EIGHTEENTH ANNUAL REPORT

FEDERAL COMMUNICATIONS COMMISSION

FISCAL YEAR ENDED JUNE 30, 1952

(With introductory summary and notation of subsequent important developments)

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(as of June 30, 1952)

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(Term expires June 30, 1958)

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*Resigned September 19, 1952; succeeded by Eugene H. Merrill, October 14, 1952.

LETTER OF TRANSMITTAL

FEDERAL COMMUNICATIONS COMMISSION,
Washington 25, D. C.

To the Congress of the United States:

There is herewith submitted the eighteenth annual report of the Federal Communications Commission, covering the fiscal year ending June 30, 1952.

Subsequently, on July 16, 1952, the Congress amended section 4 (k) of the Communications Act to require certain additional data to be furnished in the first and second annual reports thereafter. The Commission has started compilation of this material which, in accordance with the new requirements, will be submitted as part of its nineteenth and twentieth annual reports.

Because of the interest in television and other developments, the introductory summary of the current annual report makes reference to noteworthy events up to the time of going to press.

Respectfully,

PAUL A. WALKER, *Chairman.*

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INTRODUCTORY SUMMARY

1. HIGHLIGHTS OF THE FISCAL YEAR
2. SUBSEQUENT EVENTS

1. HIGHLIGHTS OF THE FISCAL YEAR

GENERAL

Historically, the fiscal year 1952 marked more than a century of land-line telegraph operation, over fourscore years of ocean-cable telegraph service, three-quarters of a century of land-line telephone usage, a half century of sea and global radiotelegraph communication, a quarter century of international radiotelephony, three decades of commercial radio broadcasting, and 18 years of unified regulation of electrical communication by the Federal Communications Commission.

When the Commission was established in 1934, most international communication was by cable. Now it is predominately radio—telegraph or telephone. Besides linking us with many foreign nations, radio is today being utilized for about 60 different kinds of services in our own country. As a result, the number of radio authorizations on the books of the Commission this year, for the first time, exceeded the 1,000,000 mark.

Because it enters the home, broadcasting commands so much popular interest the average person does not realize that there are now 45 times more nonbroadcast stations than there are broadcast stations, and that the former are equally important to the public interest and convenience. In other words, more than 200,000 radio authorizations are held by public agencies and by private industry and individuals as compared with less than 5,000 stations engaged in program broadcast. The broadcast total includes about 1,200 pickup and studio-transmitter links. The nonbroadcast figures, on the other hand, do not indicate the actual number of transmitters involved, since a single authorization—as in the case of a police or fire department, railroad, taxicab company, etc.—can cover many portable or mobile transmitters. Thus, the safety and special radio services collectively represent nearly 540,000 transmitters operating on the land, on the sea, and in the air.

Some of these nonbroadcast services—such as those devoted to public safety—protect life and property. Others—like aeronautical, marine, and land transportation—speed and safeguard transportation

of people and goods. Still another service—industrial—expedites production and delivery of essential products. Also, there are common-carrier (for hire) services which affect the rates the public pays for telephone and telegraph facilities.

In addition, more than 800,000 Commission radio-operator authorizations are now outstanding. These include 679,000 commercial authorizations of different classes to operators who depend upon radio for their livelihood or profession, and more than 100,000 authorizations to amateur radio operators who are interested in radio as a hobby or for training.

NATIONAL DEFENSE

The Commission's national-defense activities continued to multiply. They cut across all fields of electrical communication. Besides policing the spectrum with the Government's only monitoring network, the Commission is providing military, civilian defense, and defense industry with communication facilities far beyond peacetime requirements. This program, in general, consists of strengthening and expanding the Nation's communication systems to cope with the existing and any potential emergency, harnessing wire and radio facilities to the defense effort, helping safeguard plants and operations, and preventing subversive radio operation.

Of particular importance are measures to control electromagnetic radiations, both from communication and noncommunication sources, which could be used as "beams" to guide enemy aircraft and flying missiles. "Conelrad" (an abbreviation of the term "control of electromagnetic radiation") is the short name applied to this project. With the cooperation of broadcasters, a plan has been worked out for the Department of Defense for alerting broadcast stations and controlling their operations during an alert in a manner to confuse the enemy and, at the same time, assure continued broadcast service to the public and civilian defense and other emergency communication. Conelrad plans are proceeding for the other services and are expected to be put into effect during the next fiscal year.

On October 24, 1951, the President signed an amendment to the Communications Act which strengthens and clarifies his emergency powers with respect to electromagnetic radiation control. An Executive order of December 10 thereafter empowered the Commission to enforce regulations in this connection.

On June 27, 1952, the Commission finalized rules for a Radio Amateur Civil Emergency Service, to become effective the following August 15, in which amateur stations and operators can render further emergency service by providing communication for civil-defense purposes. March 21, 1952, marked the first year of operation of the Disaster Communications Service, which enables Government and non-Government stations to engage in emergency communication.

Other established radio services include the Special Emergency Radio Service, the State Guard Radio Service, the Civil Air Patrol, and various public safety services concerned with the protection of life and property under normal as well as abnormal conditions.

At different times the Commission has liberalized the commercial radio-operator rules because of the scarcity of certain classes of operators, especially on board ships. It has also made it easier for amateurs serving in the Armed Forces to keep up their licenses.

INTERNATIONAL

The most significant accomplishment in the international radio field was agreement reached at the Extraordinary Administrative Radio Conference of the International Telecommunication Union (ITU), held at Geneva in the latter part of 1951, on methods to bring into world force the allocations of spectrum space to various radio services.

Besides furnishing frequency usage data, the Commission resumed daily notifications to the ITU of new frequency assignments. The Commission's radio-frequency record now consists of 70,000 cards reflecting the historical use of each frequency, and over 90,000 machine punch cards giving particulars about the present Commission authorizations.

The Commission assisted the Department of State in preparing for, and participated in, a total of 20 international conferences, and was doing preparatory work for 27 future conferences.

A total of 670 cases of international radio interference received the Commission's attention during the year, of which number 445 were resolved; and 375 cases of treaty infractions were reported to appropriate foreign administrations.

COMMON CARRIERS

The public's use of communications services furnished by common carriers established new records. For calendar year 1951, the Bell System, which operates about 82 percent of the telephones in this country, reported new highs of a daily average of 139 million local and 6 million toll calls. Bell System's revenues amounted to $3.6 billion, which produced profits of $365 million, representing increases over 1950 of 10 and 5 percent, respectively. Over 45 million telephones are in service in this country with more than 2 million added during the past year.

Fiscal 1952 was also a record year in applications for telephone facilities, with the Commission authorizing $107.5 million in wire-line construction and $41.5 million in microwave radio-relay construction. Rapid growth continued in the mobile field, with the telephone carriers providing service in 180 cities to 21,000 mobile units, up 21 percent over a year ago. Mobile service by miscellaneous nontelephone com-

panies is furnished in 193 cities to 13,000 mobile units, up 45 percent over a year ago.

Outstanding new developments in telephony included the completion of the first transcontinental microwave radio relay system for telephone service as well as for Nation-wide transmission of television programs; television program transmission facilities of telephone carriers expanded to more than 30,000 channel miles; and customer dialing of long-distance toll calls began on a trial basis.

The Commission initiated and conducted negotiations which resulted in the public's telephone bill being about $16 million a year less than it otherwise would have been. In these negotiations, agreement was reached with representatives of the State commissions and the industry to change separations procedures so that $90 million in exchange telephone plant and $22 million in associated annual expenses would be transferred from intrastate to interstate jurisdiction for rate-making purposes. This decreased intrastate revenue requirements by about $30 million a year. Partially offsetting this, the show-cause aspect of the Commission's outstanding investigation of interstate telephone rates was settled by permitting a net increase of $14 million in interstate toll telephone rates. These arrangements also materially reduced the disparity between intrastate and interstate toll rates and eliminated several inconsistencies in the interstate toll rate schedule.

Western Electric reduced its sales prices at the rate of $45 million annually to affiliated Bell companies, effective April 1, 1952. This action came after the Commission had expressed to Western Electric the view that its earnings might be excessive.

Depreciation rates were prescribed for nine Bell companies, reducing their annual depreciation charges by $7.9 million a year.

During calendar year 1951, Western Union, the domestic telegraph carrier, handled 189.6 million messages on its land-line system, the highest volume since 1948. As a result of wage increases which became effective July 1, 1951, however, Western Union was permitted to increase its interstate telegraph rates, effective September 1, 1951, and intrastate rates on later dates, so as to add revenues of $10.5 million a year. This increase partially offset the wage increases. A reduction in the Federal excise tax on telegrams from 25 to 15 percent on November 1, 1951, was estimated to reduce the telegraph bills of users $14 million a year. Additional rate increases were proposed by the telegraph company in June 1952, to produce increased revenue of $13 million a year to offset increased wages which became effective September 1, 1951, and additional wage increases which the company proposed to pay. At the end of the fiscal year, the new rates had not yet gone into effect.

In February 1952, Western Union amended its tariffs to prohibit transmission of horse- and dog-racing news to certain classes of users, a measure designed to deny the service to gambling interests. Hearings were held before the Commission in June 1952, and decision was pending at the close of the fiscal year.

International carriers experienced continued growth in volume, with increases of 9.4 percent in telegraph message revenues and 23.6 percent in radiotelephone revenues over the previous year. Telegraph service is furnished to 84 foreign countries and oversea points and through them to nearly every other country in the world. Radiotelephone service is furnished directly to 55 foreign countries and oversea points and through them to 48 additional countries.

On November 14, 1951, the Commission authorized Commercial Pacific Cable Co. to discontinue operations. This was the only United States carrier operating trans-Pacific cables. The Commission determined that adequate substitute service would be furnished by the radiotelegraph carriers.

During the year extensive reassignments of radio frequencies were made to international carriers to comply with international agreements intended to obtain more orderly use of frequencies by all countries.

In response to requests for rate increases, the Commission held extensive formal hearings on marine telegraph rates. The decision was pending.

On March 5, 1952, the Commission ordered an investigation into all phases of the matter of Western Union complying with the requirement of the Communications Act that it divest itself of its cable system. Hearings were scheduled to begin early in fiscal 1953.

SAFETY AND SPECIAL RADIO SERVICES

Most of the nonbroadcast radio stations are grouped in what is known as the Safety and Special Radio Services. Their more than 212,000 authorizations represent the use of nearly 540,000 transmitters and constitute the largest number of radio stations licensed by the Commission.

Utilization of their services by individuals, industry, commerce, and State and local governments comprise a broad field of radio operations in connection with protection of life and property, industrial and agricultural production, transportation, disaster, and civil defense.

The more than 40 of these nonbroadcast services fall into four main categories:

The safety group, with nearly 80,000 authorizations, covers the use of nearly 190,000 transmitters by the Aeronautical (42,000 transmitters), Marine (35,000), Police (81,000), Fire (11,000), Forestry-

Conservation (14,000), Highway Maintenance (4,200), Special Emergency (1,900), and State Guard (140) Radio Services.

