ELEVENTH ANNUAL REPORT

FEDERAL COMMUNICATIONS COMMISSION

FISCAL YEAR ENDED JUNE 30, 1945

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[As of January 1, 1946]

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(Term expires June 30, 1952)

LETTER OF TRANSMITTAL

FEDERAL COMMUNICATIONS COMMISSION,
Washington 25, D. C., April 3, 1946.

To the Congress of the United States:

In accordance with the requirements of section 4 (k) of the Communications Act, the Eleventh Annual Report of the Federal Communications Commission for the fiscal year ending June 30, 1945, is submitted herewith.

Respectfully,

CHARLES R. DENNY, *Acting Chairman.*

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SUMMARY

Most far-reaching of all the activities of the Federal Communications Commission during the fiscal year was its reallocation of bands of frequencies in the radio spectrum to provide for the postwar development of new services and the expansion of existing ones. This was made possible by the extension of the usable spectrum space from a prewar ceiling of 300 to 30,000 megacycles through wartime inventions developed to meet military needs. Even with the addition of this space, the demand for channels still exceeded the supply, indicating the vast amount of radio activity that may be expected in the postwar era.

Channels were allocated for FM, television, facsimile, rural telephone systems, railroads, buses, trucks, autos, radar, personal walkie-talkie, and many other types of radio service.

Standard broadcasting profits continued to rise. Total net income of stations and networks (reported for the calendar year of 1944) before Federal income tax, was up 35 percent over the preceding year. Concerned over the high prices being paid for stations, the Commission called the matter to the attention of the Congress. At the end of the fiscal year, 931 standard stations, 46 FM stations and 6 television stations were on the air.

Reductions in interstate rates on calls beyond 790 miles negotiated by the Commission with the American Telephone & Telegraph Co. will save users $21,000,000 annually. An annual saving of $2,000,000 will result from the Commission's order prohibiting surcharges by hotels on interstate telephone calls. Construction of $70,000,000 worth of wire telephone facilities was approved—an increase of 85 percent over last year.

Substantial reductions were made in various overseas radiotelephone rates and some new overseas radiotelegraph circuits were established. Following in the wake of United Nations victories, radiotelegraph circuits were re-established between the United States and France, Belgium, Netherlands, Norway, Czechoslovakia, and other European countries. Effective May 1, 1945, a uniform 20-cent per word rate was established for telegraph service to Europe, Central America, West Indies, Latin America, and the Philippine Islands reducing prewar rates which had ranged as high as 36 cents per word to Europe and 48 cents to Latin America.

Experimentation in radio and electronics reached a new high due to the pressure of military demands and the availability of Federal funds for research. Experimental authorizations by the Commission totaled 1,143—a 100-percent increase over the previous year. There is active experimentation in the operation of radio relay systems for the transmission of standard broadcast, FM and television programs, facsimile and telegraph messages as well as in the use of two-way radio for land, marine, and air mobile units.

In the course of enforcing regulations to promote the safety of life and property at sea, Commission inspectors made 15,731 ship inspections, served 9,391 violation notices. The Commission examined 64,260 applicants for commercial radio operators licenses, issued 61,038 licenses.

The Commission's technical research program includes its 7-year-old recording project to determine the effect of the sunspot cycle on standard broadcast reception, studies of sky-wave interference in the very high frequencies—bursts, Sporadic–E layer reflections and F2 layer reflections, and other vagaries of propagation at these frequencies.

The Radio Intelligence Division (RID), established in 1940 particularly to monitor the ether lanes for wartime espionage transmissions and to guard communications vital to the war from interference, discovered 46 unlicensed stations, investigated 1,445 complaints of suspicious transmission or interference and furnished directions to 283 lost planes, many of them military craft.

The Foreign Broadcast Intelligence Service continued the work started in 1941 of monitoring several million words of text broadcast by foreign stations daily and transmitting significant portions to our Government and allied governments. At the end of the fiscal year, listening posts were being maintained at Silver Hill, Md.; Portland, Oreg.; the Island of Kauai of the Hawaiian Islands and Guam. The FBIS also had access to monitored material of the British Broadcasting Co.

HIGHLIGHTS OF ACTIVITIES JUNE 30, 1945, TO JANUARY 1, 1946

In the 6-month interval from the close of the fiscal year to January 1, 1946, the Commission made substantial progress in its reconversion program for communications in the postwar era.

The "freeze" on new broadcasting construction was lifted in October. The postwar pattern for the immediate development of FM and television was completed with the issuance of rules, standards of good engineering practice, and plans allocating the frequencies over the Nation. At the close of the calendar year, the Commission had issued conditional grants to 230 of nearly 750 applicants for FM channels, had on file 520 standard and 150 television applications. Indicative of the vast number of conflicting claims of various applicants was the Commission's action of December 5 scheduling 271 public hearings for the first 3 months of 1946.

The new Railroad Radio Service was authorized on a regular basis. Experimental licenses were being issued for the General Mobile Service. The first experimental license for the civilian use of radar was issued December 13. Amateurs returned to the air on certain bands on November 15.

Another major rate reduction negotiated by the Commission with the AT&T effective February 1, 1946, is expected to result in a $20,000,000 annual saving for telephone users. Commission representatives participated in the United States-British Commonwealth Telecommunications Conference at Bermuda which resulted in arrangements for sharply reduced rates between the United States and British points throughout the world, expected to go into effect by April 1, 1946. In addition, arrangements were made for the establishment of a number of new radio circuits and retention of existing wartime circuits to certain British points. Since the end of the war new radiotelegraph circuits, operating at reduced rates, have been opened to various Far Eastern points formerly held by the Japanese.

The Foreign Broadcast Intelligence Service was transferred at the end of the year to the War Department.

CHAPTER I

General

1. ADMINISTRATION
2. COMMISSION MEMBERSHIP CHANGES
3. STAFF ORGANIZATION
4. PERSONNEL
5. APPROPRIATIONS
6. LEGISLATION
7. LITIGATION
8. DOCKETS
9. INTERNATIONAL
10. INTERDEPARTMENT RADIO ADVISORY COMMITTEE
11. FREQUENCY ALLOCATION

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CHAPTER I—GENERAL

1. ADMINISTRATION

There were no significant administrative changes during the fiscal year.

2. COMMISSION MEMBERSHIP CHANGES

Paul A. Porter was given a recess appointment as Chairman of the Commission by the President on December 21, 1944, to fill the unexpired term of James Lawrence Fly, who resigned on November 15, 1944. Mr. Porter's nomination as Chairman was confirmed by the Senate January 18, 1945. Commissioner E. K. Jett was designated by the President to serve as Interim Chairman from November 16, 1944, until Mr. Porter's recess appointment.

On March 30, 1945, Charles R. Denny was sworn in as Commissioner to succeed T. A. M. Craven, whose term expired June 30, 1944.

On July 23, 1945, William H. Wills was sworn in as Commissioner, to succeed Norman S. Case, whose term expired June 30, 1945.

3. STAFF ORGANIZATION

The Commission's organization consists of four operating departments: Engineering Department, Law Department, Accounting Department, Foreign Broadcast Intelligence Service. There are four staff service units: The Office of the Secretary, Information Office, Personnel Office, and the Budget and Planning Office.

An Administrative Board comprising the General Counsel, Chief Engineer, Chief Accountant and Secretary acts on matters delegated to it by the Commission. A Rules Committee initiates, considers proposals for new or revised rules, regulations, forms and procedures, and advises the Commission with respect to such matters.

4. PERSONNEL

At the close of the fiscal year, the Commission personnel totaled 1,513, of whom 784 were in Washington and 729 in the field (151 outside the continental United States). The total number of employes in the Engineering Department was 700, Law Department 68, Accounting Department 119, Foreign Broadcast Intelligence Service 331, and Administrative 295.

5. APPROPRIATIONS

For the fiscal year, the Commission was appropriated a total of $6,312,343. Of this amount, $2,104,500 was for its regular activities; $4,191,143 for its war activities, and $16,700 for printing and binding.

6. LEGISLATION

No legislation amending the Communications Act of 1934, as amended, or directed to the functions of the Commission was passed during the fiscal year. However, extensive hearings were held before the Senate Committee on Interstate Commerce, pursuant to Senate Resolution 187, Seventy-eighth Congress, second session, authorizing a study of international communications by wire and radio, on the subject of merger of international wire and radio carriers. The Commission cooperated with the committee in these proceedings, and in hearings held before the committee during March and April, 1945, representatives of the Commission furnished testimony and extensive data. On April 3, 1945, the hearings were adjourned subject to the call of the chairman of the committee.

7. LITIGATION

At the beginning of the fiscal year two cases involving the Commission were pending in the Court of Appeals for the District of Columbia and during the year four additional cases involving the Commission were filed in that court. Of the two that were pending, one was dismissed by the court on motion of the Commission, and the Commission's action was upheld in the other. With respect to the four cases filed during the year, two were dismissed and two are still pending. Review of one of the cases dismissed in the court of appeals has been granted by the United States Supreme Court and is pending in that court.

At the beginning of the fiscal year there were also five cases involving the Commission pending in the district courts of the United States. Of these, judgment for the Commission was rendered in four cases; two of which were appealed to the Supreme Court, which affirmed the judgments below. In the other district court case the court ruled against the Commission, and this case is now pending in the Supreme Court on appeal by the Commission.

Included in the above litigation were the following cases of particular interest:

New York Telephone Co. v. *United States.*—In this action, which was one of the five cases pending in the district courts at the beginning of the fiscal year, the New York Telephone Co. sought to have set aside an order of the Commission of December 14, 1943, made after extensive hearings, requiring the New York Telephone Co. to make certain adjustments in its accounts. These adjustments relate to certain transactions between the company and its parent corporation, American Telephone & Telegraph Co., under which the New York Telephone Co. acquired from the American Telephone & Telegraph Co. properties at a price in excess of original cost to American Telephone & Telegraph Co. less accrued depreciation. The New York Telephone Co. recorded these transactions by entering in its books the prices charged to it by American Telephone & Telegraph Co. The Commission disapproved this accounting, holding that in transfers of property between parent and affiliate the book figures of the parent company for the property in question should have been used by the affiliate. The New York Telephone Co. obtained review of this order before a statutory three-judge court in accordance with section 402

(a) of the Communications Act of 1934, as amended (47 U. S. C. § 402 (a)). The motion of the Commission for summary judgment was denied on August 28, 1944, and an injunction was issued setting aside the Commission's order (*New York Telephone Co.* v. *United States*, 56 F. Supp. 932). The case is now pending in the United States Supreme Court on appeal by the Commission.

Hotel Surcharge cases.—Four of the five cases involving the Commission and pending in the Federal district courts at the beginning of the fiscal year involved the Commission's jurisdiction over charges made by hotels in connection with interstate and foreign long-distance telephone calls made by their guests. On January 6, 1942, the Commission instituted a proceeding for the purpose of determining whether charges by hotels made for or in connection with such calls are within the jurisdiction of the Commission under the Communications Act of 1934. In these proceedings, it was disclosed that certain hotels in the District of Columbia and elsewhere made certain charges known as "surcharges" or "service charges" in connection with interstate and foreign telephone calls made by their guests, which were in addition to the charges specified in the effective tariffs filed by the telephone companies supplying service to such hotels. After hearing, the Commission concluded that it possesses jurisdiction with respect to such charges by hotels, and by its order of December 10, 1943, directed the American Telephone & Telegraph Co. and the Chesapeake & Potomac Telephone Co. (D. C.) to filed tariffs showing the charges collected by hotels or the condition upon which telephone service is furnished to hotels. On January 22, 1944, these companies filed tariffs effective February 15, 1944, providing that telephone service is furnished to hotels on the condition that use of the service by guests, tenants, and others shall not be made subject to any charge in addition to the toll charges set forth in the effective tariffs of the telephone company. Similar tariffs were filed on behalf of all other companies in the Bell system.

On February 14, 1944, the Hotel Association of Washington, D. C., instituted a suit pursuant to the provisions of section 402 (a) of the Communications Act of 1934, to set aside the Commission's order of December 10, 1943, which was dismissed by the court on June 6, 1945, after the litigation discussed below had been concluded in favor of the Commission.

On February 19, 1944, the Commission, having determined that certain hotels in the District of Columbia were not complying with the tariff provisions of the telephone companies effective February 15, 1944, relating to the making of charges in addition to those set forth in the effective tariffs of the telephone companies, had a suit instituted in the United States District Court for the District of Columbia pursuant to the provisions of section 401 (c) of the Communications Act to enjoin violation of section 203 of the Communications Act. The district court found the tariff provision involved to be valid and on June 8, 1944, issued an injunction against the defendant hotels prohibiting further violation of that tariff provision. On appeal by the defendant hotels the action of the district court was upheld by the United States Supreme Court in a decision affirming the holding below that the tariff provision in question was a valid regulation of the use of telephone service by subscribers and that departure therefrom constituted a violation of the Communications Act. The Supreme Court held that

this conclusion clearly followed from provisions of the Communications Act vesting in the Commission a supervisory authority over "charges, practices, classifications, and regulations" connected with interstate and foreign wire communication service and requiring that provisions of the tariffs filed with the Commission governing such service be "just and reasonable" (*Ambassador, Inc., et al* v. *United States*, decided May 21, 1945).

On February 23, 1944, and February 24, 1944, the United States, on behalf of the Commission, instituted similar suits in the district courts of the United States for the Southern District of New York and the Northern District of Illinois, respectively, under section 401 (c) of the Communications Act to enjoin violation of section 203 of that act by certain hotels in New York City and Chicago and by the telephone carriers which furnish them service. In the New York case the court announced its decision on August 31, 1944, granting the motion for injunction (*United States* v. *American Telephone & Telegraph Co.*, et al., 57 F. Supp. 451) which on appeal was upheld by the United States Supreme Court in a per curiam decision on the authority of the previously decided case, discussed above, involving the Washington hotels, (*Hotel Astor, Inc., et al.* v. *United States*, decided May 28, 1945). In the Chicago case an injunction against the hotels and telephone companies involved was granted on June 9, 1945.

8. DOCKETS

The Commission heard 116 docket cases, of which 98 were broadcast, 17 common carrier, 1 hearing applicable to all services which was the allocation proceeding; held 10 oral arguments, of which 5 were on broadcast matters, 2 common carrier, 3 allocation proceedings. A total of 380 motions, petitions and other pleadings were acted upon, of which 304 were granted, 69 denied, 7 dismissed. Included in the total of 380 motions, 352 were on braodcast matters (278 granted, 67 denied, 7 dismissed), 28 on telephone and telegraph (26 granted, 2 denied).

9. INTERNATIONAL

Maintenance of complete records of all frequencies transmitted and received by radio stations operating in the United States and its possessions was continued. These records assumed increased importance because of the crowded spectrum and the unprecedented wartime demand for frequencies by the armed forces. The Commission's "Master Frequency List" was again revised and was used extensively in connection with the frequency allocation hearing.

A complete course in telecommunications techniques was given one engineer from Chile who was sponsored by the Commission. Shorter courses were given three engineers from South American and Cuba as holders of trade scholarships sponsored by the Inter-American Training Administration of the Coordinator of Inter-American Affairs. Twelve Chinese engineers sponsored by the Foreign Economic Administration and the Office of War Information were given courses concerning the Commission's administrative practices and Standards of Good Engineering Practice. A 1-year nonacademic program of training in industry was prepared for six of the above Chinese engineers.

Treaty violations and interference cases numbering approximately 850 were handled during the year, the more important cases being presented directly to the Department of State for transmission to the respective foreign administrations. Such action has resulted in the elimination or alleviation of many serious problems of interference and consequently in the improvement of communications in the United States.

10. INTERDEPARTMENT RADIO ADVISORY COMMITTEE

The Interdepartment Radio Advisory Committee approved 3,631 new assignments and 635 deletions, bringing the number of assignments recommended by it since its establishment to 40,363. Outstanding assignments now total 34,040. During the year, 231 changes in assignments and 3,771 temporary assignments, which are not included in the above figures, were made. A total of 8,739 applications and requests were processed by the committee during the year.

A proposed international frequency allocation table covering the range from 10 kilocycles to 30,000 megacycles was coordinated with the allocation table proposed by the Commission and this will be the basis of the United States proposal at the next International Telecommunications Conference.

11. FREQUENCY ALLOCATION

To enable the radio art to take advantage of the important wartime technical advances, to meet the greatly increased demands for the use of radio and to facilitate orderly planning for postwar development, the Commission held comprehensive hearings during the fiscal year for a complete review of the spectrum. The proceeding was entitled "In the Matter of Allocation of Frequencies to the Various Classes of Non-Governmental Services in the Radio Spectrum From 10 Kilocycles to 30,000,000 Kilocycles."

The hearings opened on September 28, 1944, pursuant to an order issued August 15, 1944. The Commission sat en banc. The preliminary hearings lasted through November 2, 1944, for a total of 25 hearing days. A total of 4,559 pages of testimony were taken, 543 exhibits were received, 231 witnesses testified. Testimony at the Commission's hearings on the use of radio for railroads, September 13–18, 1944, was incorporated in the allocation hearing by reference.

Extensive cooperation in preparing for the allocation hearing was provided by the Radio Technical Planning Board, which was organized in September 1943, by a committee composed of the representatives of the Radio Manufacturers Association and the Institute of Radio Engineers. It was sponsored by nonprofit associations and societies having an important interest in radio.

The Commission issued a proposed report on allocations from 25,000 to 30,000,000 kilocycles on January 15, 1945. Hearings on this proposed report were held from February 28 to March 3, inclusive, and on March 12. In addition, closed hearings were held March 12 and 13, to consider evidence classified as a military secret. A final report on this section of the spectrum, was issued May 25, 1945, with the exception of the portion from 44 to 108 megacycles, for which the

Commission offered three alternative proposals concerning the position of FM. Hearings were held on this latter section on June 22 and 23, and a report issued on June 27, 1945.

Salient points of the allocation above 25,000 kilocycles are discussed in the various sections of this annual report dealing with the respective subjects. FM was located in the 88 to 106 megacycle region. Commercial television was assigned 13 channels below 300 megacycles, with the 480–920 band being assigned for experimental television. Channels were allocated for a number of new services such as railroad radio, citizens radiocommunication service, rural telephone service and industrial and medical service.

The new allocations were to become effective as soon as the Commission could prepare regulations and standards of good engineering practice and as soon as manpower and materials become available.

A report on the proposed allocation below 25,000 kilocycles was issued on May 21, 1945.

CHAPTER II

Standard Broadcast

1. MATERIALS AND MANPOWER
2. PROPOSAL TO EXTEND BAND
3. NORTH AMERICAN REGIONAL BROADCASTING AGREEMENT
4. CLEAR CHANNEL HEARING
5. MULTIPLE OWNERSHIP
6. SALES PRICES OF BROADCAST STATIONS
7. FINANCIAL DATA
8. STATISTICS

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CHAPTER II—STANDARD BROADCAST

1. MATERIALS AND MANPOWER

Due to the continuation of wartime restrictions on the use of equipment, material, and manpower for the construction of new broadcast stations, authorizations for new broadcast facilities have been confined in general to 250-watt stations where the necessary equipment and manpower have been shown to be available.

Several changes in Commission policy on authorizations were ordered during the fiscal year.

The policy in effect on July 1, 1944, permitted the installation of stations where equipment and manpower were shown to be available and War Production Board approval of the construction could be obtained. A number of new stations were authorized under this policy until December 1944 at which time, the War Production Board advised that manpower was becoming increasingly scarce and that construction should be restricted to those cases where the service would contribute to the war effort. Accordingly, on January 16, 1945, the Commission decided to restrict grants to localities not receiving primary broadcast service from any existing stations. Changes in existing facilities were permitted only if substantial construction was not needed and the cost was less than $500.

All applications on file on January 16, 1945, were automatically held in status quo unless the applicant specifically requested immediate consideration on the basis that the application met the requirements of the new policy.

2. PROPOSAL TO EXTEND BAND

The Commission's proposed report on frequency allocation below 25,000 kilocycles issued on May 21, includes a plan to extend the low-frequency end of the band so as to include 540 kilocycles. The addition of 540 kilocycles to the standard broadcast band would open one new channel for the use of standard broadcast stations. The number of stations that may be assigned to this new channel will be dependent on the classification of the frequency as a clear, regional, or local channel. The Canadian Government at present uses the new channel under special arrangement for a 50-kilowatt station at Calgary, Alberta. Any extensive use of the channel by the United States will require revision of existing Treaties and Agreements with North American countries.

3. NORTH AMERICAN REGIONAL BROADCASTING AGREEMENT

The existing agreement with Canada, Mexico, Cuba, Newfoundland, Haiti, San Domingo, and the Bahamas (North American Regional Broadcasting Agreement) relative to joint use of frequencies in the standard broadcast band expires in March of 1946 and efforts are being made to extend the treaty for another year. Need for revision of the

agreement has become apparent, particularly with respect to clarification of some of its requirements. In addition, changes will be requested if 540 kilocycles is added to the standard broadcast band and Commission rules governing clear channels are changed as a result of the forthcoming clear channel hearing. The matter of extension and possible alterations will be discussed at the Inter-American Conference in September 1945.

4. CLEAR CHANNEL HEARING

A general public hearing to determine what changes, if any, should be made in the present policies on allocation of clear channels in the standard broadcast band, was ordered by the Commission on February 20, 1945. The date was later fixed for January 14, 1946.

Commission studies have shown that there are still large areas in the Nation which receive no radio service at all during the daytime hours and no primary radio service at night. Moreover, the Commission has received many applications for authority to use power in excess of 50,000 watts which is the maximum power now permitted a clear channel station.

Committees composed of both industry and Government representatives are now engaged in various studies in preparation for this hearing.

5. MULTIPLE OWNERSHIP

Order No. 84A promulgating section 3.35 of the Rules and Regulations effective on May 31, 1944, provided that no license shall be granted for a standard broadcast station directly or indirectly owned, operated or controlled by any person where such station renders or will render primary service to a substantial portion of the primary service area of another broadcast station directly or indirectly owned, operated or controlled by such person. Provision was made, however, for exceptions where the public interest, convenience, and necessity would be served by such multiple ownership.

