenses the requirements are relatively simple. These licenses authorize the radiotelephone operators on aircraft and the majority of the shift operators at police transmitters.

APPENDIX J

TABLE I.—Applicants for radio operator licenses examined

District number and location	Commercial							Amateur except class C	
	First telegraph	Second telegraph	Third telegraph	First telephone	Second telephone	Third telephone	Code test only	Class A	Class B
1. Boston, Mass.	21	132	2	142	8	783	160	180	500
2. New York, N. Y.	38	131	15	208	22	874	171	438	1,144
3. Philadelphia, Pa.	5	66	2	52	11	459	63	125	373
4. Baltimore, Md.	6	21	9	52	25	157	55	35	104
5. Norfolk, Va.	8	19	4	35	8	90	23	66	104
6. Atlanta, Ga.	2	27	6	55	9	104	27	90	111
7. Miami, Fla.	14	99	17	58	31	354	17	51	73
8. New Orleans, La.	13	106	14	86	10	138	54	45	74
9. Galveston, Tex.	3	46	6	38	4	50	58	32	68
10. Dallas, Tex.	3	52	26	113	33	417	50	140	318
11. Los Angeles, Calif.	23	106	20	219	26	756	109	220	424
12. San Francisco, Calif.	17	61	17	107	64	422	67	130	311
13. Portland, Oreg.	8	24	0	47	7	146	26	52	114
14. Seattle, Wash.	14	45	20	54	8	358	41	94	102
15. Denver, Colo.	1	7	6	47	31	100	20	47	100
16. St. Paul, Minn.	4	10	7	65	13	74	18	77	173
17. Kansas City, Mo.	1	32	27	368	30	252	224	206	229
18. Chicago, Ill.	7	92	21	223	41	763	144	297	531
19. Detroit, Mich.	7	77	17	168	56	530	91	327	779
20. Buffalo, N. Y.	2	67	6	111	20	143	32	152	524
21. Honolulu, Territory of Hawaii	5	12	2	9	1	18	8	28	78
Total	202	1,232	244	2,257	457	6,988	1,458	2,841	6,234

TABLE II.—Operators licensed except amateur

District number and location	Commercial																
	Extra first	First telegraph	First telegraph with first telephone endorsement	First telegraph with second telephone endorsement	First telegraph with third telephone endorsement	Second telegraph	Second telegraph with first telephone endorsement	Second telegraph with second telephone endorsement	Second telegraph with third telephone endorsement	Third telegraph	Third telegraph with first telephone endorsement	Third telegraph with second telephone endorsement	Third telegraph with third telephone endorsement	Telephone first	Telephone second	Telephone third	Telephone third with telegraph endorsement
1. Boston, Mass.	0	129	55	0	0	103	50	0	0	1	0	0	0	142	7	917	8
2. New York, N. Y.	0	296	114	7	2	57	71	2	2	12	6	-1	1	212	24	1,144	0
3. Philadelphia, Pa.	0	49	28	2	-1	51	28	3	3	-1	3	0	0	68	12	471	7
4. Baltimore, Md.	0	82	48	2	0	17	16	1	-2	7	0	1	0	85	21	216	0
5. Norfolk, Va.	0	34	5	0	0	0	11	1	0	0	0	0	0	50	3	101	0
6. Atlanta, Ga.	0	11	12	1	0	4	22	3	0	2	-1	0	1	92	8	140	0
7. Miami, Fla.	0	39	21	1	0	54	22	1	3	4	3	4	-2	40	16	331	0
8. New Orleans, La.	0	111	55	1	0	47	43	4	2	7	3	0	0	91	6	116	8
9. Galveston, Tex.	0	60	8	0	0	35	17	6	0	5	5	3	0	31	2	46	0
10. Dallas, Tex.	0	8	14	-1	0	7	36	6	1	5	4	4	0	125	13	406	0
11. Los Angeles, Calif.	1	78	53	3	1	32	83	3	2	6	4	3	0	190	35	756	0
12. San Francisco, Calif.	0	182	37	1	0	50	23	2	0	5	8	0	0	125	85	496	0
13. Portland, Oreg.	0	34	10	0	0	11	17	-1	0	0	0	0	0	58	20	143	0
14. Seattle, Wash.	0	68	22	1	0	50	13	1	0	10	1	0	3	69	19	382	0
15. Denver, Colo.	0	3	6	0	0	1	12	1	0	2	1	0	0	75	41	121	1
16. St. Paul, Minn.	0	5	8	0	0	3	24	3	0	0	3	-1	0	76	9	82	0
17. Kansas City, Mo.	0	3	21	3	0	6	48	3	1	1	4	1	3	337	27	286	0
18. Chicago, Ill.	0	23	40	3	0	33	92	5	1	6	7	1	1	171	45	698	0
19. Detroit, Mich.	0	21	40	0	0	32	61	7	0	-1	5	2	2	201	43	582	0
20. Buffalo, N. Y.	0	9	13	0	0	-1	33	0	0	3	1	2	-1	96	13	142	0
21. Honolulu, Territory of Hawaii	0	20	8	0	0	11	3	1	1	0	0	0	-1	0	0	16	5
Total	1	1,265	618	24	2	603	725	46	11	70	53	21	7	2,340	449	7,592	29