The industrial group, with nearly 14,000 authorizations, covers the use of more than 90,000 transmitters by the Power (51,000), Petroleum (15,000), Forest Products (5,200), Special Industrial (15,000), Low Power Industrial (2,300), Relay Press (nearly 450), Motion Picture (nearly 200), Agriculture (10) and Radiolocation (11) Radio Services.

The land-transportation group, with nearly 6,500 authorizations, covers the use of nearly 145,000 transmitters by the Railroad (9,000), Urban Transit (1,700), Intercity Bus (400), Taxicab (125,000), Highway Truck (3,200), Automobile Emergency (1,500) and Citizens (3,000) Radio Services.

The Amateur Radio Service has more than 113,000 authorizations covering about the same number of transmitters. The relatively new Disaster Communications Service has 69 authorizations but more than 400 transmitters.

The only new radio service in the safety and special category authorized during the year was the Industrial Radiolocation Service, which became operative February 1, 1952.

Interest in the Safety and Special Radio Services is attended by the fact that more than 141,000 applications were received during fiscal 1952, which was 34,000 more than in the year previous and 48,000 more than in fiscal 1950.

BROADCAST

Highlighting the broadcast year was removal of the "freeze" on the construction of new television stations which had been in effect since the fall of 1948 pending the outcome of the comprehensive proceedings affecting the future of video broadcasting.

This was accomplished by a final report and order of the Commission on April 11, 1952, which, by adding 70 UHF channels to the then available 12 VHF channels, opened the door for more than 2,000 TV stations to ultimately serve nearly 1,200 communities in the United States and its possessions, and reserved channel assignments in 242 communities for noncommercial educational use. To make Nation-wide TV coverage possible, the Commission had to change the rules with respect to station power, coverage, separation, etc.

The report fixed July 1, 1952, as the date for beginning the processing of applications for new TV stations under a temporary procedure designed to bring their first TV service to the greatest number of people in the shortest possible time. In general, priority was to be given places without TV stations according to their rank in popula-

tion, and applications from the Territories and possessions and for educational stations were to be processed as received.

Before the freeze was lifted, 108 commercial TV stations and more than 200 TV experimental and auxiliary stations held authorizations.

While the increase in the number of standard broadcast stations was not as great as during the year previous, the close of fiscal 1952 saw 2,420 authorized commercial AM stations with more than 1,000 pickup auxiliaries. Fewer AM authorizations were canceled during fiscal 1952 than during either of the previous 2 years.

Under international agreement, the Commission on June 18, 1952, proposed to add the channel 540 kilocycles to the broadcast band.

Though signed by the President in February 1951, the new North American Regional Broadcasting Agreement (NARBA) was not yet ratified by the Senate. Consequently, no action could be taken with respect to the so-called clear-channel and daytime-skywave hearings.

There was a decrease of only 11 commercial FM broadcast authorizations during the year in contrast with 73, 133, and 155 for the previous 3 years, respectively, and the number of such licensed stations grew from 534 to 582 in fiscal 1952. Six FM broadcast stations held authorizations to transmit incidental facsimile programs.

Ten new noncommercial educational FM broadcast stations were authorized, bringing the total number in that service to 104. Forty-two of these stations operate with power of 10 watts or less.

Forty international broadcast stations continued to beam the Voice of America programs overseas under the auspices of the Department of State.

FIELD ENGINEERING AND MONITORING

Field engineering and monitoring activities were conducted through nine regional offices which supervised 23 district offices, 6 suboffices, 3 ship offices, and a network of 19 monitoring stations.

The field staff inspected more than 20,000 ship, broadcast, and other radio stations, as a result of which nearly 9,500 discrepancies or deficiencies were observed. Most of these (6,810) involved ship installations.

Examinations given in the field resulted in the issuance of 179,000 new commercial operator authorizations, which was an increase of about 29 percent over the previous year. Owing to the establishment of several new classes of amateur licenses, more than 35,000 amateur examinations were given by the field staff in fiscal 1952 as compared with less than 12,000 in fiscal 1951.

Interference complaints required more than 10,000 field investigations during the year, or almost 500 over the 1951 figure. Most of these (6,800) related to TV. Complaints of interference to AM reception decreased to less than 2,300.

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A total of 114 illegal radio stations were located and closed in 1952 as compared with 101 in 1951. Prosecution of five cases of unlicensed operation resulted in the conviction of nine persons.

A new secondary monitoring station was established near Fairbanks, Alaska, but budget limitations called for closure of the secondary monitoring station at Bay St. Louis, Miss.

A mounting number of violations was observed by the monitoring system, which resulted in the serving of more than 10,000 violation notices, an increase of nearly 1,400 over the previous year.

Monitoring stations obtained more than 82,000 bearings, and were called upon to furnish direction findings for 138 lost or disabled ships and aircraft.

Interference and other cases requiring monitoring reached an all-time high of more than 2,700.

In addition to numerous monitoring surveys to obtain frequency data, the field staff was assigned 59 new engineering projects in addition to 102 carried over from the previous year. Also, nearly 6,500 antenna construction proposals were studied and cleared with respect to air-navigation safety considerations.

TECHNICAL RESEARCH AND LABORATORY

The Commission's technical activities are devoted largely to resolving problems relating to wave propagation, technical standards, and various allied subjects. A factual knowledge of propagation characteristics and equipment capabilities is fundamental to an intelligent allocation and use of frequencies.

Emphasis was given during the year to VHF and UHF propagation studies and to projects dealing with technical standards. Field intensity sunspot recordings of 17 stations, representing 10 years of data accumulated by each station, were analyzed.

In cooperation with industry, Government, and other interested groups, much attention is being given to the growing problem of interference to radio communication from carrier current systems, industrial heating equipment, diathermy apparatus, arc welders, garage-door openers and other remote-control devices, electric razors and heating pads and blankets, fluorescent lights, automobile ignition systems, and other items which emit radiation. The Commission has established standards for the control of such devices and has allocated specific frequencies to absorb some troublesome emissions, but the situation has been made acute by the mounting number of television receivers, which are particularly susceptible to interference.

In order to curb potential radiation at the source, the Commission tests certain proposed equipment before it is manufactured and distributed. Items which are submitted to it for "type approval" include those intended for marine radio, diathermy, and industrial heating

use, as well as the monitoring equipment used by broadcast stations. Certain other equipment is offered for "type acceptance." During the year the Commission type-approved 90 items and type-accepted 32 others.

Besides testing apparatus, the Commission's laboratory near Laurel, Md., helps draft regulations governing such equipment, makes technical measurements and engineering investigations in connection with the allocation of frequency bands to different communication services, and assists in establishing and revising engineering standards and regulations.

A total of 369 experimental radio stations, employing more than 1,500 transmitters, were in operation at the close of the year. They were in three groups: Class 1, operated by manufacturers and organizations to develop or improve equipment and techniques; class 2, for the development of new radio services or the expansion of existing services; and, class 3, for individuals conducting temporary experimental projects in their own behalf.

COMMISSION

The following changes in Commission membership occurred during the year: Chairman Wayne Coy resigned on February 21, 1952, and, on February 28, Paul A. Walker (then Vice Chairman) was named Chairman by President Truman. At the same time, Robert T. Bartley was nominated as a Commissioner to fill out Mr. Coy's unexpired term. Commissioner Bartley was confirmed by the Senate on March 4 following. On March 7, 1952, the Commission elected Commissioner Rosel H. Hyde as its Vice Chairman. Renominated for another term on May 5, 1952, Commissioner Hyde was confirmed by the Senate on May 15.

During the year the Commission completed the reorganization of its staff on functional lines, a process which had extended over several years. The final step—effective March 2, 1952—was creation of a Field Engineering and Monitoring Bureau and redistribution, realinement, and redefinement of certain other offices and functions. In consequence, the Commission now operates with four Bureaus—Common Carrier, Safety and Special Radio Services, Broadcast, and Field Engineering and Monitoring—and eight Offices, Administration, Chief Engineer, Chief Accountant, General Counsel, Secretary, Opinions and Review, Hearing Examiners, and Information.

At the close of the fiscal year the Commission personnel totaled 1,138, which is the smallest number it has had since 1941.

In fiscal 1952, the Commission operated with an appropriation of $6,585,550, which was less than that for each of the three previous years.

2. SUBSEQUENT EVENTS

COMMUNICATIONS ACT AMENDMENTS

On July 16 the President signed the Communications Act Amendments, 1952 (Public Law 554), which further amended the Communications Act of 1934. These amendments require various changes in existing Commission procedures and specify certain information to be reported to Congress.

COMMON CARRIERS

Increased Western Union interstate telegraph rates became effective September 1. They were expected to add $10.5 million in annual revenue, to partially offset wage increases to Western Union employees.

In a decision of October 9, the Commission found insufficient evidence to presently require interconnection of Western Union microwave facilities with the Bell microwave-coaxial cable system for TV relay purposes.

SAFETY AND SPECIAL RADIO SERVICES

On August 13 the Commission proposed a new ship licensing procedure which would permit licensees to plan ahead for the numerous frequency changes required by international treaty.

A Radio Amateur Civil Emergency Service, which enables amateurs to provide radio communication for civil defense purposes, became operative August 15.

On October 1 the Commission reminded amateurs in the Armed Forces that they can take the examination for advanced class operating privileges by mail, before the end of the 1-year waiting period.

As of October 15, the number of authorizations in the Safety and Special Radio Services approximated 220,000, covering the use of some 550,000 transmitters.

BROADCAST

Television.—When processing of TV applications was resumed on July 1, there were on file more than 700 applications for new stations, 450 of which had either been amended or submitted after the April 14 announcement of the lifting of the freeze.

Between July 11 (when the first post-freeze grants were made) and November 6, 98 new TV stations were authorized. Of this number 9 were for noncommercial educational operation. Total TV authorizations were 206. Pending applications were approaching the 900 mark.

Post-freeze commercial grants made up to November 6 promised initial TV service for 65 communities: Gadsden, Mobile, and Montgomery, Ala.; Little Rock, Ark., Fresno and San Bernardino, Calif.;

Denver and Pueblo, Colo.; Bridgeport, New Britain, and Waterbury, Conn.; Peoria and Rockford, Ill.; Muncie and South Bend, Ind.; Sioux City, Iowa; Fort Lauderdale and St. Petersburg, Fla.; Ashland, Ky.; Baton Rouge, La.; Frederick, Md.; Fall River, Holyoke, New Bedford, and Springfield, Mass.; Ann Arbor, Battle Creek, East Lansing, Flint, and Saginaw, Mich.; Duluth, Minn.; Jackson, Miss.; St. Joseph and Springfield, Mo.; Lincoln, Nebr.; Elmira, N. Y.; Asbury Park and Atlantic City, N. J.; Asheville and Raleigh, N. C.; Akron, Massilon, Warren, and Youngstown, Ohio; Portland, Oreg.; Bethlehem, Harrisburg, New Castle, Reading, Scranton, Wilkes-Barre, and York, Pa.; Columbia and Charleston, S. C.; Chattanooga, Tenn.; Amarillo, Austin, El Paso, Lubbock, and Wichita Falls, Tex.; Lynchburg and Roanoke, Va.; Spokane, Wash.; San Juan, P. R.; and Honolulu, T. H.