Since the effective date of this regulation the Commission has approved 19 applications for the severence of multiple ownership of broadcast facilities. In addition, there were pending at the close of the fiscal year 5 applications which provide for the sale of facilities to comply with this policy. Where a licensee is required to dispose of facilities to meet the terms of the regulation, the Commission has issued a certificate pursuant to section 112M of the Internal Revenue Code, which affords the licensee an opportunity to treat the sale as an involuntary conversion of property with a resulting effect on the gain realized for income tax purposes.

6. SALES PRICES OF BROADCAST STATIONS

The profitability of broadcast operation and the wartime restrictions on the construction of new stations resulted in a sharp increase in the sales prices of broadcast facilities. From an examination of applications for the sale of existing stations it became apparent to the Commission that licensees were selling their stations for amounts far in excess of the value of the physical assets to be transferred.

In letters to the Senate Interstate Commerce Committee, and the House Interstate and Foreign Commerce Committee, the Commission called attention to this trend and requested congressional direction as to the policy it should follow in passing on the sale of radio stations where the sales prices are in excess of the going concern and physical property values. In its letter the Commission pointed out:

The Congress has had before it proposals to limit the amount of consideration to the value of the physical properties (of radio stations) transferred but no provision of this character has been adopted. The statute does make clear that the frequencies are not in any way the property of the licensees. The Commission has rejected and is prepared to reject any transfer which on its face involves a consideration for the frequency. The Commission, apparently consistent with congressional policy, has approved transfers that involve going-concern values, good will, etc. There remains, however, a serious question of policy and one on which the law is not clear, as to whether the Commission should approve a transfer wherein the amount of the consideration is over and beyond any amount which can be reasonably allocated to physical values plus going-concern and good will, even though the written record does not itself show an allocation of a sum for the frequency. Our concern in this regard is heightened by the tremendously high prices which radio stations are commanding in the present state of the market. This is illustrated by the fact that one local station was sold for a half million dollars and some regional stations are selling for a million or more.

It is the Commission's policy to disapprove of transfers which obviously represent the activities of a promoter or broker, who is simply acquiring licenses and trafficking in them. Under the present state of the law, however, it is not clear that the Commission has either the duty or the power to disapprove of a transfer merely because the price is inordinately high—even though it may well be deduced that a substantial value is placed on the frequency. In the absence of a clear congressional policy on this subject, we though best to draw the matter to the attention of your own Committee and the House Committee on Interstate and Foreign Commerce.

7. FINANCIAL DATA

All networks and stations.—Four major and five regional networks and 875 standard broadcast stations in the United States, Hawaii, Alaska, and Puerto Rico reported net revenues from the sale of time amounting to $246,339,532 in 1944 as compared with $195,704,153 reported by 9 networks and 841 standard broadcast stations for the previous year, or an increase of 25.87 percent. In addition, these networks and stations received $28,959,079 in 1944 from the sale of talent and other incidental broadcast activities as compared with $19,613,621 for the previous year, an increase of 47.65 percent in this class of revenue. After deducting operating expenses, and before Federal income tax, these stations and networks reported operating income amounting to $90,272,851 as compared with $66,475,586 for the previous year, an increase of 35.80 percent.

The four major networks.—The four major network companies (CBS), American (formery Blue), Mutual, and NBC) and their 10 key stations reported total revenues from the sale of time aggregating $84,068,954 in 1944 as compared with $71,027,292 for 1943. The net revenues from the sale of time amounted to $63,656,085 in 1944 and $54,479,894 in 1943 and these amounts plus revenues from the sale of talent, etc., gave combined broadcast revenues of these networks and stations of $79,030,449 in 1944 as compared with $64,301,538 for the previous year; and broadcast income (revenues less expenses before Federal income tax, and excluding net lossess from other than stand-

ard broadcast operations amounting to $741,680 for 1944 and $351,092 for 1943) amounted to $20,283,746 for 1944 and $19,455,701 for 1943, or an increase of 4.26 percent.

Average broadcast income per station.—In general, standard broadcast stations reported a substantial improvement in the results of operations for 1944. Excluding the 10 key stations of major networks for which the reports did not include adequate segregations of expenses between these stations and network operations, the average broadcast income of clear channel stations with operating power of 50,000 watts, unlimited time, amounted to $496,247 per station in 1944, or an increase of 24.01 percent over 1943, and such income reported by the clear channel unlimited time stations with operating power of 5,000 to 20,000 watts averaged $129,534 per station, or an increase of 109.43 percent over the corresponding amount reported for 1943. The average broadcast income reported by regional unlimited stations amounted to $114,380 per station in 1944 as compared with $79,784 in 1943, an increase of 43.36 percent. Local unlimited time stations reported average broadcast income of $12,682 per station in 1943 and $23,421 in 1944, showing an average increase of 84.68 percent. Broadcast income reported by local unlimited time stations affiliated with major networks averaged $25,815 per station in 1944, or an increase of 70.86 percent over the average for 1943, while local unlimited time stations not affiliated with a major network reported an average increase of 85.58 percent over 1943.

Stations reporting losses.—There were 41 of the 875 stations reporting losses (total broadcast expense in excess of total broadcast revenues) in 1944 as compared with 94 of the 841 included in the statistics for 1943. The average loss per station in 1944 was $3,764 while the average loss in 1943 amounted to $5,348. Only 27 of the stations reporting losses in 1944 were affiliated with the major networks while there were 42 in 1943.

Stations affiliated with major networks.—The total number of stations affiliated with major networks and included in the statistics for 1944 was 689 and for 1943 was 604. The average broadcast income of the 689 stations amounted to $94,004, an increase per station of 28.82 percent over the average of $72,975 for the 604 stations in 1943.

Employes and compensation.—There were 34,281 persons employed by the 4 major and 5 regional networks and 875 standard broadcast stations as of December 31, 1944, with a total pay roll for the year of $99,773,425. For 1943 the 4 major and 5 regional networks and 841 standard broadcast stations reported total pay roll of $82,171,023, and 31,806 employes as of the end of the year.

8. STATISTICS

As of June 30, 1945, there were 931 standard stations licensed and 24 under construction. During the year, 33 new stations were added, 2 were deleted.

The Commission received 822 formal applications for new stations and changes in exiting facilities, granted 418; received 704 applications for renewal of licenses, granted 1,064 renewals and extensions; issued 214 special authorizations.

New stations authorized

Call letters	Permittee and location	Power (watts)	Frequency (kc)	Time designation
KALL	Abrelia S. Hinckley, George C. Hatch, and Wilda Gene Hatch, a partnership, d/b as Salt Lake City Broadcasting Co., Salt Lake City, Utah.	(1)	910	Unlimited DA.
KCMJ	Richard W. Joy and Donald C. McBain, d/b as Palm Springs Broadcasting Co., Palm Springs, Calif.	250	1340	Unlimited.
KCOK	Herman Anderson, Tulare, Calif.	250	1240	Do.
KCRA	Ewing C. Keily, David R. McKinley, and Vernon Hanson, d/b as Central Valleys Broadcasting Co., Sacramento, Calif.	250	1340	Do.
KFLW	Herald Publishing Co. of Klamath Falls, Klamath Falls, Oreg.	250	1450	Do.
KGAK	Albert E. Buck and Merle H. Tucker, a partnership, d/b as Rio Grande Broadcasting Co., Gallup, N. Mex.	250	1230	Do.
KNAK	Granite District Radio Broadcasting Co., Salt Lake City, Utah.	250	1400	Do.
KNOE	James A. Noe, Monroe, La.	250	1450	Do.
KPKW	Western Radio Corp., Pasco, Wash.	250	1340	Do.
KSMA	Hugh G. Shurtliff, Charles A. Shurtliff, Mareby Cardella (Della) Shurtliff, and Cleo Agnes Center, Santa Maria, Calif.	250	1450	Do.
KXOA	Lincoln Dellar, Sacramento, Calif.	250	1490	Do.
WATT	Midwestern Broadcasting Co., Cadillac, Mich.	250	1240	Do.
WBAC	Robert W. Rounsaville, Cleveland, Tenn.	250	1340	Do.
WCMA	Corinth Broadcasting Co., Inc., Corinth, Miss.	250	1230	Do.
WDAD	Indiana Broadcast, Inc., Indiana, Pa.	250	1450	Do.
WFEB	Alabama Broadcasting Co., Inc., Sylacauga, Ala.	250	1340	Do.
WHGB	Herbert Kendrick and G. L. Hash, a partnership, d/b as Harrisburg Broadcasting Co., Harrisburg, Pa.	250	1400	Do.
WHNC	Henderson Radio Corp., Henderson, N. C.	250	890	Daytime.
WHTB	Voice of Talladega, Inc., Talladega, Ala.	250	1230	Unlimited.
WJXN	P. K. Ewing, Jr., F. C. Ewing, a partnership, d/b as Ewing Broadcasting Co., Jackson, Miss.	250	1490	Do.
WKIX	Inter-City Advertising Co., Columbia, S. C.	250	1490	Do.
WKWF	John M. Spottswood, Key West, Fla.	500	1600	Do.
WKVM	American Colonial Broadcasting Corp., West of Arecibo, Puerto Rico.	250	1230	Do.
WLAT	Loys Marsdon Hawley, Conway, S. C.	250	1490	Do.
WLEE	Thomas Garland Tinsley, Jr., Richmond, Va.	250	1450	Unlimited except when WBBI operates.
WMLT	George T. Morris, Wilmer D. Lanier, and J. Newton Thompson, d/b as Dublin Broadcasting Co., Dublin, Ga.	250	1340	Unlimited.
WMSA	Brockway Co., Massena, N. Y.	250	1340	Do.
WNEX	Macon Broadcasting Co., Macon, Ga.	250	1400	Do.
WNHC	Elm City Broadcasting Corp., New Haven, Conn.	250	1340	Do.
WPAG	Washtenaw Broadcasting Co., Inc., Ann Arbor, Mich.	250	1050	Daytime.
WPIK	Potomac Broadcasting Corp., Alexandria, Va.	250	730	Do.
WSSV	Southside Virginia Broadcasting Corp., Petersburg, Va.	250	1240	Unlimited.
WSTN	Charles P. Blackley, Staunton, Va.	250	1400	Do.

Stations deleted for fiscal year ending June 30, 1945

Call letters	Grantee and location	Date of deletion
KCRJ	Central Arizona Broadcasting Co., Jerome, Ariz. (licensee voluntarily submitted license for cancellation).	Aug. 8, 1944
WFEB	Alabama Broadcasting Co., Inc., Sylacauga, Ala. (C. P. only. Request for extension of time within which to meet procedural requirements of Commission Statement of Policy of Jan. 26, 1944, denied Sept. 26, 1944 and application designated for hearing. Granted Dec. 12, 1944).	Sept. 26, 1944

[1] Kilowatts.

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CHAPTER III

Nonstandard Broadcast

1. GENERAL
2. FREQUENCY MODULATION (FM) BROADCAST SERVICE
3. TELEVISION BROADCAST SERVICE
4. INTERNATIONAL BROADCAST SERVICE
5. NONCOMMERCIAL EDUCATIONAL BROADCAST SERVICE
6. ST (STUDIO-TRANSMITTER) BROADCAST SERVICE
7. RELAY BROADCAST SERVICE
8. FACSIMILE BROADCAST SERVICE
9. DEVELOPMENTAL BROADCAST SERVICE
10. STATISTICS

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CHAPTER III—NONSTANDARD BROADCAST

1. GENERAL

Due to the continued wartime restrictions on manpower and materials, the construction of commercial frequency modulation (formerly designated as high frequency broadcasting), television, and facsimile broadcast stations has been negligible during the past fiscal year. The authorization of new construction has been limited to those cases where the applicant was pursuing a program of technical research and development. Some additional construction has gone forward in the international broadcast service employed for psychological warfare. Few new stations have been authorized in the remaining nonstandard broadcast services.

FM and television stations built before the outbreak of the war have continued to furnish broadcast service. Many of these stations could not be fully completed and have been licensed to operate with available equipment until conditions permit the completion of construction. Since the manufacture of receiving sets was discontinued early in the war, the extent of public participation in these new services has necessarily been limited.

There has been increased planning for the postwar construction of frequency modulation (both commercial and noncommercial educational) and television broadcast stations. Many applications were filed, although no action was taken on them under the wartime "freeze" policy.

A number of experimental television and developmental broadcast stations were authorized during the year for technical research and development. Due to the relative newness of services in the portion of the spectrum used in FM and television broadcasting, many technical subjects need further study in order to provide the most efficient use of these frequencies. Considerable progress has been made during the year on such studies.

The frequency allocation provides the basis for postwar planning of station construction, design of transmitting and receiving equipment, and the basis for the adoption of rules and standards relating to the allocation and operation of the various classes of broadcast stations in the high frequency portion of the spectrum.

2. FREQUENCY MODULATION (FM) BROADCAST SERVICE

The only new FM station authorized during the year was an existing experimental station which was granted permission to operate on a commercial basis. As of June 30, 1945, 53 commercial FM broadcast stations were authorized, 46 being licensed and in regular operation. Although the Commission's rules provide for a minimum daily operating schedule of 6 hours per day (except Sunday), some stations are furnishing a program service throughout the day and evening.

The large amount of interest in FM is indicated by the 429 applications for new stations on file at the end of the fiscal year and hundreds of requests for information and application forms. Predictions by witnesses at the allocation hearing indicated the possible establishment of several thousand FM stations within a few years after the war, or several times the number of standard broadcast stations now in operation.

The choice of channel space for FM broadcasting was the subject of a thorough review by the Commission at the frequency allocation hearing. For several years there had been concern that FM broadcasting in the vicinity of 50 megacycles would be subject to serious skywave interference, nullifying to a great extent the possibilities of interference-free reception expected of FM. The Commission has been conducting a recording program for over 2 years, measuring the extent and intensity of skywave signals from existing FM stations; the data collected during this program served to emphasize the amount of interference that would be expected when a large number of FM stations were installed and in operation in the vicinity of 50 megacycles. There was divergence of opinion as to the expected amount and effect of skywave interference in the future, some believing that the characteristics of FM transmission and reception would serve to minimize the deleterious effects of skywave transmission, and others believing that the service would be severely degraded during summer seasons and during times of high sunspot activity. Following the allocation hearing the Commission proposed to place FM in the vicinity of 100 megacycles. In order to obtain additional data relating to radio wave propagation, a closed hearing was held on March 12 and 13, 1945, since much of this material was classified. This hearing was attended by the Commission, members of its staff, and industry and broadcasting personnel who had been cleared by the military for the purpose.

Since it appeared at the time that the production of FM equipment could not be resumed in 1945, or even in the first part of 1946 unless Japan capitulated, and since the Commission desired to have as much information as possible before it prior to making a decision about the FM band, the Commission announced on May 25 that it would withhold the allocation for FM pending further propagation measurements to be made during the summer of 1945. Subsequently, however, the War Production Board advised the Commission that the manufacture of FM, AM and television transmitters and receivers might begin at an earlier date than was originally indicated to the Commission, and that it would probably not be possible for the War Production Board to give 90 days advance notice to the Commission before the resumption of production. Accordingly, the Commission on June 5, 1945, ordered a further argument and hearing in order that a final decision might be reached at the earliest possible date.

Many factors are involved in a decision of this nature, including ground wave coverage, skywave interference, transmitting and receiving equipment, present investment, and other matters of a minor character. Based on the testimony and data before it, the Commission was convinced that a superior FM broadcast service would be furnished by operation in the vicinity of 100 megacycles and, accordingly, on June 27, 1945, it allocated the band of 88 to 92 mega-

cycles for noncommercial educational FM broadcasting and the band of 92 to 106 megacycles for commercial FM broadcasting. In addition, the band of 106 to 108 megacycles was allocated to facsimile, with the provision that if in the future this band would not be required for facsimile, it would be available for FM.

3. TELEVISION BROADCAST SERVICE

Throughout the fiscal year commercial television broadcast stations have also been subject to the freeze policy, and no new commercial television broadcast stations were placed in operation. At the close of the fiscal year six commercial and three experimental television broadcast stations were furnishing a television service. Under wartime rules, commercial television broadcast stations need operate only 4 hours per week, as compared to the 15 hours a week previously required.

Considerable interest was shown during the year in establishing experimental television broadcast and relay stations for the purpose of developing television equipment and techniques, and 20 experimental television broadcast stations were authorized. Of the 47 experimental television stations authorized at the end of the fiscal year, approximately half are relay stations used for transmitting television programs from the studio or from other points of program origination to the television broadcast transmitter. Experimentation began in the transmission of television programs over a series of relay stations between Washington and Philadelphia, and the satisfactory results obtained indicated that prospects are good for future network television broadcasting on a large scale. City-to-city relaying of television material may, of course, also be carried on by the use of coaxial cable, and it is likely that the postwar period will employ both methods for network television.

While commercial television construction has been restricted under wartime freeze policies, applications have been accepted and at the end of the fiscal year 118 applications for new stations were on file. The great amount of interest in television broadcasting indicates that dozens of cities and their surrounding areas will have television broadcast service as soon as equipment can be constructed and installed.

Much testimony was presented during the frequency allocation hearing concerning the prospects of postwar television. Considerable controversy arose as to whether television should proceed with present channel widths in the portion of the spectrum now employed for television broadcasting, or whether emphasis should be placed on television experimentation and operation in the higher bands where wider channels are available for pictures having greater detail and color. While the higher frequencies offer the only opportunity for a large number of channels of sufficient width to provide this form of television service, insufficient information appeared to be available upon which to guarantee the prompt establishment of television broadcasting in this portion of the spectrum. It appeared that it would be some time before transmitting and receiving equipment would be adequately developed and standards could be adopted for the establishment of television broadcasting in the upper frequency range. The Commission, therefore, provided as

many 6-megacycle channels as possible, (13) between 44 and 216 megacycles for immediate postwar television broadcasting; in addition, the band from 480 to 920 megacycles was provided for experimental television broadcasting, looking toward the future establishment of a superior television service in this range.

4. INTERNATIONAL BROADCAST SERVICE

During the past fiscal year, the installation of new international broadcast stations in the United States has been completed in accordance with plans made at the beginning of the war to provide expanded facilities for the needs of psychological warfare. A total of 36 international broadcast stations, including five 200-kilowatt transmitters, are now operating. At the close of the European war the emphasis was shifted to west coast operations, where 10 transmitters licensed to international broadcast licensees and 6 transmitters leased from point-to-point companies, as well as 1 transmitter in Hawaii, were employed to concentrate programs on Japan and Japanese-held areas on a round-the-clock schedule. Meanwhile, on the east coast 26 transmitters continued to operate on somewhat reduced schedules with programs for Europe, Africa, and Central and South America, with the emphasis shifted from psychological warfare to troop entertainment and news. All international broadcast stations continue to be programmed and operated under the direction of the Office of War Information and the Office of Inter-American Affairs.

During the latter part of the fiscal year several conferences were held with representatives of the Office of War Information, the Office of Inter-American Affairs, the State Department, and licensees of international broadcast stations concerning the postwar status of international broadcasting. No policy has as yet been formulated concerning this matter.

5. NONCOMMERCIAL EDUCATIONAL BROADCAST SERVICE

This service was established in 1938 to provide a service for organized nonprofit educational agencies to advance their educational work by transmitting programs to schools in an educational system as well as educational and entertainment programs to the public. At the end of the fiscal year 6 such stations were in regular operation, construction permits for 6 others were outstanding, and 22 applications for new stations were on file. Although the authorization of new stations in this service has not been restricted, the severe limitations on equipment and personnel have not permitted much progress in this service during the war.

A great deal of testimony was presented at the frequency allocation hearing indicating the expected rapid postwar development of FM broadcasting by educational institutions. Witnesses stressed the need for an adequate number of channels to provide facilities for the many educational stations being planned, including State-wide networks of educational stations in many States.

The Commission has provided for this expected growth by allocating 20 FM channels in the band 88 to 92 megacycles, adjacent to the commercial FM band of 92 to 108 megacycles. FM receivers will include both bands, enabling noncommercial educational FM to grow with commercial FM, both services being available to the public.

6. ST (STUDIO-TRANSMITTER) BROADCAST SERVICE

ST broadcast stations are used to provide program circuits between the studio and transmitter of FM and international broadcast stations. Radio circuits of this type are particularly desirable where the main transmitter is located on a mountain top or other isolated places and where it would be difficult to install and maintain adequate wire circuits having high fidelity and low noise level characteristics and at the same time be relatively free from failure due to sleet storms and other maintenance problems. Although only a few ST broadcast stations are in operation, these furnish satisfactory service with a minimum of interruptions. No additional ST broadcast stations were authorized during the fiscal year, but it is probable that many will be installed as soon as the construction of new FM broadcast stations is resumed. Largely the result of wartime research and development, higher frequencies than those now employed for ST broadcasting (330 to 344 megacycles) appear desirable for this purpose and, accordingly, the Commission has provided a band from 940 to 960 megacycles for this service. In addition, higher frequency bands allocated for fixed and mobile services will be available for experimentation in the ST broadcast service, and certain television channels may also be used on the basis of no interference to television operation.

7. RELAY BROADCAST SERVICE

In connection with standard and other classes of broadcast stations, relay broadcast stations are used for the purpose of transmitting program material to the main station when wire circuits are not available. In addition, relay broadcast stations may be used for emergency program circuits between the studio and transmitter of broadcast stations during failures of regular wire circuits. Various factors during the war have resulted in the limited use of relay broadcast equipment but it is expected that in the future the use of these stations will again expand.

Construction of these stations during the past fiscal year has been authorized where it was shown that the required materials were available without priority and that a need for the service existed. During the year 23 construction permits were granted, and the total number of stations authorized as of June 30, 1945, was 560.

Some changes in frequency allocations for relay broadcast stations were announced by the Commission following the allocation hearing.

8. FACSIMILE BROADCAST SERVICE

Experimentation in facsimile broadcasting has been continued on a limited scale during the past fiscal year by the three stations authorized in this service. However, considerable interest has been shown in facsimile, and two construction permits for facsimile experimentation were granted during the year.