## APPENDIX K

### TABLE I.—*Transatlantic telephone service*

	Number of paid messages in both directions										
	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937 <sup>1</sup>
Great Britain.....	2,296	5,646	7,987	7,265	8,657	6,625	7,209	7,647	9,209	15,453	10,827
France.....		2,890	4,686	4,369	4,519	2,983	2,859	2,214	2,429	4,322	3,228
Germany.....		851	1,200	1,115	1,521	806	881	649	680	1,433	982
Switzerland.....		72	287	251	505	510	580	296	361	593	445
Italy.....			38	243	320	244	326	268	323	452	429
Holland.....		146	182	169	277	125	205	148	205	527	335
Sweden.....		42	64	74	184	367	109	83	84	176	121
Spain.....		40	185	518	1,152	720	264	108	146	161	39
All others <sup>2</sup> .....		204	426	635	672	524	666	650	846	1,371	978
<b>Total.....</b>	<b>2,296</b>	<b>9,891</b>	<b>15,055</b>	<b>14,639</b>	<b>17,807</b>	<b>12,904</b>	<b>13,099</b>	<b>12,063</b>	<b>14,283</b>	<b>24,488</b>	<b>17,884</b>

<sup>1</sup> 6 months.

<sup>2</sup> These include 17 countries and territories in Europe and 16 countries and territories reached via Europe.

### TABLE II.—*International radiotelephone circuits as of June 30, 1937*

Circuit terminals	Statute miles	Service date
<i>North America to Europe</i>		
(1) New York to London (long-wave).....	3,448	Jan. 7, 1927
(2) New York to London.....	3,448	June 6, 1928
(3) New York to London.....	3,448	June 1, 1929
Montreal to London.....	3,246	July 11, 1932
New York to Paris.....	3,610	Dec. 1, 1936
<i>North America to South America</i>		
New York to Buenos Aires.....	5,327	Apr. 3, 1930
New York to Rio de Janeiro.....	4,849	Dec. 18, 1931
New York to Lima.....	3,679	Oct. 14, 1932
Miami to Bogota.....	1,514	Dec. 22, 1932
Miami to Caracas.....	1,362	Dec. 19, 1932
Miami to Barranquilla.....	974	Nov. 8, 1934
<i>North America to Asia and to Oceania</i>		
San Francisco to Honolulu.....	2,393	Dec. 23, 1931
San Francisco to Manila.....	6,969	Mar. 30, 1933
San Francisco to Tokyo.....	5,133	Dec. 8, 1934
San Francisco to Shanghai.....	6,200	May 19, 1937
San Francisco to Bandoeng.....	9,101	Feb. 1, 1934
<i>North America</i>		
New York to Hamilton (Bermuda).....	795	Dec. 21, 1931
Miami to Tegucigalpa (Honduras).....	919	Apr. 23, 1935
Miami to Managua (Nicaragua).....	1,002	June 7, 1933
Miami to San Jose (Costa Rica).....	1,120	Mar. 20, 1933
Miami to Panama.....	1,161	Feb. 24, 1933
Miami to Nassau.....	175	Dec. 16, 1932
Miami to Guatemala.....	1,017	Apr. 17, 1933
Miami to Trujillo.....	833	Oct. 31, 1935
Miami to Kingston.....	576	Apr. 3, 1936
Miami to San Juan.....	1,034	Feb. 20, 1936
Miami to San Salvador.....	1,012	June 10, 1936
Trujillo to San Juan.....	251	Sept. 4, 1936

CHART 1

## OVERSEAS POINT TO POINT RADIOTELEPHONE SERVICE ANNUAL MESSAGES

NOTE: 1937 MESSAGES ARE ESTIMATED ON BASIS OF SIX MONTHS ACTUAL