The first post-freeze TV grants (July 11) were for three Denver, Colo., commercial stations. The first TV station to go on the air since the freeze lift was KFEL–TV, Denver (July 19). The first UHF video station to begin operation was KPTV, Portland, Oreg. (September 20). The first Territorial TV grant was for a commercial station at San Juan, P. R. (July 23).

The first noncommercial educational TV grant went to the Kansas State College of Agriculture and Applied Science, Manhattan, Kans. (July 25). Subsequent educational grants to October 15 were to the University of Southern California, Allan Hancock Foundation, Los Angeles, Calif.; the Board of Regents, University of the State of New York, for stations at Albany, Binghamton, Buffalo, New York City, Rochester, and Syracuse, that State; and the University of Houston and Houston Independent School District, Houston, Tex.

Hearings on contested TV applications, on a city-by-city basis under the temporary processing procedure, began October 1. On October 15 the Commission suspended the processing of competitive applications for new TV stations facing hearing so that, for the time being, it could concentrate on the many pending noncompetitive TV applications.

By November, more than 19 million TV sets were estimated to be in use, and nearly 30,000 miles of Bell System coaxial and microwave facilities were serving 110 TV stations in 67 cities.

Frequency modulation.—The first FM Territorial grant was made on September 18 for a commercial station at Honolulu.

As of November 1, there were 641 commercial and 110 noncommercial educational FM authorizations.

Amplitude modulation.—On the same date, outstanding authorizations for AM stations totaled 2,506.

COMMISSION

Commissioner Robert F. Jones resigned on September 19 and, on October 6, the President appointed Eugene H. Merrill to fill out Mr. Jones' term which expires June 30, 1954. Commissioner Merrill took office on October 14.

Four additional hearing examiners were appointed since the close of the fiscal year, bringing the total number of examiners to 12 as of October 15.

The first foreign national completing a course in telecommunication studies with the Commission under the Government's point 4 program of foreign economic assistance was a representative of Honduras (September 19). Several members of India's Government and representatives of Pakistan completed the course thereafter.

CHAPTER I—GENERAL

1. AUTHORITY AND PURPOSE
2. COMMISSION
3. FUNCTIONS
4. COMMISSIONERS
5. STAFF ORGANIZATION
6. PERSONNEL
7. APPROPRIATIONS AND EXPENDITURES
8. LITIGATION
9. LEGISLATION
10. HEARINGS
11. CORRESPONDENCE, RELEASES, AND PUBLICATIONS
12. LICENSES AND OTHER AUTHORIZATIONS
13. APPLICATIONS AND OTHER FILINGS

1. AUTHORITY AND PURPOSE

The Federal Communications Commission was created by the Communications Act of 1934 and administers that act, as amended.

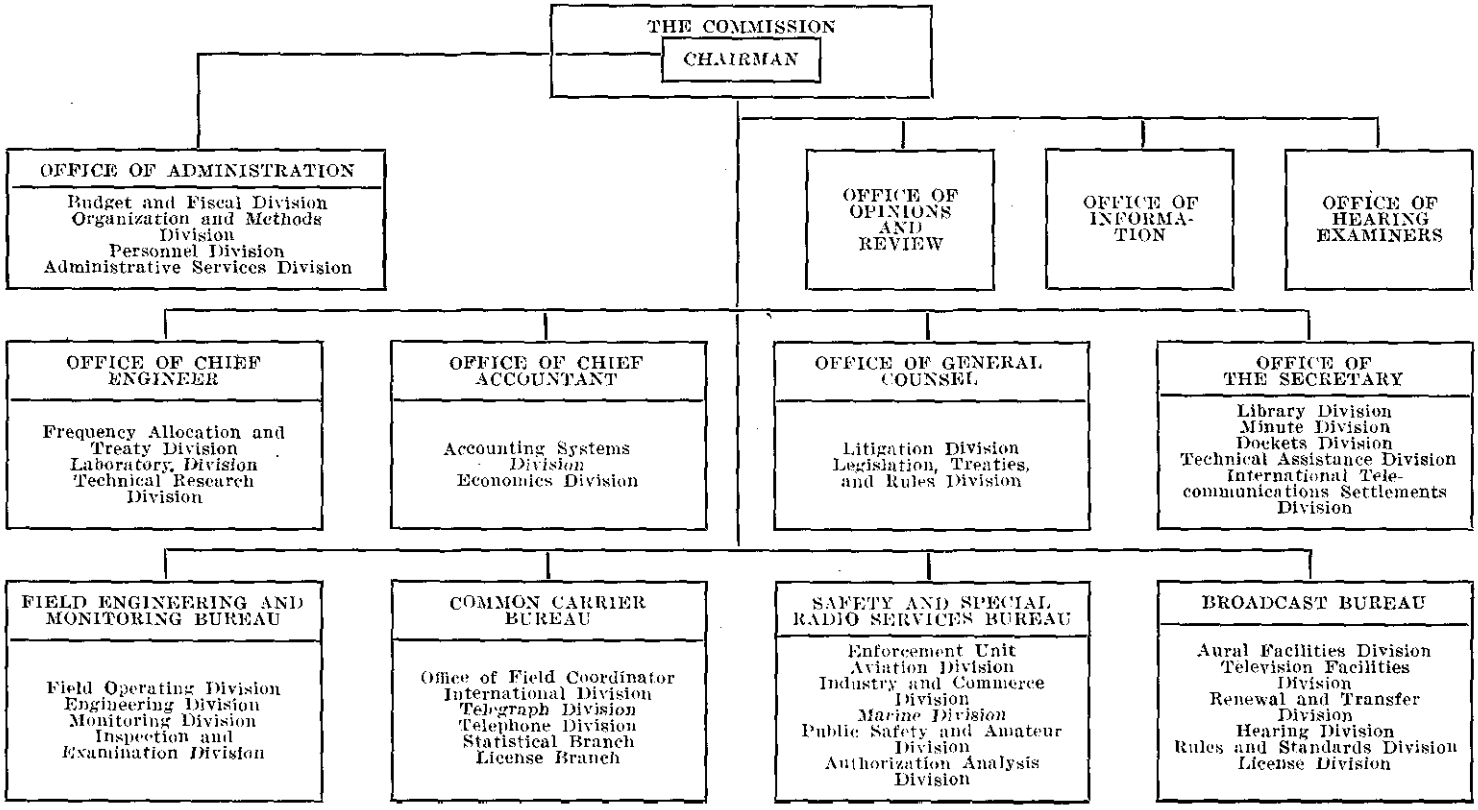
The Commission was established "for the purpose of regulating interstate and foreign commerce in communication by wire and radio so as to make available, so far as possible, to all the people of the United States a rapid, efficient, Nation-wide, and world-wide wire and radio communication service with adequate facilities at reasonable charges, for the purpose of the national defense, for the purpose of promoting safety of life and property through the use of wire and radio communication, and for the purpose of securing a more effective execution of this policy by centralizing authority heretofore granted by law to several agencies and by granting additional authority with respect to interstate and foreign commerce in wire and radio communication."

2. COMMISSION

As an independent Federal agency established by Congress, the Commission reports directly to Congress. It is composed of seven Commissioners appointed by the President, subject to confirmation by the Senate. The Chairman is designated by the President without Senate confirmation; the Vice Chairman is elected by the Commission membership. The normal term of a Commissioner is 7 years.

FEDERAL COMMUNICATIONS COMMISSION

Organization Chart as of June 30, 1952



3. FUNCTIONS

Commission regulation covers three major fields of communication: Interstate and international common carrier operation by wire and radio (telegraph, telephone, and submarine cable); nonbroadcast radio facilities (safety and special); and broadcast (program) stations.

This involves supervision of rates and services of telephone and telegraph companies subject to Commission jurisdiction; allocating radio bands for different services and assignment of frequencies to individual stations; licensing of radio transmitters and radio operators; encouraging more effective and widespread utilization of radio; promoting protection of life and property through the use of radio on land, water, and in the air; participating in the formulation and domestic administration of wire and radio provisions of treaties and other international agreements to which the United States is a party; and helping coordinate the many forms of electrical communication to the national security program.

The authority of the Commission extends to the United States Territories and possessions, but not to the Canal Zone. Communications facilities operated by the Federal Government are not subject to its jurisdiction.

The act limits licensing by the Commission to citizens of the United States, and denies the license privilege to corporations of which any officer or a director is an alien, or of which more than one-fifth of the capital stock is owned or controlled by foreign interests.

The Commission exacts no fee or charge of any kind in connection with its regulatory or licensing functions.

4. COMMISSIONERS

The Commissioners function as a unit, directly supervising all staff activities and making all important policy determinations. From time to time, committees of Commissioners are designated to make special studies and supervise particular undertakings. The performance of specified functions is delegated to individual Commissioners, and members of the staff as units or individuals.

Changes in the membership of the Commission during the year were as follows: Chairman Wayne Coy resigned on February 21, 1952, and on February 28 Paul A. Walker (then Vice Chairman) was named Chairman by President Truman. On that same day the President nominated Robert T. Bartley as Commissioner to fill out Mr. Coy's unexpired term ending June 30, 1958, and he was confirmed by the Senate on March 4. On March 7, 1952, the Commission elected

Commissioner Rosel H. Hyde as its Vice Chairman. Renominated for another 7-year term (to June 30, 1959), by the President on May 5 following, Commissioner Hyde was confirmed by the Senate on May 15.

5. STAFF ORGANIZATION

During the year the Commission completed the reorganization of its staff on functional instead of professional lines. The final step, effective March 2, 1952, made these changes:

Created a Field Engineering and Monitoring Bureau with four divisions—Engineering, Inspection and Examination, Monitoring, and Field Operating—and created a new district field office to serve the District of Columbia and adjacent counties in Maryland and Virginia;

Redistributed the functions of the Office of the General Counsel between two divisions—Litigation and Legislation, Treaties and Rules—and abolished, as of March 30, 1952, the only remaining field office of the Office of the General Counsel, at Los Angeles;

Realined the Office of the Chief Engineer into three divisions—Frequency Allocation and Treaty, Technical Research, and Laboratory—and retained supervision of various special engineering projects under the Chief Engineer;

Redefined the duties of the Office of the Chief Accountant with two divisions—Accounting Systems and Economics;

In the cases of these advisory professional staff offices (General Counsel, Chief Engineer, and Chief Accountant), the Commission provided for Assistant General Counsels, Assistant Chief Engineers, and Assistant Chief Accountants, as the case may be, to be in charge of their respective divisions;

Changed the name of the Bureau of the Secretary to the Office of the Secretary, and designated its component divisions as Docket, Minute, Library, and Technical Assistance;

Transferred the broadcast license functions from the Office of the Secretary to the Broadcast Bureau;

Transferred service, mail and files, messenger, and certain records supervision from the Office of the Secretary to the Office of Administration, which will now have four divisions—Budget and Fiscal, Organization and Methods, Personnel, and Administrative Services;

Transferred the technical assistance functions from the Office of the Chief Engineer to the Office of the Secretary;

Transferred the reference room of the Common Carrier Bureau and the library of the Technical Research Division of the Office of the Chief Engineer to the Library Division of the Office of the Secretary;

Transferred certain functions of the Experimental and Miscellaneous Branch of the Office of the Chief Engineer to the Technical Research Division in the same office;

Changed the name of the Office of Formal Hearings to Office of Hearing Examiners;

Changed the name of the Office of Formal Hearing Assistants to Office of Opinions and Review.