During the frequency allocation hearing a number of witnesses testified to the expected importance of facsimile broadcasting during the postwar period, indicating that transmission speed has increased considerably and that fidelity of reproduction has been improved. There was testimony to the effect that facsimile broadcasting would be an

important service to the public and that adequate frequencies should be provide for this purpose.

The Commission has provided a band of 2 megacycles (106 to 108 megacycles) adjacent to the FM band and the band 460 to 470 megacycles for facsimile broadcasting. In the event that the 106- to 108-megacycle band will not be required for this service in the future, this band will be available for assignment to FM broadcast stations, and FM receiver manufacturers have been encouraged to include the entire band of 88 to 108 megacycles in their receivers.

Should multiplex transmission of sound and facsimile on the same FM broadcast channel prove to be entirely feasible without degrading the sound service with receivers used by the public, such multiplex operation may be authorized. In addition, the Commission has announced that it will authorize FM broadcast stations to transmit simplex facsimile over their FM broadcast transmitters during periods not required for sound broadcasting.

9. DEVELOPMENTAL BROADCAST SERVICE

Developmental broadcast stations are authorized for the purpose of conducting research, development, and experimentation relating to broadcast equipment and techniques when such work requires the use of radiation. The past fiscal year has seen a great amount of interest develop in this service, and the number of stations authorized has increased during the year from 4 to 27. The accelerated interest in broadcasting in the high frequency portion of the spectrum has, of course, been reflected in this service, and many licensees are conducting programs of research relating to the development of equipment and the measurement of signal intensities and service areas in high frequency broadcasting. The research programs conducted by licensees of developmental broadcast stations have in the past contributed materially to the development of high standards in broadcast equipment, and it is expected that the same result will follow from many of the problems now being investigated.

10. STATISTICS

Number of stations in the nonstandard broadcast service for fiscal year ending June 30, 1945

Class of station	As of June 30, 1944	New	Licenses or CP's surrendered or abandoned	As of June 30, 1945
High-frequency broadcast (Exp.)	3	0	2	1
High-frequency broadcast (Temp. class II Exp.)	3	0	2	1
High-frequency broadcast (FM)	52	1	0	53
Low-frequency relay	254	16	9	261
High-frequency relay	292	7	0	299
Television (Exp.)	27	20	0	47
Television (Commercial)	9	0	0	9
International	37	1	0	38
Developmental	4	23	0	27
ST (Studio-Transmitter)	[1] 8	0	0	[1] 8
Facsimile	3	0	0	3
Noncommercial educational	8	4	0	12
Class II (Exp.)	1	0	0	1
Total	701	72	13	760

[1] Includes 3 confidential stations.

Nonstandard broadcast applications

Service	Applications received	Authorizations issued	Special authorizations
Relay broadcast	113	105	20
International broadcast	28	18	28
Television broadcast (Commercial)	97	6	17
Television broadcast (Exp.)	92	63	87
Facsimile broadcast	0	0	0
High-frequency broadcast (Exp.)	1	0	21
High-frequency broadcast (FM)	325	14	22
High-frequency broadcast (Temp. class II Exp.)	5	0	1
Noncommercial educational broadcast	42	10	0
Developmental broadcast	52	34	11
ST (Studio-Transmitter) broadcast	2	2	1
Class II broadcast (Exp.)	0	0	0
Total	757	252	208

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CHAPTER IV

Common Carriers

1. TELEPHONE (WIRE AND RADIO)
2. TELEGRAPH (WIRE, CABLE, AND RADIO)
   - (a) DOMESTIC
   - (b) INTERNATIONAL

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CHAPTER IV—COMMON CARRIERS

1. TELEPHONE (WIRE AND RADIO)

SERVICE AND FACILITIES

Construction of wire facilities.—The year showed a marked increase in construction activity. As materials were released from military use, the industry expanded its construction activities to meet the constantly growing demands for toll service. Two hundred and twenty applications were received for supplementing existing facilities of which 199 involved construction projects ranging up to $9,480,000, 2 covered leasing, 8 purchases. Two hundred and ten applications were approved, including 26 filed during the 1944 fiscal year. The estimated total construction cost was $70,091,140, an increase of $60,508,901 over the preceding fiscal year.

Wire telephone applications for construction approved by the Commission from July 1, 1934 to June 30, 1945

Period	Number of applications	Estimated construction cost	Route miles of cable placed	Miles of coaxial units	Miles of open wire placed
July 1, 1934 to June 30, 1935	7	$1,145,851	234.3	189	0
July 1, 1935 to June 30, 1936	15	275,625	24	0	475
July 1, 1936 to June 30, 1937	50	5,551,702	206	0	17,045
July 1, 1937 to June 30, 1938	45	3,931,000	499	0	1,212
July 1, 1938 to June 30, 1939	45	6,960,123	646	780	1,967
July 1, 1939 to June 30, 1940	72	9,070,952	1,209.2	168	3,501
July 1, 1940 to June 30, 1941	137	38,319,399	5,263	0	15,521
July 1, 1941 to June 30, 1942	169	45,046,250	5,099.7	1,790	34,583
July 1, 1942 to June 30, 1943	48	8,683,627	418	0	4,501
July 1, 1943 to June 30, 1944	121	9,582,239	574.8	0	7,968
July 1, 1944 to June 30, 1945	210	70,091,140	2,378.3	7,902	2,963
Total	919	198,647,908	16,552.3	10,829	89,736

Fourteen applications involving construction cost estimated at $17,576,215 were received during the year which were still pending before the Commission at the close of the year.

Approximately 1,700,000 miles of toll message channels were added to the Bell system facilities—an increase of 18.5 percent over the total miles in service at the beginning of the year. Of this increase 85 percent resulted from the use of carrier systems.

The use of the EB emergency type of carrier channels continues to grow. Of the 1,700,000 total channel mile increase, about 500,000 miles were of the EB type.

Planned wire projects.—In our tenth annual report, reference was made to the American Telephone & Telegraph Co.'s program for installing 6,000 to 7,000 route miles of coaxial facilities during the next 5 or 6 years. During the year under report, the Commission authorized the construction of 1,112 route miles of this type of cable

carrying 7,902 coaxial unit miles and involving an estimated expenditure of $20,286,000. Coaxial units are designed for the transmission of high frequencies suitable for both telephone and television transmission.

Volume and speed of toll service.—The demand for telephone toll service continues to grow to new peak levels. During the year 730,000,000 toll board calls were handled by the Bell system and 621,000,000 short haul calls were handled through Bell operated boards other than toll boards. These figures represent increases over the preceding year of 11 and 3 percent, respectively. Traffic of the long lines department of the American Telephone & Telegraph Co. increased from 175,000,000 to 196,000,00 calls—an increase of 12 percent.

The average time required to complete toll board calls in June 1945 was 3.4 minutes—an increase of 0.1 minute when compared with a year ago.

Abandonments.—Three applications were filed pursuant to section 214 of the Communications Act requesting authority to discontinue toll service to three towns on the Western Union telephone network. Authority in each of these cases was granted by the Commission, since adequate telephone toll service is provided by the Bell system to these points.

Pursuant to the requirements of the Board of War Communications Order No. 10, the Commission has been notified of the closing of 1 small rural exchange, 10 telephone toll stations, 166 telephone toll stations with telegraph listings, and the removal of 7,620 miles of copper wire, 874 miles of iron wire, 231 miles of steel wire, 31 miles of cable and 459 miles of poles. Except in the case of the small rural exchange serving a very few subscribers, these abandonments have not affected service and result mainly from the substitution of cable for aerial wire routes and the involuntary removal of telephone stations. The materials salvaged, particularly copper, as a result of these operations, are available for future construction, thus supplementing the nation's stockpile of critical materials.

Interstate and foreign telephone toll service at Maryville, Mo., and surrounding rural areas.—On February 20, 1945, the Commission issued an order instituting an investigation to determine whether adequate and comprehensive telephone service was available to persons residing at Maryville, Mo., and its surrounding rural areas. This action was taken by the Commission because it appeared that the subscribers of the People's Telephone Exchange, Inc., which operated a telephone exchange serving Maryville and its surrounding areas, had no interstate and foreign telephone service except to certain nearby communities in Iowa. It further appeared that the Hanamo Telephone Co., which also operated a telephone exchange in Maryville, connected with the lines of the Southwestern Bell Telephone Co. by means of which interstate and foreign telephone toll service was available to its subscribers; and that the Peoples Telephone Exchange requested both Hanamo and Southwestern Bell to establish a connection with its facilities, but that such requests were refused. Accordingly, the Commission's order also directed Southwestern Bell and Hanamo to show cause why the Commission should not order each or either of them, pursuant to section 201 of the Communications Act of 1934, as amended, to establish a physical connection of their facilities with those of the Peoples Tele-

phone Exchange, and also directed Southwestern Bell to show cause why the Commission should not order it, pursuant to section 214 of the Communications Act, to extend its lines to connect with the facilities of the Peoples Telephone Exchange.

The proceedings in this matter are pending further action by the Commission, it appearing that since the Commission's order of investigation was issued, the Hanamo and Peoples companies have been consolidated into the Nodaway Telephone Co., and that interstate and foreign telephone toll service is now available to all subscribers of both companies. It appears that physical consolidation of the two exchanges will be accomplished in the near future.

Domestic radiotelephone services.—New developments in the radiocommunications art have indicated the apparent feasibility of extending common carrier communications service via radio, to all types of mobile vehicles on land, the sea, and in the air. This means that the mobile common carrier radio services heretofore limited exclusively in operation for communications between waterborne vessels and shore connections will probably be extended to passengers in airborne craft as well as to persons in automobiles, trains, busses, and other vehicles where wire communication is not feasible. Great public interest has already been evinced in this service by such groups as doctors, delivery services, truck and bus carrier organizations, taxicabs, etc. Many Bell system companies, serving some of the principal cities of this country, have filed applications for experimental authorization to inaugurate this service.

The wartime developments in the art have also opened the way to a great extension in the field of radio relays. These developments look to the installation of radio relay telephone circuits which will further extend and enhance existing radio telephone and wire networks helping to make available radio telephone service to rural or isolated areas where such service was not before feasible. A further major development along this line relates to the experimentation being conducted with a view to the use of these circuits for the transmission of both aural and visual program material, aircraft and ship position reporting service, etc. During the fiscal year, experimental authorizations for the construction of stations of this type were granted to American Telephone & Telegraph Co., International Business Machines Corp., General Electric Co., Raytheon Manufacturing Co.

Fixed public and marine services in Alaska.—During the fiscal year, 781 applications relating to the operation of both telephone and telegraph common carrier stations in Alaska were granted. Included among these were 49 authorizations for new facilities, bringing the total count of Alaskan common carrier stations to 648.

International radiotelephone circuits.—A new circuit was established between the United States and Quito, Ecuador during the United Nations Conference, and a new circuit was also opened between San Francisco and Khabarovsk, USSR, to supplement the existing New York-Moscow circuit. During the fiscal year the New York-Rome radiotelephone circuit was re-established, with Italcable operating the foreign terminal. Construction of facilities for a circuit between San Juan, P. R., and St. Thomas, V. I., was authorized but as of June 30, 1945, the circuit had not yet been opened to the public. Radiotelephone tests which were conducted with Afghanistan indicated that a circuit with such country could not be operated on a satisfactory basis until

more efficient equipment is installed at the foreign terminal. Similarly the establishment of a new direct circuit to China is contingent upon the installation of new equipment at the Chinese terminal. During the fiscal year, a number of so-called cue channels used for controlling program transmission, were established on a temporary basis by the American Telephone & Telegraph Co. and by certain of the radiotelegraph carriers.

As a result of the end of the war in Europe, the Board of War Communications on May 10, 1945, canceled all of its orders restricting public radiotelephone service and the Office of Censorship undertook to formulate the necessary rules relating to the censorship on all of this service.

During the fiscal year 81 applications were received for point-to-point telephone service and 82 authorizations were issued. As of June 30, 1945, there were 16 licensed radiotelephone stations (including 3 domestic stations used for short distance toll telephone service within the United States).

RATES AND TARIFFS

Rate reductions—American Telephone & Telegraph Co., long lines department, and Associated Bell system companies.—Following negotiations by the Commission with the American Telephone & Telegraph Co. the Bell system agreed to effect an annual reduction in rates for long distance interstate telephone service anywhere in the United States beyond the distance of 790 miles and for foreign long distance telephone service beyond 810 miles between points in the United States and points in Canada, effective July 1, 1945. It is estimated that such reduced rates will save users of long distance telephone service approximately $21,000,000 a year. Individual reductions range from 10 to 37 percent, varying with distance and type of service. Coast-to-coast daytime station-to-station calls are reduced from $4 to $2.50 by reason of this reduction. When the Commission was created in 1934, the rate for a coast-to-coast call was $10.25. The Commission has been successful in obtaining subsequent reductions in this rate as follows: 1936, $8.50; 1937, $7.25; 1940, $4.

Special telephone charges of hotels, apartment houses, and clubs on interstate and foreign communications.—The United States Supreme Court on May 21, 1945, affirmed the decision of the Federal district court in Washington, D. C., enjoining various hotels in that city from continuing to collect surcharges on interstate and foreign telephone toll calls. This injunction was to enforce a provision included in message toll telephone tariffs filed by the Chesapeake & Potomac Telephone Co. (Washington, D. C.) with this Commission, effective February 5, 1944, providing that "message toll telephone service is furnished to hotels, apartment houses, and clubs upon the condition that use of the service by guests, tenants, members, or others shall not be made subject to any charge by any hotel, apartment house, or club in addition to the message toll charges of the telephone company, as set forth in this tariff." Identical tariff provisions had also been filed by the other Bell system telephone companies. The Supreme Court held that under the Communications Act of 1934, as amended, the tariff provision in question was a valid regulation of the use of telephone service; that a departure from this regulation was a viola-

tion of the Communications Act; and that a prosecution of an action to restrain such violation was authorized.

The Supreme Court, on May 28, 1945, in a per curiam opinion, also affirmed a decision of the Federal district court in New York, N. Y., enjoining various hotels in that city from continuing to collect surcharges on interstate and foreign telephone toll calls in violation of a tariff regulation of the New York Telephone Co. like the above-quoted regulation of the Chesapeake company. In this case, the New York Telephone Co. and the American Telephone & Telegraph Co. were also enjoined from furnishing interstate and foreign long distance telephone service to such of the defendant hotels as continued to violate the tariff regulation in question. On June 8, 1945, an injunction was granted by the Federal district court in Chicago, Ill., enjoining the collection of surcharges by various hotels in that city and enjoining the Illinois Bell Telephone Co. and the American Telephone & Telegraph Co. from giving interstate foreign toll service to any defendant hotel which continued to collect surcharges in violation of the tariff provision in question.

These enforcement proceedings were instituted by the Attorney General at the Commission's request, to enforce the tariff provision in question. (See pp. 5–6 for further discussion of the Supreme Court and the district court decisions.)

Complaints have been filed with the Commission by certain hotel associations against the Bell system telephone companies attacking the reasonableness of the tariff prohibition against collection of surcharges. At the request of the complainants, however, the hearings on these complaints have been postponed indefinitely.

It is estimated that elimination of these hotel surcharges will result in a saving to the users of the service of approximately $2,000,000 annually.

Reductions in rates for overseas message toll and program transmission services.—In the Commission's annual report for the fiscal year ended June 30, 1944, it was indicated that the American Telephone & Telegraph Co. had filed amended tariffs to become effective August 1, 1944, reducing the 3-minute week-day and Sunday rates for overseas message toll telephone service between the United States on the one hand and Argentina, Brazil, Chile, Peru, Colombia, Haiti, and Puerto Rico, on the other hand, and that rates for overseas program transmission channels would be reduced between the United States and the countries named, except Puerto Rico.

Following these changes the rates for overseas message toll service were substantially reduced between the United States and Costa Rica, Curacao, Guatemala, Honduras, Nicaragua, Panama, and Surinam on September 1, 1944; to and from Bahama Islands, Jamaica, and Hawaii on November 1, 1944; Bermuda on December 1, 1944; Trinidad on February 1, 1945; and Great Britain on June 23, 1945. The charge for a three-minute telephone call between New York City and London is now $12 as compared with the former week-day rate of $21.

On May 1, 1945, reduced rates for night message toll service were established to and from Brazil. The charges for program transmission channels are based on the message toll telephone rates and concurrent reductions followed for this service. Prior to the close of the year the company had filed amended tariff schedules reducing the rates for message toll and program services between the United States on

the one hand and Switzerland and Italy on the other hand. It had also reported the progress of negotiations tending toward lower rates to Australia, Barbados, Belgium, Bolivia, Holland, Norway, Paraguay, Portugal, Russia, and Uruguay.

Effective August 4, 1944, Press Wireless, Inc., established rates and regulations for "Leased Radiotelephone Service." This service permits a customer to select the frequencies desired by means of remote-control apparatus on his premises.

Effective August 26, 1944, Press Wireless, Inc., established rates for voice scheduled transmission service. This service permits for the first time the transmission of multiple address press messages by voice.

On September 24, 1944, Press Wireless, Inc., established point-to-point addressed program transmission service between New York and the liberated area of Belgium and the occupied area of Germany, and on November 15, 1944, to and from the Philippines.

Effective November 21, 1944, the Public Utilities California Corp. reduced rates for both interstate and intrastate message toll telephone service, the total annual savings to users being approximately $8,500.

Effective December 20, 1944, the Lorain County Radio Corp. discontinued report charges in connection with ship telephone service on the Great Lakes.

Effective January 1, 1945, as a result of the purchase of the Bridgeport Telephone & Telegraph Co. (Calif.) by the Interstate Telegraph Co., a reduction was made in rates for message toll telephone service.

Effective January 18, 1945, R. C. A. Communications, Inc., established rates for program transmission and reception service between New York and France.

Effective March 4, 1945, R. C. A. Communications, Inc., established rates for monthly program transmission service between New York, N. Y., and Buenos Aires, Argentina.

Effective March 13, 1945, the Bell Telephone Co. of Pennsylvania, the Diamond State Telephone Co. and the New Jersey Bell Telephone Co. discontinued the so-called "qualified toll line service." Under this service a 10-cent additional charge was applicable on message toll calls between certain exchanges in New Jersey and certain exchanges in Delaware and Pennsylvania.

Effective April 15, 1945, the American Telephone & Telegraph Co. reduced the rates for monthly program transmission service between New York and London, resulting in a savings of approximately $150,000 annually.

Effective May 7, 1945, R. C. A. Communications, Inc., reduced the rates for program transmission service between the United States and Ecuador.

On June 12, 1945, the Pacific Telephone & Telegraph Co. filed amended tariff schedules effective on July 15, 1945, establishing rates and regulations for ship telephone service through its new coastal harbor station at Eureka, Calif.

On June 29, 1945, the New England Telephone & Telegraph Co. filed amended tariff schedules, effective August 1, 1945, reducing the landline charges in connection with ship telephone service through its coastal harbor radiotelephone station at Boston, Mass.

Bell system license service contracts.—The Commission, acting in close cooperation with the committee designated by the National Association of Railroad and Utilities Commissioners, is continuing

its investigation of services performed by the American Telephone & Telegraph Co. for the Bell system associated companies and the American Telephone & Telegraph's long lines department, allegedly in fulfillment of the obligations imposed by the "license contract" between the American company and the 21 associated operating telephone companies. Studies are being conducted which include analyses of services rendered, the cost incurred in performing such services, and the reasonableness of the methods used in allocating such costs among the operating companies, including the long lines department.

Division of revenue contracts between American Telephone & Telegraph Co. and the associated companies.—During 1944 and 1945 the American Telephone & Telegraph Co. entered into new contracts with most of the associated companies for the division of revenues from interstate telephone toll service on hauls of more than 40 airline miles. Under these contracts the long lines department and the associated company agreed to divide net operating income from this business (before Federal income taxes) on the basis of the relative book cost of plant contributed by each of the contracting companies. The procedures for separations conform substantially to those considered at the public hearings. The results of operations under the new contract are being carefully studied.

Rate schedules.—At the close of the year, 345 communication carriers had tariffs and concurrences on file with the Commission.

Numerous irregularities in the rate schedules were corrected or eliminated through correspondence with the carriers.

Special permission.—During the year, 43 applications for special permission to make changes in the tariffs or to file tariffs to become effective on less than statutory notice were received from telephone carriers, all of which were granted.

SUPERVISION OF ACCOUNTS

New York Telephone Co. accounting.—On January 2, 1945, a three-judge district court, upon complaint by the New York Telephone Co., permanently enjoined and set aside the Commission's order of December 14, 1943, directing the New York Telephone Co. to charge $4,166,510.57 to its appropriate surplus accounts, which amount, after investigation and hearings by the Commission, was found to represent an inflationary write-up in the company's plant accounts. In a proceeding described in the last annual report of the Commission, the Commission had found that such write-up resulted from certain transfers of property to the New York Telephone Co. by its parent company, the American Telephone & Telegraph Co., at "prices" in excess of the net book cost to the parent company. This case is now pending before the United States Supreme Court. (For further discussion of the district court's decision see p. 4.)

Uniform system of accounts.—Several amendments were made to the uniform system of accounts prescribed by the Commission. These amendments, simplified the accounting requirements without sacrifice of records of essential accounting information. Among these amendments, for example, were provisions for direct credits to the telephone plant accounts of amounts representing property contributed to telephone carriers and the concurrent elimination of the liability account for such contributions. This change in accounting procedure simplifies the utilization of the accounts in rate cases.

Some progress was made toward a general revision of the uniform system of accounts for class A and class B telephone companies, prescribed by the Commission on June 19, 1935. Changes in the communications art and in the nature of the operations of the carriers as well as advancements in the science of accounting, particularly those that tend to make the books of account more informative, lead to the natural outmoding of many of the requirements of a uniform system of accounts and lead to the need for a comprehensive revision of such a system.

Original cost restatements and disposition of plant acquisition adjustments.—Efforts were continued toward appropriate adjustment of carriers' accounts reflecting amounts, reported as valid cost of communicating plant, in excess of prescribed original cost. Such amounts included in plant acquisition adjustment accounts were reduced during this year to the extent of approximately $3,000,000. In certain instances amounts were disposed of immediately through charges to income or surplus; in others the Commission approved amortization, through charges to income or surplus, over periods ranging up to 15 years. These reductions were accomplished without resort to formal proceedings. Reductions in larger amounts are expected to be effected in the future.

Continuing property records.—The date for completion of continuing property records has been extended from June 30, 1945, to June 30, 1946. Requirements of the uniform system of accounts with respect to the plans for the installation and maintenance of continuing property records have been the subject of conferences among representatives of this Commission and those of State commissions and the carriers. The carriers have substantially complied with such requirements.

Pacific Coast restatements.—As a result of further studies by the Commission and exchanges of views with the West Coast Telephone Co. and the State commissions of Oregon and Washington, the recorded investment of the telephone company was reduced by approximately $1,800,000 .

Depreciation.—Further studies were pursued regarding the changes in, and the property of, the depreciation rates of common carriers by wire and radio, in view of the vital importance of this work to the regulatory duties of the Commission with respect to rates and charges.

Relief and pensions.—A study was made of the proposed revision by the Bell system telephone companies of their actuarial computations and the resultant payments into their pension-trust funds, the revision being necessitated by the alleged increase in wage and salary scales. Certain studies were made with respect to the propriety of the methods used by certain carriers to determine the adequacy of the pension-trust funds. Consideration was given to the matter of charging current operating expenses with the cost of pensions based on service prior to the adoption of the pension plan. Other studies were also made of the data which were submitted by communication carriers regarding their pension plans.

Pennsylvania Telephone Corp. accounting.—On February 16, 1944, the Commission ordered a general investigation into the accounting performed, and the accounts, records, and memoranda kept by the Pennsylvania Telephone Corp. with respect to all entries made in its

account 100.4 "Plant Acquisition Adjustment," and further ordered that all charges to operating expenses which were made on or after January 1, 1943, for the purpose of amortizing the amounts in said account 100.4 be suspended, pending determination by the Commission as to the reasonableness and propriety of such charges. The company was also ordered to appear and show cause why the Commission should not refer the matter of certain apparent accounting violations to the Attorney General of the United States for the institution of appropriate proceedings. These violations involved the practice of making charges to operating expense to amortize amounts in its account 100.4, without the prior authorization of the Commission, as required by the Commission's accounting orders and regulations. Hearings in this mater were held in March 1944, in conjunction with the Pennsylvania Public Utilities Commission, and further hearings are pending.

Miscellaneous.—Other activities of the Commission in this field include:

Completed studies in the offices of two large telephone companies of the policies and practices of the carriers in extending credit and the accounting performed for uncollectible items.

Continued studies of the relative magnitude of the earnings of the carriers in relation to their investments.

Continued studies of American Telephone & Telegraph Co. long lines department, with respect to plant additions, working capital requirements, depreciation reserves, receipts and payments for lease and joint use of plant, and division of revenues from joint interstate business with other participating carriers.

The annual report form (Form M) for telephone companies was revised to reflect the changes in the methods of classifying employes (referred to in the report for the fiscal year 1944), to provide a more consistent method of reporting the carrier's depreciation practices, and to eliminate parts of several schedules of detailed information not deemed necessary of compilation during the wartime shortage of personnel.

After extended conferences among representatives of the Commission, the State commissions, and the telephone industry, amendments simplifying and clarifying the "standard practices for the establishment and maintenance of continuing property records by telephone companies" were adopted by the Commission.

ECONOMICS AND STATISTICS

Economic studies.—Basic economic studies were begun in 1945 on several questions related to the telephone industry. One of these concerned the availability of service. A preliminary report on some aspects of the availability of landline communications service was prepared and published in October 1944. While such study dealt with both telegraph and telephone service, the most striking result of the analysis was the disclosure of the declining trend which prevailed between 1920 and 1940 in the availability of telephone service to farmers. Between those years the number of telephones on farms decreased 39 percent while the number of farms with the dwelling lighted by electricity increased 34 percent.

Statistics and general studies.—Annual reports containing financial and operating data were filed by 156 common carriers, and 41 controlling companies for the calendar year 1944. The number of common carriers reporting includes 129 telephone and 27 wire telegraph, ocean cable, and radiotelegraph carriers.

Considerable data are shown in the publication "Statistics of the Communications Industry in the United States," which is published annually. A few financial and operating items are shown in the following table, which were compiled from the annual reports filed by telephone carriers:

Telephone carriers

Item	1944	1943	Percent, increase or (decrease)
Investment in plant and equipment	$5,856,316,360	$5,749,404,257	1.86
Depreciation and amortization reserves	$1,987,628,404	$1,815,817,128	9.46
Net investment in plant and equipment	$3,868,687,956	$3,933,587,129	(1.65)
Local service revenues	$1,052,143,699	$1,015,417,529	3.62
Toll service revenues	$766,160,211	$683,249,608	12.13
Total operating revenues [1]	$1,904,406,470	$1,779,244,520	7.03
Operating expenses [1]	$1,234,521,876	$1,143,350,306	7.97
Taxes, including income and excess profits	$438,581,635	$393,854,121	11.36
Net operating income after all taxes	$231,303,259	$242,040,393	(4.44)
Net income	$183,740,662	$194,244,968	(5.41)
Dividends paid	$185,670,632	$181,860,721	2.09
Company telephones:			
Business	8,339,007	8,389,888	(.61)
Residential	15,044,664	14,683,244	2.46
Average number of calls originating per month:			
Local [2]	3,225,654,898	3,232,537,623	(.21)
Toll [2]	132,586,772	121,494,120	9.13
Number of employes at end of October:	365,308	368,603	(.89)
Male	102,230	103,330	(1.06)
Female	263,078	265,273	(.83)
Total pay roll for the year	$807,110,401	$752,259,155	7.29

[1] Intercompany general service and license fees and rents amounting to approximately $35,000,000 for each of the years 1944 and 1943, have not been eliminated.
[2] Partly estimated.

2. TELEGRAPH (WIRE, CABLE, RADIO)

(a) Domestic

SERVICE AND FACILITIES

Integration of domestic telegraph systems—Consolidation of telegraph facilities.—Following the Commission's final report and order authorizing and approving merger of Western Union and Postal facilities (discussed at length in our tenth annual report), Western Union has, with the exception of 3 functional offices, completed the consolidation of duplicating telegraph offices. Between October 7, 1943, and June 30, 1945, the following offices have been closed: Functional, 87; tributary, 637; branch, 530; agency, 462; joint, 27. As part of the consolidation program, 105,682 duplicate call boxes and 3,682 duplicate teleprinter customer tie lines were removed. The removal or abandonment of duplicating trunk pole lines has not, as yet, been undertaken although local and branch line facilities comprising 6,000 miles of wire and 324 miles of pole line have been removed.

During the year, Western Union opened new offices as follows: Tributary, 24; branch, 32; agency, 169; joint, 33; and the company installed 1,983 new customer teleprinter tie lines.

Integration of Postal Telegraph employes into the Western Union system.—In the course of the hearings on the application of the Western Union Telegraph Co. and Postal Telegraph, Inc., to merge various commitments were made by Western Union on matters of seniority, job assignment and wage parity of employes affected by the merger. Compliance with these commitments was subsequently incorporated by the Commission as a condition in numerous orders issued under section 214 of the Communications Act authorizing Western Union to close former Postal functional offices. Disputes arose subsequent to merger and numerous complaints were received by the Commission with respect to compliance by Western Union with its commitments. Arbitration machinery was established by the National War Labor Board in June 1944, for the settlement of these disputes and under this machinery, integration of the two labor forces was substantially completed. An employe election was held by the National Labor Relations Board and in January 1945, the American Federation of Labor was certified as the collective bargaining representative for employes in six of the seven divisions of the Western Union system. Thereupon, the A. F. of L. challenged the authority of the arbitrator to continue the settlement of disputes presented to him by ex-Postal employes and, at the close of the fiscal year, the National War Labor Board suspended further arbitration of these disputes outside New York City pending disposition of the union's protest.

Construction of wire facilities.—During the year under report, 102 applications for wire telegraph construction certificates were filed with the Commission and 8 were on hand from the preceding year. Of these 104 were granted and 6 were pending at the close of the year. The authorizations involved the construction of 269,965 channel miles of carrier systems at an estimated cost of $1,162,651 and the leasing of approximately 2,214 miles of circuits by the applicants.

A notable improvement in Western Union's method of handling traffic in the Pacific coast area resulted from the inauguration on December 30, 1944, of the company's reperforator switching office in Oakland, Calif. This large office, operating direct channels to many cities in the country, provides methods for the rapid relaying and routing of telegraph messages in this important area.

New telegraph carrier systems were installed by Western Union during the year between Chicago and St. Louis and between New York and Washington. Carrier systems provide high grade communication channels at relatively low cost and definitely tend to improve the stability of transmission.

Speed of service.—The quality of telegraph service supplied by Western Union continued to improve as the merging of personnel and facilities progressed. The average time required for the fastest 95 percent of ordinary full rate messages to be relayed through a telegraph message center (for Western Union and former Postal offices combined) in June, 1944, was 9.8 minutes. In June 1945 the performance had improved to 8.8 minutes. The percent of such messages completed in 15 minutes was 82 and 87.8, respectively.

The volume of TWX connections (Teletypewriter Exchange Service operated by the Bell Telephone system), declined from 1,214,791 in June 1944 to 1,095,687 in June 1945—a reduction of 10 percent. The

average time required to establish TWX connections between subscribers has improved from 1.8 minutes in June 1944 to 1.6 minutes.

Domestic radiotelegraph.—As in the case of radiotelephony, many new developments have been made and are being made in radiotelegraphy. During the fiscal year the Western Union Telegraph Co., the American Telephone & Telegraph Co. and other communications common carriers applied for and obtained experimental authorizations looking forward to the development of radio relay systems capable of carrying multitelegraphic as well as other types of communications channels. A number of applications have been granted to enable other organizations to carry on similar experiments (e. g., International Business Machine Corp., General Electric Co., Westinghouse Electric Co., Raytheon Manufacturing Co.).

Radiotelegraph relay systems may prove capable of carrying a great number of telegraph channels of all types, including facsimile. Such systems will allow the Western Union Co. to remove some of its pole lines on main line trunk routes.

Discontinuance, reduction, or impairment of service.—Section 214 of the Communications Act of 1934 was amended by Congress on March 6, 1943, to provide, among other things, that no carrier shall discontinue, reduce, or impair service to a community, or part of a community, unless and until it has obtained from the Commission a certificate that neither the present nor future public convenience and necessity will be adversely affected thereby.

As of the beginning of the fiscal year, 13 applications filed under this amendment were pending and 133 were received during the year. Of those received, 38 were for authority to reduce office hours, 51 to close agency offices at military points, 28 to close railroad operated agency offices due to abandonment by railroads or shortage of railroad operators, 6 to close branch offices, 6 to close agency offices, 2 to close main offices, 1 to remove an ocean cable, and 1 to discontinue operation by the substitution of another company. With the exception of a very few cases alternate service was provided to the community or part of a community affected. Of these 146 applications, 95 were granted, 3 were denied, 1 was withdrawn, and 47 were pending as of June 30, 1945.

RATES AND TARIFFS

Rationalization of the domestic telegraph rate structure.—In the report accompanying its order of approval of the merger of the domestic telegraph carriers, the Commission pointed out that it recognized that the present telegraph rate structures were developed under competitive conditions which produced numerous anomalies and questionable discriminations, and which resulted in the establishment of preferential rate classifications; that the elimination of competition within the domestic telegraph industry will permit correction of these and other anomalies; and that the economies and other benefits resulting from the merger are expected to make possible substantial reductions in rates. The Commission observed that such reductions should be accompanied by a rationalization of the rate structure so that unwarranted preferences are eliminated, and the basic classifications are established in such a manner as to stimulate greatly increased volumes of traffic, with resulting savings in cost. The Commission is now studying telegraph rates and services with a view to accomplishing the merger objectives outlined above, and has been following closely

the activities of Western Union in attempting to develop a revised rate structure.

Telegraph rate changes.—On July 1, 1944, the American Telephone & Telegraph Co. established rates for 100-speed private line teletypewriter service for a trial period of 1 year at charges 33⅓ percent higher than for 60-speed service. Later in the fiscal year the Pacific Telephone & Telegraph Co. and the Western Union Telegraph Co. established the service at the same charges.

On June 29, 1945, the American Telephone & Telegraph Co. filed amended tariff schedules effective July 1, 1945, reducing the charges for 75- and 100-speed private line teletypewriter service, resulting in an estimated annual saving to users of $120,000. These reductions followed conferences between representatives of the company and members of the staff of the Commission.

Government rate order.—Pursuant to the authority of the Post Roads Act of 1866 and subsequent legislation, the Commission promulgated its annual order fixing rates applicable to United States Government telegraph messages for the ensuing fiscal year beginning July 1, 1945. The new order (No. 125) continues in effect the same rates prescribed for the past fiscal year except for certain minor changes which will result in annual savings to the Government of approximately $32,900. Since July 1, 1943, the rates for Government domestic telegraph messages have been fixed at 80 percent of the rates charged the public for the same class of service, and the rates for international messages of the United States Government are not to exceed 50 percent of the United States carriers' proportions of the rates for commercial messages of the corresponding classes.

Special permissions.—During the year 289 applications for special permissions to make changes in tariffs, or to file tariffs to become effective on less than statutory notice, were received from the carriers rendering domestic and international telegraph services. Of this number 262 were granted, 16 were denied, and 11 were withdrawn.

SUPERVISION OF ACCOUNTS

Uniform systems of accounts.—Several amendments were made to the uniform systems of accounts prescribed by the Commission.

Original cost restatement of plant accounts and establishment and maintenance of continuing property records.—Conferences and examinations conducted by the Commission concerning the accounts and records of Western Union have resulted in substantial progress in connection with the restatement of such accounts on the basis of original cost, and the establishment of property units for accounting purposes and for purposes of continuing property-record procedure required by the Commission's rules and regulations.

Depreciation.—Studies of the changes in, and the propriety of, the depreciation rates and the adequacy of the depreciation reserves of telegraph common carriers by wire, cable, and radio were pursued, in view of the vital importance of this work to the regulatory duties of the Commission with respect to rates and charges for communication services.

In the case of Western Union, there was substantial continuation of the program of reducing, on the basis of findings by the Commission's staff, the net recorded investments in fixed capital (that is,

plant investment accounts less depreciation and amortization reserves) by adjustments increasing the reserves and directly reducing the recorded surplus. The total adjustment in this respect as of December 31, 1944, amounted to approximately $77,400,000. A further proposed adjustment of about $31,000,000 was the subject of additional study at the end of the year.

Relief and pensions.—Further studies were made regarding the matter (which is still pending) of excluding from the current operating expenses of Western Union all pension costs in excess of normal accruals on the full-service basis (that is to say, the respective annual amounts that would be paid into a pension trust fund if the company had established such a fund, during the employes' successive periods of service). Studies were also made of the propriety of the accounting pursued by certain communication carriers in recording the cost of maintaining their pension plans.

Miscellaneous.—The annual report form (Form 0) was revised in several instances and particularly to reflect the changes in the methods of classifying the employes of domestic wire telegraph companies.

The time required for the retention by domestic telegraph carriers of copies of telegraph messages transmitted by them was extended to a period of 6 months.

Statistics and general studies.—There were 27 wire telegraph, ocean cable, and radiotelegraph carriers that filed annual reports for the year 1944. A few financial and operating items compiled from the report filed by the Western Union Telegraph Co. are shown in the following table. The figures include the ocean cable operations of Western Union, which are not adequately segregated in the report filed by that company to permit segregation from the wire telegraph operations. The data relating to other ocean cable carriers are shown on page 48.

The Western Union Telegraph Co.

Item	1944	1943	Percent, increase or (decrease)
Investment in plant and equipment	[1] $389, 086, 101	$344, 034, 810	13. 09
Depreciation and amortization reserves	[1] 164, 991, 222	$112, 814, 280	46. 25
Net investment in plant and equipment	$224, 094, 879	$231, 220, 530	(3. 08)
Domestic service revenues	$158, 032, 270	$153, 133, 698	3. 20
Foreign service revenues	$12, 199, 047	$11, 507, 878	6. 01
Total-operating revenues	$185, 903, 644	$178, 887, 319	3. 92
Operating expenses, depreciation, and other operating revenue deductions	$166, 277, 089	$165, 168, 770	. 67
Net operating revenues	$19, 626, 555	$13, 718, 549	43. 07
Income and excess profits taxes	$3, 831, 000	$4, 940, 000	(22. 45)
Net income	$8, 316, 229	$1, 750, 626	375. 04
Dividends declared	$2, 166, 747	$2, 090, 080	3. 67
Revenue messages transmitted:			
Domestic	233, 188, 694	232, 083, 099	. 48
Foreign	5, 515, 588	5, 656, 573	(2. 49)
Number of employes at end of June	63, 818	68, 846	(7. 30)
Total pay roll for the year	$116, 130, 330	$114, 872, 601	1. 09

[1] Not comparable with amounts reported for Dec. 31, 1943, because of accounting adjustments for Postal Telegraph plant purchased Oct. 7, 1943; comparable 1943 amounts are $396,600,846 and $165,380,316 for plant and depreciation allowance, respectively.

(b) International

SERVICE AND FACILITIES

General.—In March 1945, the Senate Committee on Interstate Commerce held hearings pursuant to Senate Resolution 187, Seventy-

eighth Congress, (as extended by S. Res. 24, 79th Cong.), directing a study of international communications by wire and radio. The Commission, through its Chairman, presented testimony at such hearing.

In April 1945, Press Wireless, Inc., filed a petition for the assignment to it of not less than 15 additional frequencies and requested the Commission to hold hearings to determine the relative efficiency of the use being made by the various carriers of the frequencies presently assigned to them. As of the close of the fiscal year, no final disposition of this petition had been made.

The Commission actively participated in the preparation of the United States proposals for the Third Inter-American Radio Communications Conference to be held in Rio de Janeiro in September 1945, and also continued detailed preparations for the World Telecommunications Conference expected to be held in 1946, and for various telecommunications conferences with other countries, preliminary to the World Conference.

During the fiscal year, Globe Wireless, Inc., which had discontinued commercial operations of its radiotelegraph stations on June 3, 1942, and had leased its facilities to the United States Army, resumed commercial operation of its radiotelegraph circuit between San Francisco and Honolulu, T. H. The reactivation of this company's station in New York was approved on May 3, 1945, but has not yet been placed in operation. Prior to the war, Globe Wireless, in addition to its circuit to Hawaii, operated circuits from the United States to China, the Philippine Islands, Cuba, and Colombia.

Radiotelegraph circuits.—During the fiscal year, radio-telegraph circuits were established between the United States, on the one hand, and France, Belgium, Netherlands, Denmark, Norway, and Czechoslovakia on the other hand, restoring direct radiotelegraph services which had existed prior to the war. In each of these cases, except Belgium and Netherlands, Press Wireless, Inc., was authorized to establish a circuit for the handling of press traffic only, while one or more of the other United States carriers was authorized to open circuits handling all classes of traffic. In addition to these circuits with fixed stations in liberated European countries, three carriers were authorized to communicate with portable radiotelegraph stations which were operated by them at various points in Europe, as directed by the military authorities. During the active stages of hostilities, these portable stations accompanied the various units of the United States armed forces, and since the conclusion of the European war, such stations have been located in various parts of Germany and Austria, which are under American occupation. A new circuit to Rumania, which was not in existence prior to the war, was also established for general commercial traffic, and an additional press circuit to such country was authorized but had not been placed in operation as of the close of the fiscal year.

The establishment of new circuits to the Far East was on a more limited scale, since active hostilities were in progress in the Pacific area throughout the fiscal year. At the request of the military authorities in the Philippines, one of the United States carriers installed a portable station at Leyte, communicating with its United States terminal, in order to handle all classes of messages passed by Army

censorship. This station was ultimately moved to Manila, where it is now installed on a permanent basis. Thereafter a second United States carrier was authorized to reopen its prewar circuits between Manila and the United States and between Manila and Hawaii, involving the installation by it of a station at Manila.

New radiotelegraph services instituted during the fiscal year to points in the Western Hemisphere included the establishment of additional circuits for handling press and Government traffic between New York and Buenos Aires and between New York and Santiago, Chile. A direct radiotelegraph circuit between San Fancisco and Rio de Janeiro was established at the request of the Brazilian delegation to the United States Conference, and this circuit was continued on a temporary basis after the close of the conference. At the request of the Mexican Government, the Commission authorized the establishment of a new circuit between New Orleans and Merida, Mexico, in order to expedite message traffic between the United States and the Yucatan Peninsula. At the request of the Colombian Government, the Commission also authorized the establishment of a new circuit between Boston and Bogota, Colombia, to supplement the handling of traffic from Miami to that country. A construction permit was granted for the erection of a new radiotelegraph station on St. Thomas, V. I., for communication with San Juan, P. R. This was the only new point-to-point radiotelegraph station licensed during the 1945 fiscal year, and when in operation, will be used to supplement existing cable circuits between the Virgin Islands and Puerto Rico.

In accordance with outstanding recommendations of the Board of War Communications, the Commission continued to refer to the Board all applications for the establishment of transoceanic circuits and to authorize such circuits on a temporary basis only, for a period not to exceed 1 year. Wartime procedures, involving the maintenance of close liaison on these matters with the Board of War Communication, the Department of State and the Joint Chiefs of Staff, were continued. During the fiscal year the Board of War Communications relaxed its former policy of approving the establishment of only one circuit to points in the war zones, and approved the opening of circuits by all interested United States carriers, permitting the Commission to authorize competitive circuits by qualified carriers. All circuits authorized by the Commission were subject to the condition that interference would not be caused to operational circuits of the United States armed forces.

The expansion of radiotelegraph service while hostilities were still in progress caused increased congestion in the frequency spectrum. Such difficulties were particularly acute in the Far East after increased war activities shifted to that region, and because of the continuance of communication needs of occupation forces in Europe, little relief was experienced in that area.

A total of 273 applications, covering various matters, were received and during the fiscal year 282 authorizations were issued. As of the end of the fiscal year a total of 36 fixed public point-to-point radiotelegraph stations were licensed.