The over-all reorganization program was initiated by the Commission as the result of a long-range study of its administrative needs. Establishment of the Common Carrier Bureau (1950), the Safety and Special Radio Services Bureau (1950), and the Broadcast Bureau (1951), with their resultant organizational changes, was effected through the Commission's own management studies. On June 21, 1951, the Commission contracted with McKinsey & Co., management consultants, to study the remaining phases—those dealing with field activities and staff offices. Creation of the Field Engineering and Monitoring Bureau is the result of the first of the McKinsey studies, and changes in the staff offices are based on its second study. The entire reorganization was effected through transfer of personnel.

In consequence, the Commission's staff organization and related general activities are:

Office of the General Counsel, whose function as chief legal advisor to the Commission covers matters involving litigation, legislation, rule making, international treaty and other matters, and general administrative activities presenting legal problems;

Office of the Chief Engineer, whose duties deal with the engineering phases of frequency allocations and related treaties, radio rules and standards, technical research and experimentation, and study of radiation devices with a view toward minimizing interference;

Office of the Chief Accountant, whose work includes matters of accounting regulation and economic and statistical research;

Office of the Secretary, which has charge of official records, processing of correspondence and official documents, administration of the library and certain functions relating to the internal management of the Commission;

Office of Administration (executive officer), under the direction of the Chairman, reviews the programs and procedures of the Commission and handles its budget and personnel work;

Office of Hearing Examiners, which conducts hearings and prepares and issues initial decisions;

Office of Opinions and Review, which, under Commission direction, advises and assists in the preparation of decisions;

Office of Information, which is the central source of public releases and information;

Common Carrier Bureau, which supervises telephone and telegraph matters;

Safety and Special Radio Services Bureau, which supervises non-broadcast radio services other than common carrier;

Broadcast Bureau, which supervises the broadcast services;

Field Engineering and Monitoring Bureau, which is responsible for field engineering activities, including station inspections, surveys, monitoring, direction finding, signal measurement, operator examinations, and certain enforcement activities.

An organization chart of the Commission, as of May 1952, appears as a separate page of this report.

6. PERSONNEL

A total of 1,138 persons were in the employ of the Commission as of June 30, 1952. This was a reduction of 67 since the previous year. Approximately one-third of all Commission employees are in the field. The distribution of personnel was as follows:

Office or Bureau	Washington	Field	Total
Commissioners	35	0	35
Office of Opinions and Review	8	0	8
Office of Hearing Examiners	15	0	15
Office of Information	4	0	4
Office of Administration	129	0	129
Office of Secretary	37	0	37
Office of General Counsel	17	0	17
Office of Chief Accountant	24	0	24
Office of Chief Engineer	94	15	109
Common Carrier Bureau	81	31	112
Safety and Special Services Bureau	113	0	113
Broadcast Bureau	131	0	131
Field Engineering and Monitoring Bureau	54	350	404
Total	742	396	1,138

7. APPROPRIATIONS AND EXPENDITURES

The Commission received an appropriation of $6,585,550 to cover all of its operations in the 1952 fiscal year. This, despite an increased workload, was less than the appropriation for each of the three preceding years.

A tabulation of its working appropriations for the previous 10 years follows:

1951	$6,600,000	1946	$5,954,900
1950	6,729,345	1945	6,312,343
1949	6,717,000	1944	7,884,914
1948	6,240,000	1943	7,777,135
1947	6,236,900	1942	5,655,924

A breakdown of the Commission's fiscal 1952 income and expenditures is set forth below:

Appropriation	
Regular appropriation (salaries and expenses)	$6,116,650
Supplemental	468,900
Total funds available	6,585,550

Obligations	
Personal services	$5,957,642
Travel	76,370
Transportation of things	13,998
Communication services	152,183
Rents and utilities	48,247
Printing and reproduction	29,225
Other contractual services	62,312
Supplies and materials	137,295
Equipment	107,419
Refunds, awards, and indemnities	20
Total obligations	6,584,711
Savings, unobligated balance	839
Total	6,585,550

8. LITIGATION

Section 401 of the Communications Act confers upon the district courts of the United States jurisdiction to enforce the Communications Act and the orders of the Commission. Judicial review of Commission actions is provided for in section 402 of the act. Section 402 (a) gives jurisdiction to the courts of appeals (under Public Law 901, 81st Cong., effective January 28, 1951) over suits to enforce, enjoin, set aside, annul, or suspend any order of the Commission with the exception of orders granting or refusing applications for licenses. Section 402 (b) provides for direct appeal from such other orders of the Commission to the United States Court of Appeals for the District of Columbia Circuit. The great majority of cases involving review of Commission action is instituted in the latter court.

During the fiscal year, there were 18 cases in which the Commission was a party in the Federal courts. Eight of these were instituted during that period—two in the Supreme Court, five in the Court of Appeals for the District of Columbia Circuit, and one in the Court of Appeals, Third Circuit. The other 10 cases were pending at the beginning of the year.

The Supreme Court denied certiorari in the one case brought before it on petition for review of a decision of the Court of Appeals for the District of Columbia Circuit affirming the Commission. In the latter court, the Commission was sustained in one case and reversed in three cases, and one case was dismissed by agreement of the parties.

As of June 30, 1952, one case was pending in the Supreme Court, five cases in the Court of Appeals for the District of Columbia Circuit, one case in the United States Court of Appeals, Third Circuit, and five cases were pending in United States district courts.

The status of litigation for the fiscal year may be tabulated as follows:

Court	Total	Decisions affirming Commission	Decisions reversing or remanding case	Dismissed by agreement of parties	Cases pending June 30, 1952
Supreme Court	2	1			1
Court of Appeals for District of Columbia Circuit, under sec. 402 (b)	9	1	3		5
United States Courts of Appeals including District of Columbia Circuit, under sec. 402 (a)	2			1	1
District courts	5				5
Total	18	2	3	1	12

The following cases decided during the fiscal year were of particular interest:

1. In *Scripps-Howard Radio, Inc.* v. *Federal Communications Commission* (342 U. S. 830), the Supreme Court denied certiorari, refusing to review a decision of the Court of Appeals which had affirmed a decision of the Commission granting a broadcast station in Cleveland, Ohio, to Cleveland Broadcasting, Inc., and denying the appellant's mutually exclusive application for the same facilities. The principal contention of the petition for certiorari was that the Commission had improperly decided against petitioner because of its newspaper affiliation. The Court of Appeals had sustained the Commission's authority to consider diversification of the media of mass communications in choosing between mutually exclusive applicants.

2. In *Independent Broadcasting Company* v. *Federal Communications Commission* (— U. S. App. D. C. —, 193 F. 2d 900 (1951)), the Commission had denied a construction permit for an FM station and a station license for an AM station to an applicant who, the Commission found, had misrepresented material facts and did not possess the requisite character qualifications. Knowledge of these matters came to the attention of the Commission after the AM construction permit had been granted and the hearing was held on the AM station license application together with the FM construction permit application. The Commission found that the applicant, controlled by Rev. J. Harold Smith, had misrepresented material facts concerning stock ownership, its assets and liabilities, and the business interests of Smith. It also found Smith had used intemperate language in his writings and broadcasts, that he had a habit of attacking

the honesty and sincerity of those with whom he disagreed, and that there was other evidence he lacked the character to be a licensee. This decision was affirmed by the Court of Appeals which held the record justified and supported the findings, that the procedure followed was proper, and that the Commission was not limited to a procedure of revoking the AM construction permit. The court also held that other contentions of applicant, including a claim that the action of the Commission violated the first and fifth amendments, were not grounds for reversing the Commission's decision.

3. In *American Broadcasting Company, Inc.* v. *Federal Communications Commission* (Albuquerque Broadcasting Company, Intervenor) (— U. S. App. D. C. —, 191 F. 2d 492 (1951)), the Commission had granted Albuquerque special service authorizations to use the frequency on which the appellant regularly operated as a class I–A station. These special service authorizations had been issued since 1941. Albuquerque had been moved from its regular assignment pursuant to the North American Regional Broadcasting Agreement and the Commission had been unable to determine a new permanent frequency assignment for it due to problems concerned with the NARBA shifts, the clear channel hearing, and frequency measurement considerations. The Court of Appeals held that a special service authorization permitting operation on a frequency other than that specified in a station's license was not illegal per se, and that, since section 312 (b) of the Communications Act (now sec. 316) does not necessarily require the same type of hearing in all types of factual situations, the Commission might, in appropriate circumstances, grant special service authorizations without affording a hearing to existing licensees who would receive interference as a result. The court went on to hold, however, that the propriety of the original special service authorization was not in issue and that the Commission could not continue such authorizations indefinitely without affording other affected licensees an appropriate hearing.

4. In *Democrat Printing Company* v. *Federal Communications Commission* (— U. S. App. D. C. — (1952)), the Court of Appeals reversed the Commission's decision granting a construction permit to Texas Star Broadcasting Co. for a new standard broadcast station in Dallas, Tex., upon the appeal of Democrat Printing Co., the licensee of station KSEO, Durant, Okla., which would have suffered adjacent-channel interference from the proposed operation. The court held that the Commission had erred in failing to make a comparison of the proposed program service of Texas Star with that of KSEO in the area of interference, which was of substantial size and population and where the Texas Star signal would be substituted for that of KSEO, since this comparison was a necessary factor in determining

whether the grant to Texas Star was in the public interest despite the alleged interference to KSEO. The court also held that the Commission had improperly permitted a deviation by Texas Star from one of the Commission's Standards of Good Engineering Practice without requiring fulfillment of the requirements set forth in the standard itself as conditions for such deviation and without making any finding as to why these requirements need not be met. The matter was remanded to the Commission for further proceedings.

5. In *Beaumont Broadcasting Corporation* v. *Federal Communications Commission* (— U. S. App. D. C. — (1952)), the appellant sought review of a Commission decision granting an application of Ozarks Broadcasting Co. for an increase in power. The court held that the Commission properly granted a previous application by the appellant subject to possible interference which it might receive from a later grant to Ozarks, since appellant had been offered a full hearing at that time, and that appellant therefore was not entitled to a comparative hearing on the Ozarks application. The court also held that a deviation from the Commission's Standards of Good Engineering Practice is not per se illegal since the standards are flexible, and that the Commission may, as it did here, make a grant which involves a departure from the standards when the public interest requires. However, the court held that the Commission had erred in refusing to admit engineering evidence sought to be introduced by appellant concerning a method of operation other than that proposed by Ozarks which it was contended would have avoided objectionable interference the Ozarks operation would cause, since the public interest might not be served by a grant to Ozarks with attendant interference if such interference could be eliminated by an antenna design not advanced by Ozarks. The court noted the absence of any Commission rule requiring submission of such evidence in advance of the hearing. The case was remanded to the Commission.