Ocean cables.—During the fiscal year cable communication services of the United States companies to continental Europe were restored. Direct facilities were made available to France and Italy,

service with the latter country being provided over a former enemy-owned cable between Italy and the Azores. Service to the United Kingdom, Eire, and the Azores, which had not been interrupted during the war, was continued.

The Commission approved the abandonment of 11 short sections of cable totaling 5,073 nautical miles (between various points in Central and South America) the continued use of which had become uneconomical because of extreme age. In view of the small volume of traffic handled over these sections and the availability of alternate wireline facilities connecting the points in question with other cable stations, the Commission determined that public convenience or necessity would not be adversely affected by these abandonments. The Pacific cable between Midway Island and Guam was restored during the fiscal year and reopened for the handling of commercial correspondence, thus providing cable facilities for public communications from the United States to Guam.

RATES AND TARIFFS

Rates and charges for telegraph communication service between the United States and foreign points.—In line with objectives of obtaining lower and generally uniform international communications rates throughout the world, the Commission, in April 1945, authorized the principal international cable and radiotelegraph carriers to file revised tariff schedules on less than statutory notice, effective May 1, 1945, providing for a uniform 20 cents per word basic rate on full rate messages from the United States gateway points to Europe, Central America, West Indies, South America, and the Philippine Islands. Prior existing rates to European points ranged from 23 to 36 cents per word and to some Latin American points were as high as 48 cents per word. Corresponding reductions in the other classifications were also effected, such rates being, from United States gateways, as follows: Code, 12 cents per word; deferred, 10 cents per word; night letter, 6⅔ cents per word.

The Commission also authorized Western Union to file on less than statutory notice a uniform charge of 4 cents per full rate word effective May 1, 1945, for transmitting international telegrams overland to and from any point in the United States beyond the gateway cities, replacing charges ranging from 4 to 15 cents per full rate word. The charges of Western Union for the overland transmission of messages in the other classifications have correspondingly been placed on a flat charge basis as follows: Code, 4 cents per word; deferred, 3 cents per word; night letter, 2 cents per word; and United States Government plain language and code, 2 cents per word.

Under the new tariffs, which become effective May 1, 1945, the charges for a full rate telegram to any place in Europe, Latin America, and the Philippine Islands from United States gateway cities, is 20 cents per word; from any other point in the United States, the rate is 24 cents per word.

The over-all matter of international telegraph rates is still under investigation by the Commission in its docket 6569, which is a proceeding involving the rates and charges of all international tele-

graph carriers in connection with telegraph service between the United States and all foreign points.

Rates between the United States and Brazil.—The Commission adopted an order on October 9, 1944, suspending, and ordering an investigation into the lawfulness of, certain new rates filed with the Commission by Western Union for telegraph communication service from Brazil to the United States, and further ordering an investigation into the lawfulness of the then existing rates of Western Union for service between the United States and Brazil.

After public hearings and argument, the Commission found that Western Union had failed to show the justness and reasonableness of the differentials shown in its existing tariffs and in its suspended tariffs as between the charges for north-bound telegraph messages from points in Brazil to points in the United States and the charge for similar messages in the reverse direction; that Western Union failed to show the justness and reasonableness of the differentials in such tariffs as between the charges for north-bound plain language and code messages in both the ordinary and Government classifications; and that Western Union's maintenance of, or participation in, charges resulting in the aforementioned differentials constitute or would constitute unjust or unreasonable discrimination. Accordingly, by order dated January 25, 1945, the Commission directed Western Union to rescind and cancel the suspended rates and charges and to revise its then effective tariffs to conform with the conclusions in the Commission's accompanying report. In accordance with the Commission's order, Western Union rescinded and canceled the suspended tariffs and subsequently filed revised tariffs which conformed to the Commission's order.

Telegraph rate changes.—On July 11, 1944, the ordinary press rates published by the Western Union Telegraph Co. between the United States and Australia and New Zealand via the Vancouver cable were reduced to the level of the rates for charges by the radiotelegraph carriers for similar messages via San Francisco.

On July 24, 1944, Mackay Radio & Telegraph Co., Inc., reduced the rates for Press Bulletin Service to ships and aircraft by approximately 50 percent.

Effective August 15, 1944, Mackay Radio & Telegraph Co., Inc., and R. C. A. Communications, Inc., reduced the rates for ordinary press messages to Egypt via their direct circuits by 10 cents a word to 8 cents a word from Egypt.

Effective September 1, 1944, All American Cables & Radio, Inc., Mackay Radio & Telegraph Co., Inc., R. C. A. Communications, Inc., and the Western Union Telegraph Co. established specially reduced rates for ordinary and code messages of the Pan American Union and the Pan American Sanitary Bureau from the United States to South and Central America and the West Indies.

On September 20, 1944, rates for telegraph messages from Uruguay to the United States were reduced. The reduction followed conferences between representatives of the Commission and the Uruguayan authorities.

Effective October 1, 1944, Press Wireless, Inc., reduced the rates for United States and Mexican Government messages between the company's offices in the United States and certain points in Mexico.

Effective October 7, 1944, Mackay Radio & Telegraph Co., Inc., reduced its rates for telegraph service between the United States and Vatican City via its direct circuit from 27 to 15 cents per word for full rate messages from or to New York with proportionate reductions for other classes of messages. The Western Union Telegraph Co. filed the same rates effective November 20, 1944.

Effective November 1, 1944, the United States-Liberia Radio Corp., and R. C. A. Communications, Inc., reduced the rates between the United States and Liberia over their direct circuits. Full rates were reduced from 72 to 50 cents per word and ordinary press rates from 24 to 10 cents a word. On January 29, 1945, the same rates were established by other carriers via London.

Effective November 10, 1944, R. C. A. Communications, Inc., reduced the rates for ordinary press messages between the United States and Greece by approximately 3½ cents a word.

On December 1, 1944, R. C. A. Communications, Inc., reduced the rates for ordinary press messages from Colombia to the United States by approximately 1 cent a word.

Effective November 16, 1944, All America Cables & Radio, Inc., and R. C. A. Communications, Inc., reduced the rates for telegraph messages (except ordinary press) from Venezuela to the United States.

Effective December 1, 1944, the Commercial Cable Co., Mackay Radio & Telegraph Co., Inc., and R. C. A. Communications, Inc., reduced the rates for ordinary press messages between the United States and India to 11½ cents a word.

Effective January 1, 1945, All America Cables & Radio, Inc., Mackay Radio & Telegraph Co., Inc., R. C. A. Communications, Inc., and Tropical Radio Telegraph Co. reduced the rates for telegraph messages between San Francisco, Calif., and Costa Rica, Guatemala, Honduras, Nicaragua, and Salvador, to the level of the rates to these countries from New York.

Effective in March, April, and May, 1945, telegraph rates applicable to United States Government messages between United States and certain foreign countries were made applicable to messages of the American Red Cross, the United Service Organizations, and the United Nations Relief and Rehabilitation Administration.

SUPERVISION OF ACCOUNTS

Uniform systems of accounts.—Several amendments were made to the uniform systems of accounts prescribed by the Commission. These amendments simplified the accounting requirements without sacrifice of records of essential accounting information. Important among such amendments were those extending for 1 year the time allowed for the filing of information with respect to the reclassification of the plant accounts and for the completion of continuing property records of ocean cable companies.

A preliminary draft of a new uniform system of accounts, to apply to international telegraph carriers by cable or radio (or a combination of cable and radio), was prepared and was in process of consideration and verification of factual information by the Commission's staff at the close of the fiscal year.

Original cost restatements and disposition of plant acquisition adjustments.—Studies by the international telegraph carriers necessary

for reclassification of their operated plant to conform with provisions of the uniform system of accounts are not yet completed and the time for completion has been extended to January 1, 1946. Substantial progress toward completion has been reported by the carriers.

Continuous property records.—The date for completion of continuous property records has been extended from June 30, 1945, to June 30, 1946. The Commission has been working closely with the carriers on the subject of requirements for the filing of plans of methods of procedure in the maintenance of such records, which are being pursued.

Depreciation.—Studies of the changes in, and the propriety of, the depreciation rates of the international telegraph common carriers were continued.

Relief and pensions.—A further study was made by the Commission of the pension and benefit plans of the several international telegraph carriers in view of the pending study being conducted by the Senate Committee on Interstate Commerce of international communications carriers.

Consideration was given to the matter (still pending) of excluding from current operating expenses of Radiomarine Corp. of America and R. C. A. Communications, Inc., all costs relating to pensions based on service prior to the adoption of their present retirement plan. These companies had discontinued, as of August 19, 1932, the provision for pension benefits to new employes, but have revised, as of December 1, 1944, such provisions for employes who entered the service after August 19, 1932.

The Commercial Cable Co. accounting.—The Commission ordered the Commercial Cable Co. on June 5, 1945, to suspend all charges and credits with respect to its plan of accounting for the reduction of its capital, pending submission of proof as to the amounts properly includible in its capital surplus accounts. The order also instituted a general investigation into the accounting performed by the company with respect to its surplus accounts.

STATISTICS

Statistics.—Financial and operating data compiled from the annual reports filed by the principal international carriers are shown in the following tables:

Ocean Cable Carriers

Item	1944	1943	Percent, increase or (decrease)
Investment in plant and equipment	$78, 566, 248	$80, 830, 592	(2. 80)
Depreciation and amortization reserves	$56, 017, 268	$56, 321, 142	(. 54)
Net investment in plant and equipment	$22, 548, 980	$24, 509, 450	(8. 00)
Domestic service revenues	$682, 846	$527, 706	29. 40
Foreign service revenues	$15, 494, 684	$12, 783, 442	21. 21
Total operating revenues	$16, 908, 473	$14, 275, 053	18. 45
Operating expenses, depreciation, and other operating revenue deductions	$12, 308, 622	$10, 432, 276	17. 99
Net operating revenues	$4, 599, 851	$3, 842, 777	19. 70
Income and excess profits taxes	$1, 077, 032	$1, 933, 691	2. 24
Net income	$2, 591, 056	$1, 941, 537	33. 45
Dividends declared [1]	$5, 491, 093	$811, 332	576. 80
Revenue messages transmitted:			
Domestic	527, 633	399, 187	32. 18
Foreign	4, 343, 052	4, 102, 844	5. 85
Number of employes at end of year	3, 200	3, 023	5. 86
Total payroll for the year	$6, 179, 706	$5, 443, 594	13. 52

[1] Includes $3,535,926 charged to capital surplus.

The figures shown above do not include data relating to the cable operations of the Western Union as they are not adequately segregated from the wire telegraph operations in the reports filed by that company. The number of messages and amounts of revenues derived from cable operations as reported by the Western Union for 1944 and 1943 were as follows:

Item	1944	1943	Percent, increase or (decrease)
Foreign service revenues	$12,199,047	$11,507,878	6.01
Foreign revenue messages transmitted	$5,515,588	$5,656,573	(2.49)

Radiotelegraph carriers

Item	1944	1943	Percent, increase or (decrease)
Investment in plant and equipment	$26,836,664	$26,671,803	0.62
Depreciation and amortization reserves	$16,066,358	$15,693,482	2.38
Net investment in plant and equipment	$10,770,306	$10,978,321	(1.89)
Continental and insular fixed revenues	$876,240	$865,179	1.28
Foreign fixed service revenues	$11,713,889	$8,578,412	36.55
Marine service revenues	$25 087	$16,953	47.98
Total operating revenues	$16,784,362	$13,482,746	24.49
Operating expenses, depreciation, and other operating revenue deductions	$12,682,987	$10,269,573	23.50
Net operating revenues	$4,101,375	$3,213,173	27.64
Income and excess profits taxes	$4,934,666	$3,522,964	40.07
Net income	$1,664,327	$2,069,500	(19.58)
Dividends declared [1]	$1,555,000	$920,000	69.02
Revenue messages transmitted:			
Continental and insular fixed	518,314	655,066	(20.88)
Foreign fixed	6,351,607	5,170,231	22.85
Marine	10,120	6,831	48.15
Number of employes at end of year	3,359	3,293	2.00
Total pay roll for the year	$10,244,629	$8,087,853	26.67

[1] Includes $246,420 charged to capital surplus.

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CHAPTER V

Safety and Special Services

1. MARINE SERVICES
2. AVIATION RADIO SERVICES
3. EMERGENCY RADIO SERVICES
4. WAR EMERGENCY RADIO SERVICE
5. EXPERIMENTAL RADIO SERVICES
6. MISCELLANEOUS RADIO SERVICES
7. STATISTICS
8. INSPECTIONS

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CHAPTER V—SAFETY AND SPECIAL SERVICES

1. MARINE SERVICES

COASTAL RADIOTELEGRAPH STATIONS

As of June 30, 1945, 34 coastal telegraph stations were licensed by the Commission, exclusive of those in Alaska. Three of these were authorized for limited (governmental) coastal telegraph service and the remaining 31 stations for public coastal telegraph service. During the year 61 applications were received and 46 authorizations issued in the coastal telegraph service. Three coastal telegraph stations, which, because of the wartime restrictions of the Navy Department, had been closed, were opened during the past year and were relicensed by the Commission for public service. These stations are WSC, at Tuckerton, N. J.; WSF, at New York, N. Y.; and WDA at Port Arthur, Tex.

COASTAL RADIOTELEPHONE STATIONS

Four stations held licenses for public coastal telegraph service at the close of the fiscal year.

COASTAL HARBOR RADIOTELEPHONE STATIONS

At the close of the year, 35 coastal harbor stations were licensed by the Commission, exclusive of those in Alaska. Two of these stations were authorized for limited (governmental) coastal harbor service and the remaining 33 stations were authorized for public coastal harbor service. During the year 67 applications were received and 60 authorizations issued in the coastal harbor service. A new public coastal harbor station, KOE, near Eureka, Calif., established for communication with ships in vicinity of San Francisco, was placed in operation.

MARINE RELAY RADIOTELEGRAPH STATIONS

Twenty-one marine relay stations held licenses. During the year 31 applications were received and 28 authorizations were issued. The activity of stations in this classification has increased because of the lifting of wartime security restrictions in the Atlantic and Gulf of Mexico areas. The 3 coastal stations listed above—WSC, WSF, and WDA—also render a marine relay service.

MOBILE PRESS STATIONS

There were 3 licensed mobile press stations, 3 applications were received and 3 authorizations issued.

RELAXATION OF NAVAL REGULATIONS

The Navy Department still further relaxed the restrictions on the use of radio communication between ships and between ship and shore

which had been imposed pursuant to order Nos. 1 and 2 of the Defense Communications Board (now Board of War Communications).

WEATHER AND HYDROGRAPHIC INFORMATION

In cooperation with the Canadian Radio Administration, the United States Weather Bureau, and the United States Naval Authorities, the Commission in previous years has developed schedules for the encoded transmission of weather and hydrographic information to ships in the Great Lakes area. Coastal harbor radio stations authorized to transmit such information in accordance with this schedule were WAY, Lake Bluff, Ill.; WLF, Rogers City, Mich.; WAD, Port Washington, Wis.; WAS, Duluth, Minn.; WBL, Buffalo, N. Y., and WMI, Lorain, Ohio. These authorizations were extended this year with certain changes made in the previously used schedule and with the restrictions relative to the transmission of encoded weather information relaxed to permit transmission of this information in plain language insofar as such transmissions do not conflict with Naval regulations.

STUDIES OF LIFEBOAT RADIO EQUIPMENT

The Commission continued its cooperation, in a study being conducted by Government agencies under direction of the Joint Chiefs of Staff, designed to coordinate air and sea rescue work. Projects include the testing of experimental models of lifeboat radio equipment and a survey of the deficiencies of equipment of this nature now in use.

APPROVAL OF EQUIPMENT

Several new types of marine radio equipment for use on Board ocean-going vessels which were designed and constructed to meet certain requirements of the Commission's rules and regulations were approved by the Commission.

Three additional types of receivers were approved during the year as capable of being used and operated within the limitation imposed by the Commission concerning the radiation of energy which may be detected at sea by enemy vessels. Four additional types of direction finder receivers were similarly approved. Two portable radio transmitters for use in lifeboats were approved as complying with the applicable rules of the Commission. One radiotelegraph transmitter, designed to operate as an emergency transmitter, was approved by the Commission.

EXEMPTIONS

The Commission is authorized by the International Convention for the Safety of Life at Sea, London, 1929, and section 352(b) of the Communications Act of 1934, as amended, to grant exemptions from the ship radio requirements prescribed therein to certain vessels and classes of vessels when navigated within certain specified limits, provided the Commission considers that the route and conditions of the voyage, or other circumstances, are such as to render compliance therewith unnecessary or unreasonable for the purposes of the act and treaty. It has been the policy of the Commission to grant exemption on an annual basis for certain classes of vessels and to exempt individual vessels for limited periods of time sufficient to cover the specified voyages.

The Commission renewed for another year the exemption previously granted to small United States passenger vessels of less than 100 gross tons when navigated off the Gulf Coast solely in coastal waters between Naples, Fla., and New Orleans, La.

In addition to the foregoing class exemptions, the Commission granted exemption for a period of 1 year to certain individual passenger and cargo vessels operating on international voyages.

FIXED PUBLIC AND MARINE SERVICES IN ALASKA

At the close of the year, the following stations were authorized by the Commission in the fixed public and public coastal services in the Territory of Alaska:

Coastal Harbor, 124; Coastal Telegraph, 33; Point-to-Point Telegraph, 68; Point-to-Point Telephone, 205.

PUBLICATIONS

As in past years, the Commission published a list of United States Great Lakes ship radiotelephone stations. This list, which is in pamphlet form, contains the names of the ships, call letters, ringer numbers, and licensed frequencies. In addition, it contains approved schedules for the transmission of weather and hydrographic information to ships. The Commission regularly furnished the Navy the information necessary for a list of oceangoing radio-equipped ships which it prints and distributes.

RULE CHANGES

Using the experience gained by the use of lifeboat radio installations as a guide, the Commission found it necessary to modify many of its rules pertaining to lifeboat installations. The technical requirements for lifeboat transmitters were revised to require higher standards of performance. The use of antennas supported by means of kites or gas-filled balloons was authorized in order to increase the range of the transmitters.

2. AVIATION RADIO SERVICES

GENERAL

The aviation radio services as administered by the Commission cover all non-Government use of radio in the aviation industry for both communication and navigation.

During the year, some of the strain which was imposed on commercial air carriers as a result of the war has been alleviated. The commercial airlines have regained the aircraft which were taken over by the armed forces in the early part of the war, and at the close of the fiscal year were operating a total of 533 aircraft. Of these, 375 are operated by domestic airlines.

The Commission's policy of closely coordinating applications for aviation ground radio facilities and for itinerant aircraft radio stations with the War Production Board was still in effect at the close of the fiscal year. This policy was based on the Commission's Memorandum Opinion dated July 7, 1942, relative to the use of critical

materials to construct or change the facilities of certain classes of radio stations.

The use of itinerant civil aircraft has shown a decided increase during the year ending June 30, 1945. This increase in activity is due to a number of factors, among which are the availability for nonmilitary uses of aviation fuel, aircraft, aircraft accessories, and the lifting of some wartime restrictions on the use of such aircraft. As of June 30, 1945, there were approximately 32,000 aircraft registered with the Civil Aeronautics Administration.

The most pronounced effect of the frequency allocation report on aviation radio will be a gradual transfer of such communication wherever technically practicable to the very high frequency range, primarily the band between 108 and 132 megacycles. While operation in the very high frequency range presents certain limitations on the distance over which communications may be satisfactorily conducted, it also offers a number of advantages when compared to the present system particularly with respect to the very small physical size of antennas and the great reduction in atmospheric noise.

AERONAUTICAL RADIO STATIONS

Aeronautical radio stations licensed by the Commission provide the non-Government ground radio facilities to permit air-to-ground and ground-to-air radio communications with aircraft in flight within the United States, its Territories, and possessions and between the United States and Canada. These facilities are primarily used by scheduled air carriers for maintaining necessary communications with aircraft in flight for the safety of life and property in the air and for compliance with the requirements of the Civil Aeronautics Administration. All aeronautical radio stations serving the domestic commercial airlines are licensed to Aeronautical Radio, Inc., a corporation owned by and representing all such airlines. These stations under the Commission's regulations, also must serve itinerant aircraft upon request.

During the past year, 731 applications were received and 665 authorizations issued affecting aeronautical radio stations in the United States, together with 64 applications received and 81 authorizations issued affecting stations in Alaska. As of June 30, 1945, there were 411 such stations in the United States and 66 in Alaska. These figures represent an increase of 46 stations for the United States and a decrease of 13 stations for Alaska during the year. The decrease in the number of stations in Alaska was due primarily to the acquisition and operation by the Civil Aeronautics Administration of 12 stations previously licensed by the Commission to Pan American Airways, Inc.

AERONAUTICAL FIXED RADIO STATIONS

Aeronautical fixed radio stations provide for the handling of ground point-to-point communications in connection with and relating solely to the actual aviation needs of the licensees. All such stations serving the domestic commercial airlines in the continental United States are licensed to Aeronautical Radio, Inc.

During the year, 211 applications were received and 130 authorizations issued affecting such stations in the United States. Forty-eight

applications were received and 72 authorizations relating to Alaska stations were issued. As of June 30, 1945, there were 98 such stations in the United States and 59 in Alaska—a decrease of 7 stations in the United States with no change in Alaska. The decrease in the United States may be attributed to a current trend of placing such communications on landline facilities wherever possible.

AIRPORT CONTROL RADIO STATIONS

The service performed by airport control stations is primarily concerned with regulating and controlling air traffic within the control area of the airport involved. At airports handling a large volume of air traffic the service of an airport control radio station is essential for the safety of life and property in the air. Since many aircraft may be in the air at various altitudes and approaching or leaving the airport from various directions, this service is invaluable during conditions of low visibility.

Airport control radio stations are normally operated by either the Civil Aeronautics Administration or the operators of the airport. In the latter instance such radio stations are licensed by the Commission.

Sixty-four applications were received and 45 authorizations in connection with this type of station were issued. As of June 30, 1945, 31 such stations were authorized, an increase of 3 stations during the year.

The growth of airport control radio service has been seriously impeded by wartime scarcity of equipment and frequencies. It is expected that a large increase in the number of stations operating in this service will follow closely the availability of equipment capable of operating in the very high frequency range. The Commission, in anticipation of such growth, allocated that portion of the frequency spectrum between 118 and 122 megacycles for airport control service.

FLIGHT TEST RADIO STATIONS

Flight test radio stations provide communication between aircraft and ground while such aircraft are undergoing flight tests, as in the development of new types, the development and testing of motors, propellers, and other components.

The Commission received 105 applications and issued 82 authorizations affecting stations of this class. As of June 30, 1945, there were 30 stations, a slight increase over the previous year.

FLYING SCHOOL RADIO STATIONS

There has been a decrease in the activity of flying schools and consequently a decrease in the number of such radio stations licensed by the Commission. Eleven applications were received and eight authorizations issued. As of June 30, five flying school stations were licensed.

The decrease in flying school stations is the result of the slackening demand of the military services for civilian trained pilots. In the majority of instances civilian pilot training contracts have been completely terminated.

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AIRCRAFT RADIO STATIONS

Aircraft radio stations licensed by the Commission come within two general categories and are normally classified as either "scheduled" or "nonscheduled." The first category represented all commercial air carriers operating on a scheduled basis, the second itinerant operations. Itinerant operations include private flying, commercial flying on a nonscheduled basis, transportation of corporation personnel, etc.

During the year, 6,231 applications were received and 4,043 authorizations issued affecting aircraft stations operating in the United States and possessions, including commercial United States flag aircraft operating in the international service. As of June 30, there were 3,090 such stations including 533 "scheduled aircraft"—an increase of 323.

As of June 30, there were 32,000 aircraft registered with the Civil Aeronautics Administration and it appears that a large increase in the number of aircraft radio stations may be expected within the near future depending primarily upon the speed with which radio equipment becomes generally available.

VIOLATIONS

During the year, 592 official notices were handled in the aviation radio services covering alleged violations of treaties, Federal statutes or Commission rules and regulations. Penalties were not invoked as the cases were disposed of by conferences and correspondence.

CHICAGO INTERNATIONAL CIVIL AVIATION CONFERENCE

An important step in international collaboration in the field of civil aviation was taken with the conclusion of an Interim Agreement on International Civil Aviation on December 7, 1944, at the Chicago International Civil Aviation Conference.

The Interim Agreement provides among other things for the establishment of the Provisional International Civil Aviation Organization (PICAO), which will consist of an assembly of all nations accepting the agreement, as well as a 21-member council elected by the assembly every 2 years. The PICAO will have advisory and technical functions, but will not be empowered to regulate the economic phases of air transport. The Interim Council will formulate and recommend the adoption of technical standards and procedures, and will study, report, and recommend on problems relating to air navigation and international air transport.

The Interim Agreement on International Civil Aviation became effective on June 6, 1945, when the twenty-sixth nation announced to the United States Government its formal acceptance. The provisional organization will function for an interim period not to exceed 3 years from June 6, 1945. It is expected to be superseded within that time by the permanent International Civil Aviation Organization, which will be established after 26 nations have ratified or adhered to the Convention on International Civil Aviation.

A representative of the Commission was a member of the United States delegation at the Chicago International Civil Aviation Conference, and participated in committee work in the preparation of

technical annexes relating to aviation radio communication and air radio navigation.

PROCEEDINGS IN DOCKETS 6714 TO 6721 INCLUSIVE AND 6757

These dockets cover a number of applications filed by Pan American Airways, Inc., relating to the radio communications system of that company in the Caribbean area, more generally known as the Latin American Division of Pan American Airways, Inc.

The applications proposed a general expansion of the existing radio communications facilities now operated by the applicant in the involved area. Since a number of the requests made in the applications appeared to be beyond the scope of the Commission's rules covering the operation of aviation radio communications facilities on the inter-American routes and since other issues were presented which could not be determined on the information contained in the applications, the Commission designated the applications for hearing. Aeronautical Radio, Inc., intervened in the proceedings, since the Pan American applications requested authority to share frequencies already in use by stations in the domestic aviation service operated by Aeronautical Radio, Inc. The hearing began on June 6, 1945, and lasted 3 days. As of June 30, no decision had been reached.

3. EMERGENCY RADIO SERVICES

GENERAL

The Emergency Service is a radio communication service conducted by instrumentalities of government, by public utilities and by certain private organizations for emergency communications pertaining to the safety of life and property. This service includes stations classed as municipal, State, zone and interzone police, special emergency, forestry, and municipal fire.

Three hundred and seven new emergency systems were authorized during the year. Even with the wartime restrictions on the general use of the critical materials necessary for installation of radio communication systems and the shortage of trained personnel needed for such installations, the service rendered by these emergency radio stations is of such vital importance that materials have been made available through appropriate allocation programs and issuance of priority ratings to applicants and licensees.

Class of station	Applications processed fiscal year 1945	Number of licensed stations at close of fiscal year				
		1941	1942	1943	1944	1945
Municipal police	1,800	1,196	1,672	1,708	1,906	2,051
State police	465	513	378	431	452	477
Zone police	8	69	85	94	88	85
Interzone police	4	30	33	30	31	30
Forestry	193	807	844	837	925	949
Special emergency	939	340	435	448	451	566
Municipal fire	22	6	8	10	10	12
Total	3,431	2,961	3,455	3,558	3,863	4,170

In nearly all cases the "station" referred to in this tabulation is a complete radio communication system and consists of a land station permanently installed at a fixed location and a number of associated mobile transmitter-receiver units operated under a single radio station license. In many cases the communication system covered by 1 station license includes from 1 to 4 land station transmitters at the same fixed location and a number of mobile radio units. Some licensees in the emergency service operate as many as 200 or more mobile radio units. One State (California) has authorizations to operate a total of 473 State police mobile units; 444 of the units being listed on one radio station license.

A large number of the applications filed during the past fiscal year were for construction permits and modification of licenses for new transmitting equipment installed to replace worn-out or obsolete equipment of stations in the emergency service. Nearly all new installations in this service are for equipment using frequency modulation. The comparatively few authorizations issued for use of amplitude modulated equipment were usually to licensees making minor additions to existing radio facilities and it is expected that as soon as new equipment becomes generally available many of these radio systems will be replaced with frequency modulated equipment to provide the more effective operation and extended range afforded by this method of transmission.

As a result of the Commission's frequency allocation hearing, additional frequencies have been made available for the Emergency Radio Services. On the basis of testimony presented by Radio Technical Planning Board committees and by representatives of organizations of licensees of the various classes of stations in the Emergency Radio Services, a substantial increase in the number of channels available for regular operation above 25,000 kilocycles for these stations has been made as shown in the following table:

Class of station	Number of channels before allocation hearing	Number of channels at present
State and muncipal police	29	132
Municipal fire	2	39
Forestry	11	41
Special emergency	10	[1] 47

[1] Including frequencies for power utility and similar stations now operating as special emergency stations but soon to be included in a separate service.

It is expected that with the increase in the number of frequencies available for assignment to these stations, a proportionate increase in the activity and in the number of stations in this service will result.

POLICE RADIO STATIONS

The police departments of nearly all cities, large towns, and thickly populated counties now use radio. The systems operated by State police departments are similar to those operated by the municipalities except that the States usually operate several land stations and in many cases a larger number of mobile stations. Some of the licensees of municipal and State police radio systems also operate zone or inter-

zone police stations to provide for the exchange of police messages by radiotelegraph between police departments within each zone and between the departments in different zones. These radiotelegraph facilities are used for the messages pertaining to missing persons, stolen automobiles, criminals wanted, persons apprehended, etc.

Radio makes possible the rapid mobilization of protective agencies at riots, large public disorders or other emergencies resulting from floods, hurricanes, or other similar disasters. The increase in speed of travel provided by the automobile and other modern vehicles makes it possible for a criminal to commit a crime in one city and seek refuge in another community hundreds of miles distant. The use of two-way radio by the police departments offers a primary means of effectively keeping ahead of the criminal. Modern police radio systems provide the police with facilities for instantaneous communication between central headquarters stations and patrol cars operating at any point within the area of jurisdiction of the police department. Communication between patrol cars and police headquarters stations of different police departments is also used to a great extent. Radio also offers the police a method of broadcasting general alarms to stations and mobile units throughout an area and provides for setting up blockades on highways, rerouting traffic and the effective handling of traffic and crowds during emergency periods. Police have in two-way radio communication a modern, effective weapon which is considered more valuable than any other single facility utilized to combat crime.

In addition to the transmission of emergency messages to police mobile units, many police departments transmit messages to other emergency mobile units such as fire department vehicles, private ambulances, and repair units of public utilities where cooperation or coordination with police activities is involved.

The continued increase in the number of transmitters operated by municipal and State police departments has resulted in a proportionate increase in interference between the different communication systems and in the difficulties and importance of definite frequency allocation and assignment plans. In view of the limited number of channels available for police stations, it is necessary to require close cooperation between applicants and licensees in the selection and use of frequencies available for assignment. It is expected, however, with the additional channels made available for these stations, as a result of the frequency allocation hearings, that new frequency assignment plans presently being formulated will result in more interference-free communication for the larger number of police radio stations.

MUNICIPAL FIRE RADIO STATIONS

Municipal fire radio systems are operated by municipal fire departments to provide communication between central fire stations and mobile fire fighting units and other vehicles operated by fire departments. The transmitting and receiving equipment, the communication service rendered and method of operation of municipal fire stations are similar to those of the municipal police stations except that the facilities are operated by and for the fire department of the licensee.

The relatively small number of stations of this class authorized for operation is probably due to the fact that this is a comparatively new class of station. Previous to June 23, 1944, stations similar to mu-

nicipal fire were classed as "marine fire" stations and were authorized for operation only by the larger cities operating fire boats used for fighting fires on waterfronts. Effective on June 23, 1944, the rules concerning "marine fire" radio stations were modified to change the name of this class of station to "municipal fire." This change in the rules provided for the authorization of municipal fire stations for the larger cities to operate on the one medium frequency and two very high frequencies previously allocated for the use of marine fire stations and to handle communications concerning fires, whether on waterfronts or elsewhere.

Owing to the limited number of radio channels available, authorizations for municipal fire stations are normally granted only to cities where the fire department serves a population of 150,000 or more. The fire departments of the smaller municipalities ordinarily use the police radio communication facilities as provided for by the rules governing the operation of stations of this class.

The fires and other emergencies to which fire departments respond require the use of especially fast and effective communication facilities, since time is highly important in such emergencies. It is often necessary for the units of the fire department upon reaching the scene of a disaster to call for additional assistance to respond to definite locations, for medical assistance, for ambulances, additional pumping units, special apparatus and gas masks, which are not normally carried as equipment on mobile units. Two-way radio systems provide this essential emergency communication where other communication facilities are not immediately available, are inadequate or are not usable.

With the increased number of frequencies made available to fire departments as a result of the frequency allocation, it is expected that many fire departments, especially those in the large cities, will use radio.

FORESTRY RADIO STATIONS

Forestry radio stations are licensed to municipalities, States, and other organizations legally responsible for forestry areas. These stations are operated for communications pertaining to the detection and suppression of forest fires, water shed protection and control, conservation enforcement, protection of wildlife and protection of natural resources in forest areas. Forestry radio stations are authorized primarily for communication with forest-fire-fighting units; however, emergency messages may be transmitted to other mobile units such as fire department vehicles, ambulances, and mobile police units in those cases which require cooperation or coordination with forestry service activities.

An effective communication system is important in the suppression and fighting of forest fires. Radio provides rapid communication between forest fire lookout towers in order that the exact location of a fire may be quickly determined. Radio also provides a means of communication with patrolmen and mobile units in forest areas. Additional equipment or personnel can be immediately dispatched to the scene of forest fires. On large fires where numerous patrolmen, forest fire trucks and special fire fighting and control equipment are used, radio provides the supervisors with a means of controlling all units in operation and of shifting them as conditions require.

Although many of the forestry radio stations use medium power land stations or portable stations operated permanently or temporarily in the lookout towers and headquarters stations, a large number of the licensed stations are of the portable pack or "walkie talkie" type which are carried by the personnel. It appears that with recent wartime developments of light-weight "handie talkie" and "walkie talkie" radio units, a considerable increase in the number of such units operated in the forestry service can be expected in the near future.

SPECIAL EMERGENCY RADIO STATIONS

Special emergency radio stations are operated by public utilities, highway maintenance departments, communication common carriers, and urban transportation companies temporarily to augment or to restore communication or other public facilities interrupted or destroyed during emergency conditions such as storms and floods, and also to provide communication to places isolated during times of emergency. The nature of such communication may be classified as follows: (1) Initial restoration, providing quick reestablishments of circuits for handling essential communications relating in large part to preservation of life and property; and (2) Dispatching repair and construction crews to augment or restore wire communication circuits, and to repair electric power distribution circuits, gas and water transmission facilities and highway facilities.

Under the Commission's rules and regulations, only public utilities, organizations established for relief purposes, and persons having establishments in remote locations are eligible for authorizations for special emergency radio stations. This class of station is authorized for essential communications arising from an emergency jeopardizing life, public safety, or important property. Special emergency radio stations provide a means of direct communication to repair trucks and maintenance crews of public utilities. The electric, gas and urban transit utilities operate approximately 80 percent of the stations of this class which are licensed by the Commission. Such communication facilities have been of considerable value in maintaining adequate transportation, gas and electric power for the public and for plants engaged in the manufacture of war materials during the last few years.

4. WAR EMERGENCY RADIO SERVICE

The War Emergency Radio Service is a temporary wartime service established by the Commission on June 12, 1942, to provide a means of rapid emergency local communications which may be necessary in connection with national defense and security or conditions jeopardizing public safety. This service consists of three different classes of radio stations: Civilian Defense, State Guard, and Civil Air Patrol. These stations are intended to provide distinct and separate communication facilities on specified bands of frequencies above 112 megacycles available for use by Municipal Civilian Defense, State Guard, and Civil Air Patrol organizations, respectively. Licenses for these stations are issued only to municipalities, state military organizations and the Wing Commanders of the Civil Air Patrol. This service makes available on a voluntary basis the skill and equipment of amateur radio operators and other qualified citizens under conditions which

assure responsible control, organized practice drills and systematic training, and, at the same time, permits sufficient flexibility of operations.

Class of station	Applications processed during fiscal year 1945	Number of stations at end of fiscal year		
		1943	1944	1945
Civilian Defense	352	199	253	230
State Guard	63	8	11	19
Civil Air Patrol	47	4	17	27
Total	462	211	281	276

The term "station" in the above table includes several fixed, portable, or portable-mobile transmitter and receiver units which are operated as a single coordinated emergency communication system under one license. There are several licensees in the War Emergency Radio Service authorized to operate more than 200 transmitter units under a single station license. A considerable number of the transmitters used in this service consists of portable and portable-mobile transmitters and includes the so-called pack or "walkie talkie" radio units. Although three frequency bands above 112 megacycles have been authorized for use by stations in this service, nearly all of the stations operate exclusively in the 112–116 megacycles band because the equipment available for these stations at the present time performs more efficiently on these lower frequencies.

Upon the recommendation of the Office of Chief Signal Officer, United States Army, and upon the approval by the Board of War Communications, the Commission on January 25, 1945, designated two additional channels in the medium frequency range for the use of State Guard stations in connection with State Guard operations. As a result of this action, many State Guard organizations have obtained modifications of licenses or new licenses to authorize the operation of several hundred new transmitter units.

On April 10, 1945, the Commission amended its rules and regulations governing stations in the War Emergency Radio Service so as to expand the scope of service for which Civilian Defense stations were originally authorized. In addition to use in connection with national security and defense, civilian defense stations now may be operated for communications in emergencies jeopardizing public safety. Licenses for these stations now may be issued or renewed even though the United States Citizens' Defense corps or equivalent civilian defense organizations are no longer active in the involved areas. The amended rules and regulations also authorize the existing licensees of War Emergency Radio Service stations to cooperate with the United States Weather Bureau in the operation of a proposed flood and storm warning emergency radio network to supplement existing communication facilities for the protection of life and property during emergency or impending emergency periods.

Reports received from licensees of War Emergency Radio Service stations indicate that these stations have been used to furnish emergency communications during floods, fires, explosions, and other emergencies endangering life, public safety, or important property. The

occasion which resulted in the most general use of War Emergency Radio Service facilities to date was the hurricane which struck the Northeastern Seaboard States in September 1944. A total of 34 licensees reported to the Commission that a number of units of their stations were in operation during the disaster. Other reports indicate that on at least two occasions portable-mobile units licensed to civilian defense stations were used to assist in locating aircraft which had crashed in wooded, mountainous terrain. In one instance, during a large fire, it was reported that the use of megaphones was impossible owing to the high noise level and the density of smoke whereas the small, readily portable transmitter and receiver units licensed to the municipality in the War Emergency Radio Service were placed in operation and provided the necessary emergency communications. Another War Emergency Radio Service station handled emergency communications on July 6 and 7, 1944, in connection with the disastrous circus fire at Hartford, Conn.

5. EXPERIMENTAL RADIO SERVICES

GENERAL

The Experimental Radio Service includes three classes of stations, class 1, class 2, and class 3. Authorizations for experimental class 1 stations are granted for the purpose of carrying on experimentation and development leading to the advancement of the radio art. Authorizations for class 2 stations are granted for experimental operations leading to a new type of radio service or a new phase of operation within a service already recognized by the Commission. Class 3 stations are licensed to citizens interested in radio technique solely with a personal aim to conduct experiments on their own behalf.

Under the stimulus of wartime needs, and because of the large Federal funds made available for technological research, experimental activities in the field of radio and electronics have developed to an unprecedented level during the past year. Many highly secret projects sponsored by the Army, Navy, and National Defense Research Committee were placed under contract with radio manufacturers, educational institutions, and engineering laboratories throughout the United States. The radar development projects pursued at Massachusetts Institute of Technology is a typical example. A large number of experimental radio authorizations were necessary to carry out the extensive tests required in the development and perfection of this important weapon of war. In the same manner, hundreds of additional experimental stations were authorized to meet the needs of other radio and electronic projects. While most of these projects are still classified as secret and confidential, it is definitely known that much of the success of the United Nations can be attributed to these technological developments. Radar is only one of these newly developed devices. Others will be revealed when the need for secrecy has disappeared. The full effect of these wartime developments on the future can scarcely be imagined at this early date. It is certain that the technical developments in the electronics field will exert a powerful influence on the lives of people everywhere. Faster and more reliable means of communication will appear. Television and facsimile developments will make it possible for the world to see as well as to

hear by radio. By utilizing higher and higher frequencies, not only will new techniques be unfolded but a much more general use of space radio will become possible.

The number of experimental stations authorized during the year exceeds by far the number authorized in any similar period in the past. One thousand, four hundred and forty-seven applications were received, 1,143 authorizations were issued—a 100-percent increase over the previous year.

During the accelerated research program undertaken as part of the war effort, tremendous advancements have been made in the development of vacuum tubes and associated circuits which will permit the operation of radio stations and the rendition of commercial radio service in that portion of the radio spectrum which previously was beyond the range of commercial radio equipment. These developments have resulted in extending the useful portion of the radio spectrum to such an extent that radio channels can now be made available for the establishment of many new radio services and the expansion of certain existing radio services.

New equipment also has been developed which will provide for greater safety and security. The application of radar techniques to anticollison devices for use in the aviation and marine fields may be cited as an example.

Industry, realizing the potential application of these new developments to commercial enterprises, requested frequencies for many new uses of radio during the allocation hearing. While it was impossible to satisfy all of these demands, the Commission, nevertheless, did provide frequencies for many new services, including general highway mobile, urban mobile, railroads, citizens radio, radio relay systems, power and petroleum utilities, as well as for the necessary expansion of facilities for established radio services.

While the use of radio in these new services will unquestionably prove feasible, there are many technical and policy problems which must be solved before the services can be established on a regular basis. The Commission has followed the policy of granting authorizations for the operation of stations in the new services on an experimental basis only in order to collect operational and technical data which can be analyzed and used as a basis for the determination of the needs and requirements of the new service and for the promulgation of rules and regulations governing the operation of stations in the service when established. After studies have been completed, it will be necessary to promulgate rules and regulations to cover each new service, prepare application forms, and establish procedures and policies with respect to the licensing of such stations.

RAILROAD RADIO SERVICE

A hearing, to ascertain the facts regarding the use of radio in connection with the operation of railroads as an aid in the protection of life and property, was held by the Commission in September 1944. As a result of that hearing and the frequency allocation hearing, 60 channels in the band 152–162 megacycles were allocated for the exclusive use of railroad radio stations. In addition to these channels, it was proposed that certain television bands be shared by the railroads on a mutually noninterference basis. With this encouragement, the

railroads, acting through the Association of American Railroads, have progressed rapidly with plans to adopt radio communication facilities in the operation of terminal stations, freight trains, and general railway business. Committees of the Association of American Railroads have been working closely with the Commission staff in formulating a Nation-wide allocation plan for the preparation of new rules and regulations for the railroad radio service.

At present, 125 stations are operated by or on behalf of the railroads on an experimental basis. An extensive survey made by the Railway Department of the Office of Defense Transportation indicates that the railroads intend to install a minimum of 1,500 railroad radio stations and the 52 separate railroads plan to install 2-way radio facilities as soon as equipment is available.

MOBILE SERVICES

There are two mobile services for which the Commission has allocated frequencies in the frequency allocation report. Twenty-four channels in the 152- to 162-megacycle band have been allocated to the urban mobile service, which relates to radio service for vehicles in metropolitan areas such as delivery trucks, physicians' automobiles, ambulances, taxi cabs, boats and aircraft. Forty channels in the band 30 to 44 megacycles have been allocated for the highway mobile service, which relates to communications to busses and trucks used in inter-city transportation over long distances. Of these 40 channels, 24 were designated for experimental development of a communication common carrier type of operation; 8 channels were designated for use by trucks and 8 for busses.