9. LEGISLATION

Two laws were enacted during the fiscal year by Congress which directly affected the Commission. The first of these was Public Law No. 200, Eighty-second Congress, which was approved on October 24, 1951, and which had been introduced by Senator Johnson of Colorado as S. 537. This law clarified the scope of the President's emergency powers contained in section 606 (c) of the Communications Act and added a new section 606 (h) to the act which provides criminal sanctions which may be applied against persons who violate any orders issued by the President pursuant to section 606. The new law authorizes the President to control or use devices emitting electromagnetic radiations capable of being utilized by an enemy for navigational purposes. [See chapter on national defense.]

The second law enacted by Congress which affected the Commission was Public Law No. 320, Eighty-second Congress, which was introduced by Congressman Norblad as H. R. 5369 and which was approved on April 15, 1952. This law authorized the Commission to convey to the State of Oregon two tracts of land located within the boundaries of the Commission's primary monitoring station in Portland and to accept, in exchange for those tracts, another parcel of land from the State.

The most important legislation affecting the Commission which was considered by Congress during the fiscal year was S. 658, introduced by Senator McFarland, which would extensively amend the Communications Act. This bill would make significant substantive changes in the Communications Act and would substantially alter the Commission's operating procedures and organization. The bill was passed by the Senate on February 5, 1951, and, after extensive hearings, was passed by the House on June 19, 1952, and submitted to a conference committee of the Senate and the House.[1]

The Commission resubmitted to the Bureau of the Budget various legislative proposals for consideration during the second session of the Eighty-second Congress. These proposals included (1) an amendment to section 4 (g) of the Communications Act which would authorize the Commission to purchase land and construct buildings necessary for monitoring and research purposes; (2) an amendment to section 319 of the Communications Act, which would simplify the procedure for obtaining licenses for certain types of radio stations by eliminating the existing requirement of first securing a construction permit from the Commission; (3) an amendment to section 410 (b) of the Communications Act to provide for reimbursement to the Commission by the States for the salary and expenses of Commission employees who are made available to State commissions to act as consultants or expert witnesses in common carrier regulatory matters pending before such commissions; (4) the addition of a wire and radio fraud statute to the United States Criminal Code; and (5) an amendment to section 315 of the Communications Act to provide that broadcast station licensees must afford equal opportunities to use their facilities to persons speaking for or against a legally qualified candidate for public office, as well as to the candidates themselves, as is presently provided. This amendment would also provide that equal time must be afforded for the presentation of opposing views on a public question to be voted upon at any public election. In addition, this proposal would provide that station licensees are not liable for any material broadcast pursuant to the provisions of section 315.

[1] The conference committee reported the bill on July 1, 1952, and the Senate and House adopted the conference report on July 2, 1952. The bill was finally approved as Public Law No. 554, 82d Cong., on July 16, 1952.

The Commission's proposals with respect to amending section 4 (g) of the Communications Act and adding a radio- and wire-fraud statute to the United States Criminal Code were included in S. 658, introduced by Senator McFarland. Numerous bills were introduced in Congress which would have amended section 315 of the Communications Act relating to the use of broadcasting facilities by candidates for public office. The Commission submitted comments on all of these bills but no congressional action has been taken.

Various other legislative proposals were considered by Congress which directly or indirectly affected the Commission. Hearings were held by the Senate Committee on Interstate and Foreign Commerce on four bills (S. 1563, 1564, 1624, and 2116) which propose to restrict the use of communications facilities for the interstate transmission of gambling information. The Chairman and General Counsel of the Commission participated extensively in those hearings and the four bills were subsequently reported to the Senate, where no further action has been taken. Several bills were introduced which proposed the establishment of a National Citizens Advisory Board on Radio and Television. Other bills which were considered dealt with various aspects of the problem of allocating television channels and of providing channels for use by noncommercial educational television stations. In addition, there were numerous proposals concerning television and radio programing including resolutions calling for an investigation to determine whether such programing includes immoral or otherwise offensive matter.

During the fiscal year the Commission submitted to Congress and the Bureau of the Budget reports on more than 45 proposed bills which were concerned with the Commission's functions, in addition to drafting numerous legislative proposals and participating in several congressional hearings.

10. HEARINGS

Broadcast matters continued to predominate the Commission's hearing schedule, with standard (AM) broadcast accounting for more than 80 percent of the cases disposed of during the fiscal year.

Docket statistics for that period follow:

Class	Pending, June 30, 1951	Designated for hearing	Disposed of without hearing	Disposed of following hearing	Pending, June 30, 1952
Broadcast:					
AM	260	140	105	85	210
FM	7	8	7	1	7
TV	179	8	175	4	8
Other	5	0	3	0	2
Safety and special	11	38	20	3	26
Common carrier	69	17	11	22	53
Joint and general	10	32	15	4	23
Total	541	243	336	119	329

11. CORRESPONDENCE, RELEASES, AND PUBLICATIONS

A total of 1,116,000 pieces of correspondence in the form of letters, telegrams, etc., were received or dispatched through the Commission's Mail and Files Branch during the year. Of this number, about 776,000 were incoming and nearly 340,000 were outgoing.

Regulatory and administrative procedure required the issuance, during the same period, of mimeographed public notices, orders, decisions, opinions, and rule making. These necessitated the use of approximately 41,000 stencils, 7,700,000 sheets of paper, and 12,411,000 impressions. The Commission issues no press releases and maintains no public mailing lists.

The Commission makes no public distribution of its printed publications. The latter are processed by the Government Printing Office and are sold by the Superintendent of Documents. They include rules and regulations, standards of good engineering practice, bound volumes of decisions and orders, annual and special reports, statistics of the communications industry, and miscellaneous publications. A list appears in the appendix.

12. LICENSES AND OTHER AUTHORIZATIONS

For the first time, the number of active authorizations on the records of the Commission passed the 1 million mark during fiscal 1952. This was 123,000 more than in the preceding year.

In fiscal 1952 approximately 214,000 nonbroadcast radio authorizations were outstanding. They covered the use of almost two and one-half times that many transmitters. Broadcast authorizations totaled nearly 4,800, including 1,200 auxiliary transmitters. Common carriers held nearly 1,000 radio authorizations, and experimental radio authorizations exceeded 350.

Radio operator authorizations exceeded 800,000, including 679,000 commercial operator authorizations, over 100,000 amateur operator authorizations, and more than 100,000 special aircraft radiotelephone operator authorizations.

13. APPLICATIONS AND OTHER FILINGS

During the year the Commission received more than 357,000 applications of all kinds, or 89,000 more than in fiscal 1951. Of this total, over 200,000 concerned commercial radio operators, over 140,000 involved the nonbroadcast services, nearly 5,700 had to do with broadcast, and more than 3,500 were from common carriers.

These figures do not include filings of a legal nature, periodic reports, and tariff schedules. During the year, common carriers and holding companies filed more than 29,500 tariffs and nearly 2,100 annual reports which required Commission attention. This was 10,400 more tariffs and about the same number of annual reports filed in fiscal 1951.

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CHAPTER II—NATIONAL DEFENSE

1. GENERAL
2. DEFENSE ACTIVITIES
3. CONTROL OF ELECTROMAGNETIC RADIATIONS
4. MISCELLANEOUS DEFENSE AND PROTECTIVE SERVICES

1. GENERAL

An efficient communication system is invaluable in time of peace but is vital in time of hot or cold war. Indeed, the nerve system of the defense of the Nation is represented by its communication facilities. They must not only be adequate for their respective normal services but must be integrated into national and regional plans for operation under threat of armed attack or other emergency.

Practically every communication service—whether it is wire, radio, or submarine cable—is a part of the program for the military defense and the protection of civilian life and property. This extends from the broadcast services to the services rendered by public safety agencies, such as police and fire departments, and a myriad of other services concerned with marine, aviation and land transportation, as well as aids to industry.

It is significant that the same transmitters, the same radio frequencies, the same wires and the same cables which are used under normal conditions must be harnessed during times of threat to our national security, and during periods of warfare. These communication facilities, always important to our peacetime national economy, are doubly important to defense industries, to our armed forces and to civilian defense under threatened or actual conflict.

2. DEFENSE ACTIVITIES

Since all forms of radio and wire communication are inseparably linked to the national security effort, the workload of the Commission has continued to increase during the present emergency. Many of its activities which previously required peacetime regulation have taken on high-priority aspects because of their importance to the military and civilian defense program.

One example is the necessity of intensifying surveillance of the radio spectrum. Another example is the work involved in meeting the

needs of the military, civilian defense and defense industry for communication facilities above and beyond the normal requirements of the civilian economy.

The work of the Commission in regulating the marine, aeronautical, public safety, land transportation and industrial radio services has taken on new importance because of the increasing demands of the national productive schedule and to insure that there will be no hampering or interruption of land, sea and air communication under any emergency condition.

The widespread network of communication so essential to the Nation's defense also includes broadcasting. Apart from its morale consideration, this service has to play its part in civilian defense through its ability to bring information to the public with instantaneous speed.

Communication by telephone, telegraph, and cable are likewise essential to the defense program because of accelerated use, most of which is directly due to the defense effort. There is an additional burden on the Commission in regard to these common carriers; that is to provide international radio-telegraph circuits and domestic telegraph and telephone facilities for military and defense production use.

During the past year the Commission has made studies for and participated in numerous meetings and discussions with officials of defense establishments (military and civilian) with respect to plans and projects involving problems cutting across the whole field of electrical communication.

For security reasons, these matters cannot be mentioned at this time. The same is true of a number of projects under study by the various governmental committees on which this Commission is represented. In general, it might be said that the Commission is deeply concerned with and is busily engaged in strengthening and expanding the communications system to accommodate the Nation's keyed-up requirements, thus helping to safeguard existing communication facilities, and in preventing illegal operations inimical to the interests of the United States.

3. CONTROL OF ELECTROMAGNETIC RADIATIONS

On October 24, 1951, the President signed a bill (S. 537) which amended section 606 of the Communications Act, concerning emergency powers of the Chief Executive, to provide for the control of electromagnetic radiations which might serve as navigational aids to an enemy, and to provide penalties for violations (Public Law 200, 82d Cong.).