POWER UTILITY SERVICE

The power utility service will enable public utilities (electric, gas, water, steam, and petroleum) to communicate in emergencies with mobile units. Radio will speed the dispatching of repair trucks and will permit emergency communications between a central dispatching or control station and maintenance crews. The commodities supplied by these utilities are capable of inflicting injury, death, and serious property damage if uncontrolled. These utilities therefore require instantaneous, reliable, and continuously available communication between major system control points as well as between control headquarters and mobile crews.

RADIO RELAY SYSTEMS

Radio relay systems represent a new phase in medium and long-haul domestic communication methods. The telephone and telegraph companies have maintained extensive wire line circuits throughout the United States. The wartime development of micro-wave radio equipment has made it possible to utilize a series of wide-band super-high frequency radio repeater stations to transmit simultaneously various types of intelligence including broadcast and FM programs, high-definition television and facsimile material, multiplex telephone and telegraph messages, as well as many other special types of intelligence. Well-informed persons in the communication field have visualized the installation in the near future of a Nation-wide network of relay

stations which would supplement present wire line facilities and may eventually replace them. During the year, approximately 125 class 2 experimental stations were authorized to carry on experimentation in the development of new relay systems.

RURAL TELEPHONE SERVICE

Another new radio service for which the Commission has allocated frequencies is the rural telephone service. The objective of this service is the development of rural radio-telephones and the extension of telephone service to farms and ranches where the construction of wire lines is physically impossible or economically impractical. Experimental work in this new application of radio has already been initiated. Its future growth is assured.

CITIZENS RADIOCOMMUNICATION SERVICE

In past years there has been a demand for a private radiocommunication service. Heretofore no frequencies have been available to provide facilities for a private radio service and all requests for such services had to be denied.

At its frequency allocation hearing, the Commission, on its own motion, allocated the band from 460 to 470 megacycles to a new service, the citizens radiocommunication service. Five authorizations have been granted for class 1 experimental radio stations for the purpose of developing equipment for use in this proposed service. Licensees will be free to use the service for their own purposes, provided no charge is made for the messages. The service will thus be for the private use of the licensee who will be responsible for the use of the facilities under the regulations to be promulgated by the Commission.

Station and operator licenses will be easily acquired. It is anticipated that to procure such a license, an applicant need only show familiarity with the relevant portions of the Communications Act and of the simple regulations governing this service. No technical knowledge will be required to obtain licenses and they will be issued for a period of 5 years with simple renewal provisions.

The citizens radiocommunication service can be used, for example, to establish a physicians' calling service, through which a central physicians' exchange in each city can reach doctors while they are enroute in their cars or otherwise not available by telephone. Department stores, dairies, laundries, and other business organizations can use this service in communicating to and from their delivery vehicles. Similarly it can be used in communicating to and from trucks, tractors, and other mobile units operating in and around large industrial plants and construction projects, many of which spread over a number of square miles. It can be used on farms and ranches for communication to and from men in the fields; on harbor and river craft; in mountain and swamp areas, etc. Sportsmen and explorers can use it to maintain contact with camps and to decrease the hazards of hunting, fishing, boating, and mountain climbing. Citizens generally will benefit from the convenience of this service by utilizing two-way portable radio equipment for short range private service between points where regular communication facilities are not available. During emergencies when wire facilities are disrupted as a result of hurricane,

flood, earthquake, or other disaster, the service, as has been demonstrated by amateur service, will be of inestimable value.

6. MISCELLANEOUS RADIO SERVICES

The miscellaneous radio services include the geophysical, special press, and intermittent radio services. These services include five classes of radio stations each of which provides a separate and distinct radio service. The classes of stations are geological, mobile press, relay press, motion picture, and provisional.

Class of station	Applications processed	Number of stations at end of fiscal year			
		1942	1943	1944	1945
Geological	465	302	325	358	411
Mobile press	3	3	3	3	3
Relay press	5	7	5	5	5
Motion picture	9	15	10	8	8
Provisional	191	22	36	87	142
Total	673	349	379	461	569

The most prominent classes of stations in the miscellaneous radio services, the geological and the provisional stations, are licensed by groups of portable or mobile units, and one "station" in the above table may include several complete portable or mobile units.

The allocation report made additional frequencies available to most of the classes of stations in these services. A substantial increase in the number of channels available for regular operation on frequencies above 25,000 kilocycles of the most important of the classes of stations included has been made as shown in the following table:

Class of station	Number of channels before allocation hearing	Number of channels at present
Geological	4	49
Motion picture	4	18
Provisional	9	36
Relay press	11	10
Mobile press [1]		

[1] All operation is on frequencies below 25,000 kilocycles.

GEOLOGICAL RADIO STATIONS

Geological stations are authorized for communications pertaining to work in connection with the investigation of the surface of the earth and the physical characteristics of the strata below the surface of the earth. Practically all of the licensed geological stations are operated by oil companies and geophysical exploration companies for the determination of the character of the underground strata of the earth in order to establish the probable location of oil deposits. Low power portable and mobile geological stations are used for communication by personnel of field parties prospecting for oil and for transmitting signals and impulses to seismic recording instruments from the geophones at the various pick-ups located at distances up to 15 miles from the centrally located recording truck.

Petroleum products have been especially important during the intensified industrial and manufacturing programs of the past few years and the immediate availability of an adequate supply of these vital products is a major item in modern civilization. As the more obvious and easily discovered petroleum sources are exhausted, the producers must resort to more scientific and complicated methods of ascertaining the presence of oil pools beneath the surface of the earth. In prospecting for oil, radio is being used for an increasingly important service for communication to isolated locations and for other purposes where the various scientific methods of geophysical prospecting are used.

RELAY PRESS STATIONS

Relay press stations are used to transmit to or from points where other communication facilities are not available news for publication, or orders, instructions or inquirities concerning such news to be published or to be disseminated by the news association with which the licensee is regularly affiliated. It is not intended that these stations be used to replace or to compete with wire communication facilities but that these stations be set up temporarily at a point of termination of other communication facilities and at the scene of a news event for the transmission of dispatches from the reporter in the field. Licenses for relay press radio stations are issued only to newspapers and press associations.

Reports received from licensees indicate that very little use has been made of relay press stations during the past year. However, at the frequency allocation hearing, representatives of the United Press and the Associated Press testified that with the recent improvements in the "walkie talkie," plans are being made to use these stations more extensively.

MOTION-PICTURE STATIONS

Motion-picture stations are authorized for communication in connection with the filming of motion pictures as an aid in the protection of life and property and the promotion of safety of personnel. These stations are used for communication with parties on location in isolated areas where no other communication facilities are available and for communication pertaining to the coordination and direction of activities of various units in the filming of motion pictures.

As in the case of relay press stations, motion-picture stations have been used very little during the past year; however, correspondence and inquiries from licensees and others eligible for authorizations indicate plans are being made for considerable activity of this class of station when new radio equipment is available.

PROVISIONAL RADIO STATIONS

Provisional radio stations are used for communications relative to the safety of life or property or matters which are of practical necessity in connection with projects of benefit to the public. Initial use of provisional radio stations was made in connection with large construction projects. They also are used by oil companies in the deserts, mountains, forests, swamps, inland waters, and in the ocean where other communication facilities are not available. By means of such stations a construction foreman or supervisor can keep in contact with his

crew, direct transportation of supplies and carry on other communications necessary in directing construction and production work. An effective communication system is especially valuable at construction projects and in certain industries where workmen are engaged in hazardous occupations.

Stations of this class are also used on a temporary basis for communication by plant guards or private police of large industrial plants. Many of the new stations of this class are for radiotelephone communication systems for use by plant guards at large manufacturing plants producing war materials. Improved transmitting and receiving equipment for use on the very high frequency channels allocated for use by provisional stations has resulted in an increased use of this class of station on construction projects and certain industrial operations in isolated locations.

7. STATISTICS

United States Stations

Service	Applications received	Authorizations issued	New stations authorized	Total stations June 30, 1945
Aviation:				
Aeronautical	689	640	47	411
Aeronautical fixed	169	105	4	98
Aeronautical and aeronautical fixed	42	25	0	0
Aircraft	6,028	3,918	1,657	[1] 2,998
Airport control	64	45	8	31
Flying school	11	8	0	5
Flight test	105	82	12	30
Marker beacon	5	3	1	3
Instrument landing	0	0	0	0
Subtotal	7,113	4,826	1,729	3,576
Emergency:				
Municipal police	1,800	1,362	168	2,051
State police	465	345	40	477
Zone police	8	10	1	85
Interzone police	4	6	0	30
Forestry	193	145	54	949
Special emergency	939	821	123	566
Municipal fire	22	16	2	12
Subtotal	3,431	2,705	388	4,170
W. E. R. S.:				
Civilian Defense	352	316	17	230
State Guard	63	29	7	19
Civil air patrol	47	39	11	27
Subtotal	462	384	35	276
Experimental:				
Class 1	737	718	178	457
Class 2	706	422	157	152
Class 3	1	0	0	0
No classification	3	3	3	3
Subtotal	1,447	1,143	338	612
Miscellaneous:				
Geological	465	501	69	411
Motion picture	9	6	0	8
Provisional	191	163	49	142
Mobile press	3	3	0	3
Relay press	5	5	0	5
Subtotal	673	678	118	569

[1] 533 are scheduled aircraft and 379 are portable-mobile scheduled aircraft stations.

United States Stations—Continued

Service	Applications received	Authorizations issued	New stations authorized	Total stations June 30, 1945
Fixed public service:				
Point-to-point telegraph	273	282	1	36
Point-to-point telephone	81	82	1	18
Subtotal	354	364	2	54
Fixed public press: Point-to-point telegraph	30	46	0	6
Agriculture: Point-to-point telegraph	7	7	0	7
United States coastal:				
Coastal telegraph	59	46	3	31
Coastal harbor	67	58	1	33
Coastal telephone	5	9	0	5
Marine relay	31	28	3	21
Coastal telegraph and marine relay	3	1	0	0
Coastal Telegraph, Ltd	2	0	0	3
Coastal Harbor, Ltd	0	2	0	2
Subtotal	167	144	7	95
United States total	13,684	10,297	2,617	9,365

Alaskan stations

Aviation:				
Aeronautical	43	66	10	66
Aeronautical fixed	27	57	8	59
Aeronautical and aeronautical fixed	21	15	0	0
Aircraft	203	125	0	92
Subtotal	294	263	18	217
Emergency: Municipal police	1	1	0	0
Experimental:				
Class 1	4	4	0	0
Class 2	1	0	0	0
Subtotal	5	4	0	0
Fixed public service:				
Point-to-point telegraph	155	91	6	68
Point-to-point telephone	127	229	24	205
Point-to-point telegraph and telephone	4	0	0	0
Subtotal	286	320	30	273
Coastal:				
Coastal telegraph	27	37	0	33
Coastal harbor	128	132	19	124
Fixed public and coastal	46	24	0	0
Coastal telegraph and coastal harbor	3	0	0	0
Subtotal	204	193	19	157
Alaskan total	790	781	67	647
United States stations	13,684	10,297	2,617	9,365
Alaskan stations	790	781	67	647
Total stations	14,474	11,078	2,684	10,012
Wire certificates:				
Telephone	214	220		
Telegraph	129	108		
Interlocking directorates	14	9		
Petitions	5	0		
Telephone discontinuances	3	3		
Telegraph discontinuances	174	135		
Submarine cable licenses	2	1		
Total	541	476		
Total United States stations	13,684	10,297	2,617	9,365
Total Alaskan stations	790	781	67	647
Total wire certificates	541	475	0	0
Grand total	15,015	11,554	2,684	10,012

8. INSPECTIONS

SHIP INSPECTIONS

The Commission's activities in promoting safety of life and property at sea through detailed inspections of radio installations on ships have continued to be a significant contribution to the winning of the war. Every precaution taken to save ships has served to speed the movement of men and supplies to the far-flung theaters of war.

As the result of intensive inspections and the strict enforcement of essential regulations, the efficiency of radio in safeguarding thousands of lives and billions of dollars of property on inland and coastal waters and on intercoastal and international voyages has been maintained at a high level.

Ship inspection has been carried on by the Commission and its predecessor agencies since 1910 when the United States first enacted laws requiring ships to carry radio. Section 303 (n) of the Communications Act of 1934, as amended, provides, in part, that the Commission shall have "authority to inspect all radio installations associated with stations required to be licensed by any act or which are subject to the provisions of any Act, treaty, or convention binding on the United States."

From the beginning of the war to the end of the fiscal year, the tonnage of United States vessels had increased fourfold.

Ship inspections during the year totaled 15,731, of which 13,843 were on board United States vessels and 1,888 on board ships of foreign registry; an increase of 4,429 inspections over the preceding year.

As a result of these inspections, the Commission served 9,391 violation notices for noncompliance with provisions of the law and international treaties, an increase of 1,731 over the preceding year. In addition, inspectors found 7,809 deficiencies and discrepancies which they cleared before leaving the ships.

OTHER INSPECTIONS

A total of 6,212 inspections were completed, of which 2,873 were emergency stations, 1,770 aircraft and aeronautical stations, and 1,569 miscellaneous stations. A total of 1,554 violation notices were served.

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CHAPTER VI

Radio Operators

1. COMMERCIAL OPERATORS
2. AMATEUR RADIO SERVICE
3. EXAMINATIONS

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CHAPTER VI—RADIO OPERATORS

1. COMMERCIAL OPERATORS

The commercial radio operator rules provided that, unless otherwise specified by the Commission, the actual operation of any radio station for which a station license is required shall be carried on only by a licensed radio operator of the required class.

In order to meet the needs of the various radio services administered by the Commission, the following classes of commercial operator licenses have been established: Radiotelephone first and second class, radiotelegraph first and second class, and restricted radiotelephone and radiotelegraph operator permits. In addition, a number of temporary licenses have been established because of the shortage of radio operators, as a result of the war.

During the year, the Commission established the temporary emergency radiotelegraph second class operator license. This class of license is valid for a period of 1 year from date of issuance, unless terminated earlier by order of the Commission, and was established to alleviate the shortage of ship station radiotelegraph operators, which developed as a result of the Navy Department's requirement that certain classes of United States merchant vessels must carry at least three radio operators in lieu of a single operator as formerly required.

The temporary emergency second class radio operator license authorizes its holder to stand a radio watch on board a cargo vessel and transmit only emergency communications directly related to the safety of life and property at sea, and is only valid when such cargo vessels carry at least one higher class radiotelegraph operator who maintains at least one-third of the required radio watch per day.

Normally the Commission's rules and regulations required that the holder of a radiotelegraph first- or second-class license may not act as chief operator or sole operator on a cargo vessel until he has had at least 6 months of satisfactory service as a qualified radiotelegraph operator on a vessel of the United States. A shortage of radiotelegraph operators, qualified in this manner, led the Commission to suspend the 6 months' service requirement through its order No. 83, effective July 7, 1941. Inasmuch as the shortage has continued, as a result of the rapidly increasing demands for Merchant Marine radio operators, this suspension period was extended by subsequent orders. Order No. 83–G, effective December 19, 1944, is the latest order and extends the suspension until June 30, 1945.

During the past fiscal year, numerous authorizations have been issued for operation of broadcast stations under the provisions of Commission Order No. 91–C. This order has been continued in force since its adoption on January 19, 1943, and provides that a broadcast station of any class, which by reason of actual inability to secure the services of an operator or operators of a higher class could not other-

wise be operated, could be operated under this order by the holder of any class of commercial radio operators' license, subject to the restrictions provided therein.

The Commission, on December 27, 1944, approved order No. 77–C, extending from January 1, 1945 to December 31, 1945, the suspension of the provisions of its rules which require operators to make a showing of service or use in connection with applications for renewal of outstanding radio operator licenses. This action was taken because of the obvious difficulty commercial and amateur radio operator licensees, particularly those in the armed forces, would have in meeting this requirement.

As a further convenience to many licensed and formerly licensed commercial radio operators now in the military service or employed in war industries distant from their homes, who cannot file timely applications for license renewal, the Commission adopted order No. 124 on January 2, 1945. This order permits a commercial radio operator (other than one holding a temporary emergency radiotelegraph second-class license) to file a renewal application within 1 year from the expiration date of his license providing it is filed prior to December 31, 1945.

A number of orders of the Commission, adopted prior to this fiscal year, were continued in force to provide needed relaxation of operator qualifications and requirements. This group is comprised of the following:

Order No. 93, waiving the provisions of section 318 of the Communications Act, in order to permit the operation of specified aircraft radio transmitting apparatus in the United States by qualified Latin American students, during the training period under the auspices of the Civil Aeronautics Administration. Order No. 97, establishing the temporary limited radiotelegraph second-class operator licenses for ship radiotelegraph station operation exclusively. Order No. 104, permitting regular employees of police departments in Hawaii, who are American Nationals, to operate mobile police radio transmitting apparatus under the provisions of section 318 of the Communications Act. Order No. 102, authorizing operation of aeronautical and aeronautical fixed stations employing types A–1 and A–2 emission by holders of radiotelephone operator licenses or permits, provided that the face of the license or permit has been endorsed, attesting to the holder's ability to transmit and receive International Morse Code at the rate of at least 16 code groups per minute.

The Commission also gave particular attention to requirements of the forestry radio service and as a result of its studies, promulgated less stringent requirements for operators at forestry stations. On August 14, 1944, the rules were amended by the Commission to permit the examination for restricted radiotelephone operator permit to be conducted by mail for prospective employees of forestry station licenses.

Studies and investigations have been made during the year with regard to the qualifications of radio operators in view of changing conditions and developments in the radio field. Examination questions have been revised from time to time in order to keep pace with advancements made in the radio art. At the close of the fiscal year, studies were in progress with respect to the establishment of requirements for radio operators in new radio services expected to develop after the war.

2. AMATEUR RADIO SERVICE

During the year, the Commission continued in force its orders No. 87 and 87–A, adopted on December 8, 1941, and January 8, 1942, respectively, which suspended the operation of amateur stations because of the war. On September 15, 1942, the issuance of new or renewal licenses for amateur stations was discontinued. However, the Commission continues to conduct examinations for amateur radio operator licenses and issues such licenses to applicants who establish their qualifications.

The licensing of amateur operators during the war serves a twofold purpose, since licensed amateur radio operators entering the armed forces of the Nation receive special recognition by the military authorities in view of their technical qualifications, and operators licensed during this period will relieve, to some extent, the rush of applicants for licenses, following the reactivation of amateur stations in the early postwar period.

On November 28, 1944, the Commission adopted order No. 115–A in view of wartime conditions, to alleviate the difficulty for amateur radio operators who are located in the military service of the United States or engaged in war work at locations distant from their homes, to ascertain the expiration dates of their amateur radio operator licenses and to make timely and proper application for their renewal. This order provides that every amateur radio operator license, which by its terms expired during the period December 7, 1941, to December 7, 1942, inclusive, but the duration of which has been extended by Commission order No. 115 for a period of 3 years from the date of expiration provided therein, is extended for a period of 1 year from the date of expiration as extended by order No. 115 and every amateur radio operator license issued during the period December 7, 1941, to December 7, 1942, inclusive, is extended for a period of 1 year from the date of expiration provided therein.

Of major importance to the amateur service was the Commission's frequency allocation hearing.

Studies conducted in preparation for the hearing indicated that a large increase in the number of frequency bands would be required for the amateur service in order to provide for the operation of the large number of amateur stations expected to be licensed after the war.

The American Radio Relay League appeared at this hearing in behalf of the amateur radio service and proposed that the amateur frequency bands below 60 megacycles remain unchanged except for the additional band 21,000 to 22,000 kilocycles and that frequencies above 60 megacycles be allocated by extending the present harmonic frequency family upward by the addition of new frequency bands an octave apart up to the limit of frequency allocations.

As a result of this hearing, the following frequency bands were allocated to the amateur service: 3500 to 4000 kilocycles, 7000 to 7300 kilocycles, 14,000 to 14,400 kilocycles, 21,000 to 21,500 kilocycles, 28 to 29.7 megacycles, 50 to 54 megacycles, 144 to 148 megacycles, 220 to 225 megacycles, 420 to 450[1] megacycles, 1145 to 1245 megacycles,

[1] The frequency band 420–450 megacycles is temporarily to be shared with special or navigational aids.

2300 to 2450 megacycles, 5250 to 5650 megacycles, 10,000 to 10,500 megacycles, 21,000 to 22,000 megacycles. In addition, provisions will be made for amateur disaster communication networks in the band 1605 to 1800 kilocycles. However, the exact width of this frequency band and its location within the 1605- to 1800-kilocycle band is undetermined at this time. Amateurs may also make such use as is possible on the band centered on 27.32 megacycles, assigned for medical and industrial use. Frequencies above 30,000 megacycles are being designated as available for general experimental use and this will include experimentation by amateurs. Actual operation on the frequencies allocated cannot start until the Commission removes its wartime ban on amateur activity and specifically authorizes the use of particular frequencies.

The number of frequency bands allocated to the amateur service and their position in the frequency spectrum have been established with regard to needs of governmental services as well as other services administered by the Commission. The following frequency bands formerly allocated to the amateur service have been reallocated to other services: 1750 to 2050 kilocycles, 29.7 to 30 megacycles, 56 to 60 megacycles, 112 to 116 megacycles, 224 to 230 megacycles, 400 to 401 megacycles.

At the beginning of the war, there were approximately 60,000 licensed amateur stations, which represents the largest single class of station licensees. The American Radio Relay League estimates that within 5 years after the war, the number of amateur stations will increase to approximately one-quarter million stations. It is estimated that approximately 100,000 applicants will request licenses during the first year after amateur station operation is authorized by the Commission.

3. EXAMINATIONS

Examinations of applicants for all classes of commercial licenses continued at an unprecedented high level. A total of 64,260 applicants were examined (exclusive of class C amateur) as compared with 67,424 for the previous year. Of these, 62,022 were applicants for commercial licenses including 43,183 radiotelephone and 18,839 radiotelegraph. Applicants for amateur class A and B radio operator licenses totaled 2,238. As a result of the examinations, 61,038 commercial operator licenses were issued; 52,562 telephone and 8,476 telegraph.