Section 606 (c) was amended to read as follows:

(c) Upon proclamation by the President that there exists war or a threat of war, or a state of public peril or disaster or other national emergency, or in

order to preserve the neutrality of the United States, the President, if he deems it necessary in the interest of national security or defense, may suspend or amend, for such time as he may see fit, the rules and regulations applicable to any or all stations or devices capable of emitting electromagnetic radiations within the jurisdiction of the United States as prescribed by the Commission, and may cause the closing of any station for radio communication, or any device capable of emitting electromagnetic radiations between 10 kilocycles and 100,000 megacycles, which is suitable for use as a navigational aid beyond five miles, and the removal therefrom of its apparatus and equipment, or he may authorize the use or control of any such station or device and/or its apparatus and equipment, by any department of the Government under such regulations as he may prescribe upon just compensation to the owners. The authority granted to the President, under this subsection, to cause the closing of any station or device and the removal therefrom of its apparatus and equipment, or to authorize the use or control of any station or device and/or its apparatus and equipment, may be exercised in the Canal Zone.

Section 606 of the act was further amended by adding a new subsection:

(h) Any person who willfully does or causes or suffers to be done any act prohibited pursuant to the exercise of the President's authority under this section, or who willfully fails to do any act which he is required to do pursuant to the exercise of the President's authority under this section, or who willfully causes or suffers such failure, shall, upon conviction thereof, be punished for such offense by a fine of not more than $1,000 or by imprisonment for not more than one year, or both, and, if a firm, partnership, association, or corporation, by fine of not more than $5,000, except that any person who commits such an offense with intent to injure the United States, or with intent to secure an advantage to any foreign nation, shall, upon conviction thereof, be punished by a fine of not more than $20,000 or by imprisonment for not more than 20 years, or both.

An Executive Order of December 10, 1951, empowers the Federal Communications Commission to enforce regulations in this connection. The main text of this Executive order reads as follows:

SECTION 1. The authority vested in the President by section 606 (c) of the Communications Act of 1934, as amended, is hereby delegated to the Federal Communications Commission to the extent necessary for preparing and putting into effect plans with respect to radio stations as defined in section 5 hereof, except those owned and operated by any department or agency of the United States Government, to minimize the use of the electromagnetic radiations of such stations, in event of attack or of imminent threat thereof, as an aid to the navigation of hostile aircraft, guided missiles, and other devices capable of direct attack upon the United States. The authority so delegated to the Commission shall be exercised subject to the following limitations:

(a) Nothing in this order shall be construed as authorizing the Commission to exercise any authority with respect to the content of station programs.

(b) Nothing in this order shall be construed to authorize the Commission to take over and use any radio station or to remove the apparatus and equipment of any radio station.

(c) The plans of the Commission for exercising its authority under this order shall not become effective until they have been concurred in by the Secretary of Defense and the Chairman of the National Security Resources Board.

SECTION 2. With respect to radio stations belonging to and operated by any department or agency of the United States Government, the head of each government department or agency the stations of which are involved shall, pursuant to the authority vested in the President by section 305 of the Communications Act of 1934, as amended, prepare and put into effect such plans as may be necessary to minimize the use of electromagnetic radiation of these stations in event of attack or imminent threat thereof as an aid to hostile aircraft, guided missiles, and other devices capable of direct attack upon the United States. Such plans shall not become effective until they have been concurred in by the Secretary of Defense and the Chairman of the National Security Resources Board.

SECTION 3. Whenever, pursuant to the provisions of this order, any radio station shall have been required to cease operations or whenever the normal operations of any radio station have been interfered with, such station shall be allowed to resume operations or return to normal operations, as the case may be, at the earliest possible time consistent with the national security. In exercising the authority delegated by this order, due consideration shall be given to civil defense and other national-security requirements.

SECTION 4. The Federal Communications Commission, the Secretary of Defense, and the head of each government department or agency the stations of which are involved, are hereby authorized to issue appropriate rules, regulations, orders, and instructions, and to take such other action as may be necessary, to assure the timely and effective operation of the plans and for carrying out their respective functions hereunder, and are authorized to require full compliance with their respective plans.

SECTION 5. Wherever the words "station" or "radio station" are used in this order, they shall be deemed to include any station for radio communication, and also any device capable of emitting electromagnetic radiations between 10 kilocycles and 100,000 megacycles, suitable for use as a navigational aid beyond five miles.

SECTION 6. (a) Any reference herein to the Federal Communications Commission shall, except for the purpose of issuing rules and regulations, be deemed to include the Chairman or any other member of the Commission as the Commission may designate; any reference to the Secretary of Defense shall be deemed to include the Secretary or such person as he may designate; and any reference to the Chairman of the National Security Resources Board shall be deemed to include the Chairman or such person as he may designate.

(b) Such rules and regulations as the Federal Communications Commission may issue pursuant to this order shall be issued by the Commission, except that the Commission may provide that, in the event of hostile action against the United States or imminent threat thereof, such rules and regulations may be issued by the Chairman.

SECTION 7. Every government department and agency shall give such aid and assistance to the Secretary of Defense, and shall render such cooperation with one another, as may be necessary to accomplish the purpose of this order.

SECTION 8. The Federal Communications Commission is hereby authorized to appoint such advisory committees as it may consider necessary or desirable to advise and assist the Commission in the performance of its duties hereunder.

The Federal Communications Commission is utilizing these additional delegated powers in carrying out the program for the control of radioelectric radiation in the national defense effort, which it began some time previously at the request of the Department of Defense.

The subject of control of electromagnetic radiation for defense purposes has received mounting interest and attention during the present emergency. It concerns electronic equipment which can produce radio signals of such a character and intensity that they can be used as "beams" to guide aircraft, missiles, and other devices which might be employed in an armed attack upon the United States.

"CONELRAD" (an abbreviation of the term "control of electromagnetic radiation") is the short name given to the present Commission project for such emergency control. In developing this program for the Department of Defense, the Commission has worked closely with other Government departments and agencies, both State and Federal, particularly those concerned with national defense and civil defense, and with all segments of the radio industry, especially the broadcast industry.

From the standpoint of persons whose equipment is involved, the program has been a voluntary and cooperative one. Thus far, the Commission has given primary attention to the broadcast stations. The response of the broadcasters has been excellent. In fact, their assistance has been so productive that the Commission has been able to develop a sound basic plan for alerting broadcast stations and controlling their operations during an alert in a manner to confuse an enemy.

In brief, the objective of the CONELRAD program is to minimize the use of radio signals which might guide enemy craft and, at the same time, assure the maximum possible availability of radio stations and equipment for civil defense purposes and for use in connection with other essential emergency activities, such as the production and distribution of essential goods and services and the maintenance of communication services in the interest of public safety and morale.

The Executive order is being used to implement and facilitate the accomplishment of this program along the same line that it has been following since it was started, with revisions or modifications being made from time to time as increasing knowledge and experience becomes available.

4. MISCELLANEOUS DEFENSE AND PROTECTIVE SERVICES

During the year (on December 19, 1951), the Commission moved to establish a Radio Amateur Civil Emergency Service in which amateur radio stations and operators could provide communication for civil defense purposes during the emergency. The Amateur Radio Service, which has long furnished temporary regional networks in time of flood, hurricane, and other disaster, also has a military amateur radio system operating in conjunction with the Army and Air Force.

Earlier in 1951 the Commission established a Disaster Communications Service, which enables Government and non-Government stations to engage in emergency communication, and it also set up rules to permit non-Government stations to use Government frequencies in an emergency. In the same year it reactivated the State Guard Radio Service, which affords radio facilities for State guards in States where the National Guard has been called into Federal service. At different times it has liberalized the commercial operatior rules because of the scarcity of certain operators, especially on board ships.

Other established public safety services include the Special Emergency Radio Service, which is concerned with the protection of life and property under emergency conditions; and services devoted to police, fire, forestry, conservation, and highway protection. Radio is also used by the Civil Air Patrol, a civilian auxiliary of the Air Force.

All these services are described in more detail elsewhere in this report.

The Commission adopted plans to carry on essential operations with a minimum of interruptions under any foreseeable circumstances. Commission facilities and personnel would be improvised to the extent possible to (1) continue the most urgent Commission functions, (2) protect its personnel, property and records, and (3) assist others, insofar as possible. Staffing and training in such emergency measures were well advanced at the close of the fiscal year.

CHAPTER III—COMMON CARRIERS

1. REGULATION
2. DOMESTIC TELEPHONE
3. DOMESTIC TELEGRAPH
4. INTERNATIONAL TELEGRAPH AND TELEPHONE
5. STATISTICS

1. REGULATION

Interstate and foreign communication by telegraph and telephone—whether by wire, ocean cable, or radio—is subject to Commission regulation.

The Communications Act, among other things, requires that every subject common carrier furnish service upon reasonable request and at reasonable charges. No carrier may add or acquire facilities, or curtail or discontinue service, without Commission approval. Their charges, practices, classifications, and regulations must be just and reasonable and nondiscriminatory. To implement this requirement, the common carriers concerned file tariff schedules with the Commission, and those schedules are subject to Commission review and regulation.

Rates for interstate telephone and telegraph services, as well as rates for such services between the United States and foreign and overseas points, are regulated by the Commission, which also reviews the adequacy and quality of these services.

The Commission is further empowered to prescribe the forms of records and accounts is kept by these carriers. Under this authority, it has established uniform systems of accounts for them to follow.

The Commission is required by law to approve construction of new lines and extensions or supplementations of lines which are to be used for or in connection with interstate service before any such construction may be undertaken. Further, the Commission regulates the interlocking of officers and directors of subject common carriers, it being unlawful for any person to hold office in more than one carrier unless specifically authorized by the Commission. The Commission also passes upon applications of such telephone and telegraph carriers for authority to merge or consolidate.

Common carrier wire service which is purely intrastate in character is not, in general, subject to Commission jurisdiction. However, operation of common carrier radio facilities come under provisions of the act which require the licensing of all radio transmitters.

The Commission receives applications to land or operate submarine cables connecting the United States with other countries, and advises the President with respect to the granting of such licenses, after receiving the approval of the Secretary of State.

2. DOMESTIC TELEPHONE

GENERAL

Expansion of the domestic telephone industry continued at an accelerated pace throughout fiscal 1952 and current indications are that this growth will continue during the coming year. During the calendar year 1951, the Bell System expended $1,059 million for new facilities, thereby increasing its gross plant investment to approximately $11 billion. While no totals are currently available, it is known that substantial expenditures were also made by the independent telephone industry (non-Bell companies) which, it is estimated, if added to the Bell System figures would bring the total gross plant investment of the industry to more than 12 billion.

An indication of this tremendous expansion is the fact that the amount expended to build new telephone plant in the last 6 years is greater than the total investment in such plant at the end of World War II. The highlights of this development during fiscal 1952 included the opening of the transcontinental microwave radio relay system providing the seventh basic coast-to-coast voice communications system, over which telephone calls and television programs are relayed by radio beam; the use on a large scale of microwave radio relay systems to "backbone" long-distance telephone routes, 450,000 miles of telephone channels now being provided by this method; and the initiation on November 10, 1951, on a trial basis at Englewood, N. J., by the New Jersey Bell Telephone Co., of customer dialing of long-distance calls.

The telephone companies also pursued a program to assure the continuation of essential services during emergencies. The Bell System program includes arrangements and facilities for shunting telephone traffic around disaster points, provision of stand-by power units at central offices, utilization of mobile radio and portable telephone units at strategic locations, and preparation of detailed plans for restoration of essential lines of service.

At the end of calendar year 1951 there were over 45 million telephones in service in the United States, of which 37.4 million were op-

erated by the Bell System and approximately 8 million by the independents. The Bell System added 2,070,000 phones during 1951 as compared with 1,950,000 the previous year, and reported 718,000 orders for main service and 1,606,000 requests for up grades in service as of June 30, 1952.

For the calendar year 1951 there were approximately 139,125,000 average daily local telephone conversations, and long-distance traffic was greater than in any previous year, averaging over 6 million calls a day. This constitutes an increase of 2.9 percent in local conversations, and 7.5 percent in toll and long distance conversations over 1950. In addition, the teletypewriter exchange service (TWX) calls increased almost 10 percent during the same period.

Dialing of both local and long distance calls continued to increase. Seventy-seven percent of all Bell System telephones now in use are dial, with the independent companies also vigorously pursuing their dial conversion programs. Expansion of extended area service was continued by Bell System and independent companies during 1951. Approximately four million telephone users are now able to dial their own calls to many nearby communities. At the end of 1951, Bell System operators were dialing 38 percent of all long distance calls directly through to destination; and, 1,375 cities and towns in all parts of the country—300 more than a year ago—were connected to the long distance operator dialing network. Customer dialing of long distance calls permits approximately 10,000 one and two party line subscribers in the area of Englewood, N. J., to dial their own station-to-station long distance calls to some 11 million telephone subscribers in the vicinities of Boston, Providence, New York, Pittsburgh, Cleveland, Detroit, Chicago, Milwaukee, Sacramento, Oakland and San Francisco without the assistance of a toll operator. These calls are timed and billed automatically.

Operating revenues of the Bell System increased 10 percent over the previous year, reaching a new high of $3,639,462,365 for 1951. Bell System consolidated net income applicable to American Telephone and Telegraph Company capital stock amounted to $364,874,176, an increase of 5 percent over 1950. Owing to increases in number of shares outstanding, however, net income applicable to A. T. & T. stock dropped from $12.58 per share in 1950 to $11.76 in 1951. At the end of fiscal 1952, there were 1,100,000 A. T. & T. stockholders. Some adjustment in interstate rates including both increases and decreases were authorized by the Commission during fiscal 1952, as a result of changes in separation procedures.

The expansion in the Bell System is illustrated by the following table of selected data:

Year	Number of telephones	Plant investment	Revenues	Employees
1940	17, 483, 981	$4, 701, 177, 364	$1, 174, 322, 517	275, 317
1945	22, 445, 519	5, 702, 056, 557	1, 930, 889, 452	387, 300
1950	35, 343, 440	10, 101, 521, 502	3, 261, 528, 032	523, 251
1951	37, 413, 614	10, 949, 685, 522	3, 639, 462, 365	551, 415

DOMESTIC TELEPHONE SERVICES

Construction of facilities.—As previously indicated, the telephone industry expended about $1.2 billion in the expansion and improvement of existing facilities during 1951. As in the past years, the bulk of the additions to physical plant has been in central office equipment, buildings, station apparatus and exchange lines. Commission authorizations for the construction of facilities to be used in connection with interstate and foreign services reached an all time high of more than $149 million. During fiscal 1952, the Commission granted 323 applications for authority for construction, lease or acquisition and operation of wire and cable toll facilities for use in connection with interstate and foreign telephone services, compared to 218 granted during fiscal 1951. These applications involved estimated construction costs in excess of $107.5 million. This included the annual blanket application of A. T. & T. and some of its associated companies which, for the calendar year 1952, authorized the construction and installation of facilities at an estimated cost of $59,175,000, almost twice the amount requested in the 1951 blanket application.

The following table shows the estimated costs and amounts of wire and cable construction authorized by the Commission since 1943.

Fiscal year	Number of projects	Cost	Sheath miles of cable	Tube miles of coaxial units	Conductor miles of open wire
1944	121	$9, 582, 239	574. 8		7, 968
1945	210	70, 091, 140	2, 378. 3	7, 902	2, 963
1946	239	78, 896, 450	3, 193. 8	16, 580	12. 261
1947	289	126, 325, 771	5, 587. 7	23, 490	15. 976
1948	348	127, 162, 499	2, 637. 5	46, 080	16, 373
1949	313	38, 618, 919	1, 370. 5	1, 323	7, 278
1950	141	13, 230, 678	399. 3		3, 491
1951	218	45, 795, 636	957. 1	2, 704	5, 461
1952	323	107, 533, 688	1, 388. 7	2, 972	5, 998

In addition to the construction included in the above table, during fiscal 1952 the Commission received applications from the Bell System companies for authority to construct 10 major microwave radio relay systems, and applications from non-Bell companies to construct seven projects, with an over-all estimated construction cost of $31 million. During the same period, the Commission authorized 11 Bell System companies and six independent company projects representing over-all estimated expenditures of $41.5 million. These micro-

wave radio relay systems, employed in the transmission of both telephone toll messages and television programs, together with those previously approved, will bring the industry investment in microwave radio relay facilities to more than $90 million, all since World War II.

By the end of the fiscal year, the Bell System had linked, via its microwave radio relay facilities, 28 States and the District of Columbia, and had also embarked upon microwave radio system construction to link two additional States. Provision had also been made for transmission of television program material from the United States to Toronto, Canada, by linking the Bell System microwave relay facilities with similar facilities of the Bell Telephone Co. of Canada. By means of its microwave systems together with its coaxial cable facilities (almost 30,000 miles of television channels) the Bell System was able to render television network program transmission service to 107 out of the 108 TV stations in 65 cities.

Although the expansion of operations in this field of domestic common carrier radio was predominantly by A. T. & T. and its associated companies, increasing interest in the use of microwave radio for point-to-point communications has been shown by various independent communications companies, as evidenced by grants for new radio systems to five such companies in the United States, Puerto Rico, and the Territory of Hawaii.

Discontinuance, reduction or impairment of service.—During fiscal 1952, the Commission granted 10 applications for authority to discontinue telephone service. Six involved the substitution of one carrier for another in the furnishing of wire line toll service. The remaining four were filed by miscellaneous carriers for authority to discontinue service furnished through domestic public land mobile radio service stations in De Ruyter and South Bristol Township, N. Y.; Taunton, Mass., and Centralia, Wash. Three applications for authority to discontinue wire telephone toll service were pending as of June 30, 1952.

Speed of service.—The average time required by the Bell System to complete a telephone toll call, as measured by Bell (see seventeenth annual report) was 1.8 minutes per call during 1951, or 14 seconds slower than the average for the year 1950. This slower speed was reported to have been due to the heavy load on facilities, particularly on routes where demand increased sharply, or where many circuits had been devoted to the military services. The Bell System also reported that it completed 93 percent of all toll calls on a "no hang-up basis".

Foreign attachment cases.—The last annual report noted that an initial decision had been rendered and exceptions had been filed in the case of *Hush-A-Phone Corp. et al.* v. *American Telephone and Tele-*

graph Co. et al. (Docket 9189), which involved the lawfulness of the so-called foreign attachment provisions of the defendant's tariffs insofar as they were construed to prohibit the use of the Hush-A-Phone device. Oral argument in this proceeding was heard November 30, 1951, and the Commission's final decision is pending. Oral argument on the complaint of *Jordaphone Corporation of America et al.* (Docket 9383) and *In the Matter of the Use of Telephone Answering Devices in Connection with Interstate and Foreign Telephone Service* (Docket 9701), both of which proceedings involve the lawfulness of the foreign attachment regulations as applied to automatic telephone answering devices in connection with interstate and foreign service, was held before the Commission en banc on June 24, 1952, and a final decision is pending.

Domestic Public Land Mobile Radio Service.—This service provides communication facilities for hire, primarily between fixed points and mobile units on land and, secondarily, to vessels and remote fixed points. The service is of two general classes: that furnished by landline telephone common carriers interconnected with the landline telephone system; and that furnished by the so-called miscellaneous or nontelephone company carriers which do not provide direct connection with the landline telephone system. There is also a one-way signaling or radio paging service to mobile units, and a mobile facsimile service by which telegraph messages are sent to and from mobile units in connection with the message handling and delivery procedure of landline telegraph systems.

A continued expansion marked this service during the year. The service provided by landline telephone company carriers (Bell System and independent companies) was extended to 17 more cities, making it available in 180 cities (an increase of 10.4 percent over last year) in 41 States, the District of Columbia and the Territory of Hawaii. The number of associated mobile units aggregated 20,866 units, an increase of 21.4 percent over the preceding fiscal year. The service provided by the miscellaneous (nontelephone company licensees) carriers was extended to 41 additional cities (an increase of 27 percent over last year), making it available in 193 cities in 38 States, the District of Columbia, Puerto Rico, and the Territories of Alaska and Hawaii. The number of mobile units in this latter group totaled 12,969, an increase of 44.6 percent over the preceding year. Many adjacent communities receive mobile radiocommunication service from the established systems.

During the year, the first common carrier land mobile radiocommunication systems were authorized to operate in Alaska and Puerto Rico, respectively. Previously, similar systems had been licensed to operate in the Territory of Hawaii.

Final decisions were issued by the Commission in cases involving applications to establish mobile radiocommunication systems by miscellaneous common carriers in the Chicago area (Dockets 9837 et al.) and the Dallas-Fort Worth area (Dockets 9849 et al.). An initial decision was issued in the proceeding involving applications in the Los Angeles area (Dockets 9723 et al.) and an oral argument held thereon. A decision has not yet been reached with respect to the applications in the New York City area (Dockets 9761 et al.). One new hearing was held during the year on applications in the Miami-Fort Lauderdale area (Dockets 10017 et al.) and an initial decision was issued and oral argument held thereon. The conflicting applications in the St. Paul-Minneapolis area (Dockets 9882 et al.), which were pending at the end of the preceding fiscal year, were dismissed at the request of the applicants.

In the Matter of Application of Martin J. Nunn for construction permit for one base station and 10 mobile units to operate in the Domestic Public Land Mobile Radio Service in the vicinity of Rome, N. Y., the Commission considered the question of the extent to which competition between miscellaneous common carriers would be desirable. A protest had been filed, principally on the basis that one system was already established and that there was not sufficient business to support two such systems. By memorandum opinion and order dated December 11, 1951, the Commission held that the institution of a competitive service, in that instance, would be desirable and in the public interest and may spur the growth and development of the service.

In the latter part of the year, a treaty was concluded between the United States and Canada permitting mobile radio units properly licensed in either country for common carrier service to obtain like communication service while in the territory of the other country. Procedures for the registration of such units, in accordance with the applicable provisions of the treaty, were being developed.

A sharp increase in interest in the one-way signaling service was shown in the past year. Prior to that time, only one radio station (in New York City) had been licensed to provide such service. However, during the last quarter of the fiscal year, 17 new applications were received. By the close of the fiscal year, construction permits had been issued for the establishment of such service in 3 other cities and 16 applications were pending for similar facilities in 8 additional cities. In the cases of New York City, Chicago, and in the Washington-Baltimore areas, the number of applications exceeded the frequencies available for assignment, and will probably require the holding of comparative hearings to determine which, if any, should be granted.