CHAPTER VII

Technical Studies

1. GENERAL
2. SUNSPOT CYCLE FIELD INTENSITY AND NOISE PROGRAM
3. LOW FREQUENCY RECORDING PROGRAM
4. VERY HIGH FREQUENCY BROADCAST RECORDING PROGRAM

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CHAPTER VII—TECHNICAL STUDIES

1. GENERAL

The projects under the supervision of the Technical Information Division of the Engineering Department were in the main continuations and extensions of the work underway at the close of the preceding fiscal year. As before, the actual taking of observations continued to be a function of the Field Division, while the general planning of the projects, the analysis of the results, and the preparation of reports based thereon were responsibilities of the Technical Information Division.

2. SUNSPOT CYCLE FIELD INTENSITY AND NOISE PROGRAM

This project, which involves making continuous recordings of selected broadcast stations and of atmospheric noise in the standard band at several points throughout the United States, has been continuous for the past 7 years. Recording of several additional sunspot cycles will be necessary to obtain data for allocation policies. Some changes in the details of the program have been made during the year and others will undoubtedly be made in the future.

The present allocation standards of the Commission in the standard broadcast band are based on the analysis of some 3 months' recordings made during the late winter and spring of 1935. The present analysis of the vastly larger amount of data now available is directed toward a revision of those standards. The main objectives are the preparation of new and more reliable field strength versus distance curves, methods of estimating the daily and seasonal variations from the annual mean values, a revised soil conductivity map, the preparation of day and night atmospheric noise intensity maps covering the continental United States, surveys of levels of man-made noise existing in towns and cities of various sizes, and the investigation of ratios of signal to noise to determine what ratio should be adopted as providing an acceptable grade of broadcast service. The progress made toward these objectives may be summarized as follows:

Analysis of the accumulated field intensity recordings for some 160 station-years has thus far progressed only through the first stages of summarizing. Although the point has not yet been reached where definite conclusions can be drawn, it already appears likely that:

(*a*) The results of the earlier survey will be confirmed as a general average to a considerable degree.

(*b*) Enough of the nature and the correlation of radio signal strength with the sunspot cycle will be disclosed to permit allocation of standard broadcast stations on a somewhat longer range basis.

(*c*) The data will disclose a rather considerable latitude effect on standard broadcast transmission which should be pertinent not

only to domestic allocation, but particularly also to allocation within the North American Regional Broadcasting Agreement.

(*d*) The data will provide substantially improved measures of the night-to-night reliability of serviceable signals and of the probability of interfering signals.

On account of the shortage of personnel nothing has yet been done toward a revision of the ground conductivity map.

The day and night atmospheric noise maps are being prepared principally from data obtained from seven recording sites throughout the United States, operating under the Sunspot Cycle Program. Some additional data from measurements made by others will be included in order to obtain noise levels at other points. The results of at least a year of recording at each site will be correlated with thunderstorm conditions during the year of recording and adjusted to conform with average thunderstorm conditions, using data from the United States Weather Bureau. The analysis of the data has proceeded to the point where thunderstorm correlation is being made.

The surveys of man-made noise levels have not yet been made because of equipment difficulties, but these will be solved soon. The surveys are to be made by consulting engineers and others in the industry, under the direction of the joint F. C. C.-Industry Committee set up for handling noise problems.

The investigation of acceptable signal to noise ratios consists in obtaining audience reaction to specially prepared sound records on which various ratios of signal-to-noise have been recorded. The sample signals include both speech and music and the noise samples include atmospheric noise and man-made noise for various electrical sources such as motors, etc. The signal to man-made noise records have been completed and distributed to the broadcast industry for audience reaction tests. The signal to atmospheric noise records have been delayed by equipment shortages but should be completed in the near future.

3. LOW-FREQUENCY RECORDING

This program, which will provide for measuring aeronautical beacon stations in the frequency range from 200 to 400 kilocycles and atmospheric noise at 200 kilocycles, has been for the most part unavoidably postponed because of the diversion of manpower and equipment to the very high frequency broadcast recording program. The 200-kilocycle noise recorder at Grand Island, Nebr., the only recorder now operating in this program, has been in continuous operation since October 1943. Data from this program will be invaluable in studying radio propagation and the intensity and geographical distribution of atmospheric noise in this frequency range.

4. VERY HIGH FREQUENCY BROADCAST RECORDING PROGRAM

This project has rapidly expanded in importance and scope during the year. With the advent of VHF broadcasting it was expected that one of the main advantages of using these higher frequencies would lie in the closer spacing possible between stations assigned to the same frequency owing to the absence of sky wave interference which they were presumed to enjoy. While this expectation has been verified in

general, it has nevertheless been found that sky wave interference does occasionally occur at the lower end of the VHF band. It is thus of importance to determine as accurately as possible the intensity, duration and the frequency range of such occurrences. This has been and remains the main objective of the program.

Three types of sky wave interference in the VHF region of the spectrum have been found:

(*a*) *So-called bursts.*—Work on these has been temporarily abandoned as their effect on broadcast listening appears to be negligible. As a scientific problem this phenomena is highly interesting and investigation of their origin (most probably from ionization tracks set up by meteoric particles entering the atmosphere) should yield results of value both to the radio and other fields of knowledge. Intensive work on the problem did not however seem to be justified under wartime conditions.

Analysis of the meteoric bursts consisted in counting the numbers of bursts exceeding a fixed level and tabulating the numbers occurring per hour. The daily and annual variations in the hourly number of bursts have been correlated with theoretical and observed meteoric occurrences and very good agreement has been found. In addition, visual observation by the engineer in charge of the project has resulted in 13 coincidences between bursts and visible meteors.

(*b*) *Sporadic E-layer reflections.*—These have been found to exist with extraordinary intensity and for appreciable percentages of the time during the late spring and summer months at distances from the transmitter of from 500 to 1,500 miles. They may occur during any of the years of the Sunspot Cycle and their intensity varies with the distance in such a manner that there exists a maximum at about 900–1,000 miles. The measurements so far made have been mostly in the frequency range 42–50 megacycles. Since the middle of June 1945 regular recording on 83 megacycles has been instituted while recording on 107 megacycles has been done intermittently since that time. It is expected that regular recording on both 106 and 107 megacycles will be begun within a short time. These extensions of the program have been made possible by the cooperation of the industry. The results so far obtained indicate that both the intensity and the frequency of occurrence of sporadic E-layer reflections decreases markedly as we go higher in the spectrum.

The work done under this project has been reported in some detail in exhibits No. 380, No. 4, No. 593, and No. 627 of the frequency allocation hearing.

In this case the fundamental problem of analysis is not the determination of an average field at various distances, but a knowledge of the percentage of the time during which the interfering field exceeds certain fixed intensities at any given distance together with the rate of increase of the percentage of time with increase in the number of paths over which interference is received. This essential difference between the two cases has led to the development of novel methods of analysis and representation which may be described briefly as follows.

For the determination of the occurrence of sporadic E interference within a particular band of frequencies, a single high-powered transmitting station was recorded at several selected recording sites. The recorder tapes for each recording site were analyzed to determine to the

nearest minute the times during which the sporadic E signals exceeded certain selected levels of intensity and the times blocked in on an occurrence sheet for that level. A separate occurrence sheet was prepared for each level at a given recording site and a separate set of sheets for each site. Superposition of sheets from different sites over a light table permitted an optical comparison of the coincidence of occurrences at different recorder sites and permitted an estimate to be made of the rate of increase in interference to be expected with increasing numbers of stations assigned to the same channel. Sample occurrence sheets, each covering a full year, are included in exhibit No. 4 of the frequency allocation hearing. Reference thereto will show that the sheets permit also a quick determination of the daily and annual variations in the time of occurrence of these signals. At the present time occurrence sheets are being prepared on a monthly basis, rather than on an annual basis, in order to increase their accuracy and value as permanent records.

(*c*) *F2-layer reflections.*—The sky-wave interference from reflections at the upper of the stratified regions of the ionosphere, while most serious when it occurs owing to the greater distances from which it may originate—thus involving the question of international interferences—are of concern only for a few years in the neighborhood of sunspot maxima. Hence there is no experimental work on this source of interference to report at the present time. Work on this project has been confined to theoretical studies, and analysis of the rather meager results known from previous sunspot maximum periods. The conclusions arrived at are set forth in exhibits No. 380, No. 593, and certain exhibits of the frequency allocation hearing.

(*d*) *Tropospheric effects.*—In addition to the studies of sky-wave interference the VHF broadcast recording program has included studies of the variations in the range of such signals due to variations in the physical state of the lower atmosphere or troposphere. These range variations occur at all frequencies and insufficient data have been obtained in our work up to the present to warrant definite conclusions as to the magnitude of the trend of the effect with increasing frequencies. From the small amount of observations now available it does not appear that the range variations in the neighborhood of 100 megacycles differ sufficiently from those around 50 megacycles to demand any radical differentiation in the allocation policies for the two regions. A considerable amount of information on the matters at these and higher frequencies, some of which may be useful for the Commission's allocation problems, has been accumulated by the armed forces of the Nation and National Defense Research Committee but is not now generally available owing to security restrictions. Recently, certain very high frequency equipment has been made available to the Commission by the Office of Chief Signal Officer and the Army Air Forces, U. S. A. for further investigations at presently measured frequencies and for expanding the program to include frequencies higher than those now under investigation.

VHF tropospheric signals are analyzed in a manner similar to sky-wave signals in the standard broadcast band. That is, the hourly median signal levels are first determined, and these values then used to represent variations of signal levels with time, distance and frequency, in the manner shown in exhibit No. 4 of the frequency allocation hearings.

CHAPTER VIII

War Activities

1. RADIO INTELLIGENCE DIVISION
2. FOREIGN BROADCAST INTELLIGENCE SERVICE
3. FCC ASSISTANCE TO THE BOARD OF WAR COMMUNICATIONS

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CHAPTER VIII—WAR ACTIVITIES

1. RADIO INTELLIGENCE DIVISION

The Radio Intelligence Division, established in 1940 to give America wartime protection from misuse of the ether lanes by spies or other illegal operators, discovered 46 unlicensed stations during the fiscal year, investigated 1,445 complaints of suspicious transmission and of interference. These complaints were received from the general public, commercial communication companies, Government agencies, and the military.

During the year, the RID furnished fixes to 283 planes which were in distress. A total of 996 requests for assistance of all types to planes was received. The RID took 85,031 bearings.

A number of alerts originated totaled 25,000. This figure represents the number of instances in which an origination was made by each monitoring station equipped with long-range, high-frequency direction-finding facilities for the purpose of obtaining synchronized bearings from a net of direction finding stations upon a particular radio station under surveillance.

To facilitate its task of identifying the thousands of stations heard around the world so that the enemy, subversive or unlicensed stations may be spotted instantly, the RID compiled an additional 200,000 index cards for its files. These records show the operating characteristics of stations logged or otherwise monitored.

In accordance with a budget reduction, the personnel of the RID was reduced from 468 to 328. The number of secondary stations was reduced from 59 to 28, of which 13 were equipped with long-range, high-frequency Adcock type radio-direction finders. The number of primary stations, totaling 12, was maintained.

2. FOREIGN BROADCAST INTELLIGENCE SERVICE

The Foreign Broadcast Intelligence Service carried on its activities under an appropriation 25 percent less than that available for the preceding year. This necessitated a number of changes in the service provided to departments and agencies and in organization and operating procedures.

The changes included:

a. The mimeographed publications summarizing and analyzing broadcasts relating to events and conditions in Europe (distributed first on a weekly basis, then biweekly) were discontinued at the end of December 1944.

b. The special file of European shortwave broadcasts monitored in Washington, D. C., and delivered by teleprinter to the Office of War Information in New York City was reduced to an 8-hour service from a 24-hour service as had previously been the case.

c. A Special Services Section was created which mailed out to the departments and agencies broadcasts of interest which would not be

carried to them by the regular wire service or the mimeographed publications of FBIS.

The service provided to departments and agencies of the Federal government and allied nations after the above changes were instituted may be summarized as follows:

a. Texts and summaries of broadcasts originating in some 55 different countries were delivered daily by teleprinter to some 14 different departments and agencies; by mimeographed daily report to some 23 departments and agencies; and by special services to some 22 agencies, some of which did not subscribe to the regular service. This monitored material was also made available to representatives of 22 foreign governments.

b. All broadcast messages relating to American and allied servicemen held prisoner of war were communicated immediately by wire to the War Department.

c. Broadcasts originating in the Far East were summarized and analyzed in a fortnightly mimeographed publication and delivered to some 23 different departments and agencies.

d. Texts of broadcasts and special reports based on broadcast material were prepared as required for military and civil authorities of the United States in both the European and Pacific theaters of war.

The service thus supplied to the governments of the United States and its allies was based on a careful examination of several million words of broadcast text monitored daily. At the beginning of the fiscal year, FBIS maintained three principal monitoring posts (Washington, D. C.; Portland, Oreg.; and San Francisco, Calif.), and one minor post (Honolulu, T. H.). During the year the San Francisco post was abandoned, the Honolulu post was moved to the Island of Kauai (T. H.) and greatly enlarged, and a new post was established on Guam. In addition to the broadcasts intercepted at these stations, FBIS had access to material monitored by various allied nations, principally by the British Broadcasting Corp. at its post near London, and by the British Ministry of Information at its posts near Cairo and New Delhi.

3. FCC ASSISTANCE TO THE BOARD OF WAR COMMUNICATIONS

[As the Board of War Communications is an independent agency, the emphasis in this report is on those actions which involved the cooperation of the FCC]

ORGANIZATION

The Board of War Communications (formerly the Defense Communications Board) was created by Executive Order No. 8546 on September 24, 1940, for the purpose of determining, preparing, and coodinating plans for the most efficient control and use of the country's radio, wire, and cable communications facilities during the national emergency. Thereafter, by Executive Order No. 8964, dated December 10, 1941, and by Executive Order No. 9089, dated March 6, 1942, there was delegated to the Board the President's wartime authority under section 606 (a) of the Communications Act to direct that communications essential to the national defense and security shall have preference or priority and, under sections 606 (c) and (d), to direct the use, control or closure of radio and wire communication stations and facilities.

Chairman Paul A. Porter of the Federal Communications Commission is also Chairman of the Board of War Communications. The other members of the Board are Maj. General Harry C. Ingles, Chief Signal Officer of the Army; Rear Adm. Joseph R. Redman, Director of Naval Communications; Hon. William L. Clayton, Assistant Secretary of State in Charge of Economic Affairs; and Hon. Herbert E. Gaston, Assistant Secretary of the Treasury in Charge of Treasury Enforcement Activities, who is Secretary of the Board. Commodore E. M. Webster, Chief of Communications, United States Coast Guard, is Assistant Secretary of the Board.

The Board has no paid personnel, appropriation, or funds. It operates through a coordinating committee and a law committee staffed by personnel from the agencies represented on the Board; through Labor and Industry Advisory Committees and an international Broadcasting Coordinating Committee; and through 13 "numbered committees" for radio amateurs, aviation communications, cable, domestic broadcasting, the Interdepartment Radio Advisory Committee, international broadcasting, radio communications, State and municipal facilities, telegraph, telephone, United States Government facilities, the Communications Liaison Committee for Civilian Defense, and the Priorities Liaison Committee.

ACTIVITIES

In addition to assisting in the preparation of the orders issued by the Board of War Communications during the fiscal year ending June 30, 1945, the Commission also cooperated with the Board in its consideration of problems which continued to arise concerning wartime communications such as, for example, the wartime speed and quality of domestic telegraph service. In connection with the speed and quality of domestic telegraph service, the Commission submitted to the Board during the fiscal year ended June 30, 1945, two reports dated, respectively, July 1944, and November 1944, showing the service being rendered by the telegraph industry. Continued checks were also made by the Commission to determine the extent of compliance by the telegraph carriers and the public with Board orders No. 25–C, 28, until those orders were canceled by order No. 31, dated August 16, 1945, and a number of other matters were investigated involving, for example, complaints regarding the abuse of the telephone and telegraph priorities provided for in Board orders No. 20 and 27, as amended.

The Board issued the following orders during the fiscal year ending June 30, 1945:

Order No. 6–A, dated January 25, 1945, canceling order No. 6 dated May 1, 1942, designating for closure the facilities of the French Telegraph Cable Co. within the continental United States.

Order No. 8–C, dated November 23, 1944, exempting from the closure provisions of order No. 8, upon certain specified condition, point-to-point radiotelegraph circuits between New York, N. Y., and San Francisco, Calif., operated by Globe Wireless, Ltd.

Order No. 19–C, dated May 3, 1945, canceling orders No. 15, 17, 18, 19, 19–A, and 19–B, previously issued by the Board and limiting the use of international radiotelephone communications.

Orders No. 25–D and 25–E, dated May 4, 1945, and May 17, 1945, respectively, relaxing the provisions of order 25–C prohibiting the transmission of telegraph messages of felicitation and congratulation to permit the transmission of such messages to or from members of the armed forces and the merchant marine.

Order No. 25–F, dated June 28, 1945, relaxing the ban in order No. 25–C against the performance of nontelegraphic services by domestic telegraph carriers to permit such carriers to participate in the furnishing of shopping service ordered through another carrier from outside of the continental United States.

Order No. 31, dated August 16, 1945, though issued subsequent to June 30, 1945, is listed here because of its importance. It canceled the following previously issued Board of War Communications orders: Nos. 5, 7, 8, 8–A, 8–B, 9, 10, 11, 12, 13, 14, 16, 21, 23, 25, 25–F, 28, 29, 30.

APPENDIX

PUBLICATIONS

Following is a list of Federal Communications Commission publications of general interest available at the Government Printing Office, Superintendent of Documents, Washington 25, D. C., unless otherwise indicated:

Title	*Price*
Communications Act of 1934, with Amendments and Index thereto, revised to June 14, 1945	$0.15
Federal Communications Commission Reports (bound volumes of decisions and orders exclusive of annual reports):	
Volume 1—July 1934–July 1935	1.00
Volume 2—July 1935–June 1936	2.00
Volume 3—July 1936–February 1937	2.00
Volume 4—March 1937–November 15, 1937	1.50
Volume 5—November 16, 1937–June 30, 1938	1.50
Volume 6—July 1, 1938–February 28, 1939	1.50
Volume 7—March 1, 1939–February 29, 1940	1.50
Volume 8—March 1, 1940–August 1, 1941	1.50
Volume 9—August 1, 1941–April 1, 1943	1.25
Annual reports of the Commission:	
First Annual Report—Fiscal year 1935	.15
Third Annual Report—Fiscal year 1937	.30
Sixth Annual Report—Fiscal year 1940	.20
Seventh Annual Report—Fiscal year 1941	.10
Study Guide and Reference Material for Commercial Radio Operator Examinations	.15
Standards of Good Engineering Practice Concerning Standard Broadcast Stations (550–1,600 kc.)	.65
Standards of Good Engineering Practice Concerning FM Broadcast Stations	(1)
Standards of Good Engineering Practice Concerning Television Broadcast Stations	(1)
Statistics of the Communications Industry in the United States (1939)	.25
Statistics of the Communications Industry in the United States (1940)	.20
Statistics of the Communications Industry in the United States (1942)	.35
Statistics of the Communications Industry in the United States (1943)	.30
Report on Chain Broadcasting	.30
Rules and Regulations of the FCC:	
Part 1—Rules of Practice and Procedure, Revised to February 1, 1945	(1)
Part 2—General Rules and Regulations, Revised to December 19, 1944	.10
Part 3—Rules Governing Standard and High Frequency Broadcast Stations, Revised to October 5, 1940	.10
Part 4—Rules Governing Broadcast Services Other than Standard Broadcast, Revised to May 14, 1942	(1)
Part 5—Experimental Rules, Effective October 1, 1939	(1)
Part 6—Rules Governing Fixed Public Radio Services, Revised February 20, 1943	.05
Part 7—Rules Governing Coastal and Marine Relay Services, Revised April 5, 1941	(1)
Part 8—Rules Governing Ship Service, Revised to May 31, 1943	.15
Part 9—Aviation Radio Services, Revised November 1, 1942	.05

[1] Obtainable from the Federal Communications Commission, Washington 25, D. C., upon request.

Title	*Price*
Rules and Regulations of the FCC—Continued.	
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Part 16—Rules and Regulations Governing Railroad Service	(1)
Part 31—Revised October 25, 1940, and Part 32, Effective January 1, 1937, Uniform System of Accounts, Class A and Class B Telephone Companies; Units of Property, Class A and Class B Telephone Companies (1 pamphlet)	.15
Part 33—Uniform System of Accounts for Class C Telephone Companies, Effective January 1, 1939	.15
Part 34—Uniform System of Accounts for Radio Telegraph Carriers, Effective January 1, 1940	.25
Part 35—Uniform System of Accounts for Wire-Telegraph and Ocean-Cable Carriers, Effective January 1, 1942	.35
Part 41—Telegraph and Telephone Franks, Effective August 11, 1939	.05
Part 42—Rules Governing the Preservation of Records, Revised to May 27, 1943	.10
Part 43—Rules Governing the Filing of Information, Contracts, etc., of Telecommunications Carriers, Revised to September 29, 1943	.05
Part 51—Classification of Telephone Employes	.05
Part 52—Classification of Wire-Telegraph Employes	.05
Part 61—Tariffs: Rules Governing the Construction, Filing, and Posting of Schedules of Charges for Interstate and Foreign Communications Service, Revised to September 29, 1943	.10
Part 62—Rules Governing Applications Under Section 212 of the Act to Hold Interlocking Directorates, Effective September 1, 1939	.05
Part 63—Extension of Lines and Discontinuance of Service by Carriers, Effective March 18, 1944	.05
Federal Communications Commission Report on Social and Economic Data, pursuant to Informal Hearing, etc., July 1, 1937	.60
Federal Communications Commission—Proposed Telephone Investigation Pursuant to Public Resolution No. 8 (74th Cong.)	1.00
Final Report on Telephone Investigation, House Document 340	.65
Annual Report Form H for year ending December 31, 1944	
Annual Report Form M, paper, loose-leaf edition	
Statistical Circular No. 1	.05
FCC Form 901	.05 ea. 1.25 C
FCC Form 902	.05 ea. 1.25 C
Form 903	.05 ea. 1.25 C
FCC Form 905A	.05 ea. .85 C
FCC Form 905B	.05 ea. .85 C

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