An initial decision was issued and oral argument held on the competing applications for one-way signaling service in Los Angeles (Dockets 9847 et al.) and this case was awaiting final decision. The applications for one-way signaling service in Washington, D. C. (Dockets 9825 et al.), which were pending at the close of the previous fiscal year, were dismissed at the request of the applicants.

In an important policy determination, involving the one-way signaling service, the Commission by memorandum opinion and order dated September 19, 1951, *In the Matter of Petition of Robert C. Crabb for rule-making proceeding to determine maximum number of radio-paging authorizations to be issued to a single licensee*, held that it did not deem it advisable to establish a rule, at this time, that would limit the number of authorizations to be issued a single licensee.

The petition of Bell Telephone Laboratories, Inc. (Dockets 8736 et al.), requesting the allocation of approximately 40 megacycles of frequency space between 400 and 500 megacycles for the development of a broad band multichannel system of public mobile operation, which was pending at the end of the preceding year, was denied without prejudice. At the end of the year there were pending two related petitions filed by the Bell System and the United States Independent Telephone Association, respectively, requesting the assignment of additional radio frequency channels for public mobile and point-to-point telephone services.

A rule-making proposal was initiated and concluded (Docket 10088) establishing two new frequency zones and assigning additional frequencies thereto in order to help meet the increasing demand for highway radiotelephone service and afford greater flexibility in the use of stations providing highway mobile service between large metropolitan areas. The rule change also made provision for an additional frequency available for stations providing exclusively a one-way signaling service to mobile units.

Rural subscriber and short haul toll radiotelephone services.—There was a continued expansion in these services which provide short distance radio communication to areas where rugged terrain, etc., make it impractical to construct wire lines. Such facilities play an important function in operations involving farming, ranching, mining, oil drilling, etc., in areas remote from wire-line communication. During the year, the Commission authorized the first rural subscriber radiotelephone system to be constructed with funds made available through the Rural Electrification Administration. In that case, the radiotelephone facilities were licensed to provide a communication service with subscriber dialing for a group of persons in an area where it was not economically feasible to provide wire line telephone service.

Radiocommunication service in Territories and possessions (except Alaska).—The increased use of radio for communication in the Territories and possessions was accented by the construction of new microwave radio relay facilities in Puerto Rico and the Territory of Hawaii for intraisland transmission of telephone and telegraph traffic. In connection with the petition filed by Mutual Telephone Co. of Hawaii, mentioned in the 1951 annual report, the Commission initiated a rule-making proceeding (Docket 10094), proposing to allocate frequencies in the bands 76–88 and 98–108 megacycles for assignment to stations of communications common carriers operating in that territory.

Coastal and Alaskan services.—These services, though largely authorized on a common carrier basis, are discussed in a separate chapter on Safety and Special Radio Services because of their close relationship to radio aids for the safety of life and property.

Acquisitions and consolidations.—During fiscal 1952 four applications were filed by domestic telephone carriers for authority under section 221 (a) of the Communications Act to acquire the property of another domestic telephone company. After due notice and public hearings, three of these applications were granted and an initial decision was issued looking toward a grant of the fourth.

Interlocking directorates.—The Commission received 23 applications filed by individuals pursuant to section 212 of the Communications Act for authority to hold positions of officer or director of more than one domestic telephone carrier subject to the act. Twenty-one of these applications had been granted and two were pending.

RATES AND TARIFFS

Tariff schedules.—At the close of the year, 294 telephone carriers had tariffs and concurrences on file with the Commission, an increase of 33 over the previous year. New carriers in the domestic public land mobile radio service accounted for the increase. During the year a total of 26,406 tariff publications establishing new rates or modifying rates, regulations, practices and classifications of service were filed. Of these, 6 were rejected for failure to comply with the Commission's rules. There were no suspensions of tariffs. The large increase in tariff publications over last year (10,487) was due primarily to the March 1, 1952, message toll rate change referred to elsewhere in this report.

Special permissions.—Eighteen applications for special permission to make changes in tariffs to become effective on less than statutory notice or involving waiver of certain rule requirements were received. All were granted.

Charges based on cost.—Last year's annual report referred to the Commission's progress in securing elimination of provisions in the

tariffs of the telephone carriers which provide that when special types of facilities or services are furnished to meet specific customer needs, the charges therefor will be based on the costs involved. By the close of the year, specific charges had been published for all facilities or services then being furnished by the Bell System telephone carriers with the exception of charges for special construction where suitable facilities are not available and construction involves unusual costs.

Unlawful use of telephone facilities.—Previous annual reports have mentioned the complaint of Harry and Bertha Katz against the American Telephone & Telegraph Co. and the Chesapeake & Potomac Telephone Co. alleging the unlawfulness of the Bell System companies' tariff regulations which provide that telephone service is furnished subject to the condition that it will not be used for an unlawful purpose and further providing for the discontinuance of service upon notification to the telephone company by a law-enforcement official that the service is being or will be used for an unlawful purpose (Docket 9500). On December 21, 1951, the Commission issued its decision holding that the second portion of the regulation relating to discontinuance upon notification by law-enforcement officials was unjust and unreasonable. The Commission stayed the effective date of its decision, however, pending consideration of a petition for rehearing and reconsideration filed by the defendant companies.

Investigation of Bell System rates.—The seventeenth annual report discussed the reasonableness of the level of earnings from Bell System interstate and foreign communication services.

On November 21, 1951, the Commission vacated that portion of its order of January 19, 1951, in Docket 9889 which directed the Bell companies to show cause why their rates for interstate message toll telephone service should not be reduced pending conclusion of the proceedings of investigation instituted by the January order. This was done because the revised plan for apportioning local telephone exchange costs between intrastate and interstate telephone service, which was proposed by the Commission and accepted by the National Association of Railroad and Utilities Commissioners at its 1951 annual convention, had the effect of shifting revenue requirements from intrastate to interstate in a total amount on the order of $30 million annually and thus removed the immediate bases for the show cause aspect of the January order. (See subsequent item on separation procedures.)

To compensate the Bell System companies for about one-half the amount of revenue requirements transferred from intrastate to interstate operations by the modification of cost-allocation procedures, interstate message toll telephone rates were revised effective March 1, 1952. In general, these rates were increased at the shorter distances (within 582 miles) and were decreased at distances in excess of 582 miles. The

increases were estimated to produce additional annual revenues amounting to $22¼ million and the reductions were calculated at $7¾ million which, after allowance for an increase in payouts to connecting companies of one-half million dollars, left a net increase in Bell System interstate revenues of $14 million annually.

The increased rates at the shorter distances served to lessen substantially the number of instances where intrastate long-distance rates were higher than interstate rates for equivalent distances. These disparities have been the subject of concern and joint study for several years by state regulatory authorities, this Commission, and the Bell System. The increases in short-haul rates, in addition to alleviating the disparity situation, brought such rates into closer alinement with the best estimates of costs of rendering service at those hauls so that an apparent inequity which had existed as between short- and long-haul users was removed, or at least greatly eased.

Numerous rate structure reforms were included in the March 1, 1952, interstate rate changes. For example, for over 30 preceding years the basic station-to-station day rate for 1 through 12 miles for an initial period of 5 minutes had been 10 cents. There had, however, been exceptions to this rate where the initial period charge for 5 minutes was 5 cents for distances of 6 miles or less, and these exceptions included such heavy traffic routes as Philadelphia-Camden and St. Louis-East St. Louis. These 5-cent exceptions were eliminated on March 1, 1952, along with adjustments in the length of the rate steps. At the same time the former 5-minute initial period was reduced to 4 minutes and the former 3-minute overtime period applicable in this rate step was reduced to 2 minutes with the overtime unit charge left at 5 cents. Similar reductions in the initial period from 5 minutes to 4 minutes were made in other rate steps through 24 miles, and in the 25- to 30-mile rate step the initial period was reduced from 5 minutes to 3 minutes. These reductions in initial periods were accompanied by reductions in the length of the overtime periods and there was also a rationalization of the rates and chargeable time practices on collect calls at these shorter hauls.

The differential in day person-to-person initial period rates over day station-to-station rates was adjusted to approximate a uniform 40 percent with a minimum differential amount of 15 cents substituted for the former 10 cents. The former rate schedule provided for 49 rate steps wherein the day station-to-station rate was increased by 5 cents for each succeeding step. The schedule adopted March 1, 1952, was shortened to 36 rate steps which was accomplished by inserting several 10- and 15-cent steps at the greater distances.

In the years since the creation of the Commission in 1934, there has been a steady movement toward uniform interstate message toll

telephone rates throughout the United States. By 1941, when the Pacific Telephone & Telegraph Co. was ordered to reduce its intraterritorial interstate rates to the level of the schedule in general use throughout the country (8 F. C. C. 342), this Nation-wide uniformity had been substantially achieved. One exception not cleared up, however, was in the five States served by New England Telephone & Telegraph Co., where, between 1 and 48 miles, there were various deviations from the standard pattern of rates. These deviations were eliminated on March 1, 1952.

Between points on Long Island, on the one hand, and points in nine Northeastern States, on the other hand, rate distances for long-distance telephone calls have historically been measured via New York City as a turning point. This method of distance computation followed the physical routes of toll lines but was inconsistent with the direct airline distance method of measurement ignoring geographical barriers in use elsewhere. Elimination of the New York City turning point for these distance measurements was among the reforms made effective March 1, 1952.

The investigation phase of the proceedings in Docket 9889 is being continued in order that the Commission may observe the effects of the March 1 rate revisions and the changes in allocation procedures upon the Bell System's level of interstate earnings.

Separation procedures.—One of the highlights of fiscal 1952 was the revision of the procedures for separating and apportioning telephone plant investment and expenses between interstate and intrastate operations. Since a major portion of telephone property is used in common for these services, a uniform method of separation, acceptable to both the State and Federal regulatory bodies, is essential so that property and expenses of each company subject to the respective jurisdictions may be determined for rate-making purposes.

As outlined in the previous annual report, serious questions had been raised by various State regulatory authorities, through the National Association of Railroad and Utilities Commissioners (NARUC) with respect to the reasonableness of the separation procedures, particularly in view of the fact that intrastate message toll telephone rates in the large majority of the States, were considerably higher than interstate rates for equivalent distances; and that these disparities would be further aggravated by pending intrastate rate increase applications and by possible interstate rate reductions.

This matter received intensive study by representatives of the State commissions and of the FCC during fiscal 1952 and culminated in revised procedures proposed by FCC Chairman Paul A. Walker at the annual convention of the NARUC at Charleston, S. C., in October 1951. The proposal, which had been approved by the Commission for

use on an interim basis, was unanimously approved by the convention for interim use by the States in State-rate proceedings.

In brief, these revised procedures have the effect of transferring from intrastate to interstate operations of the Bell System approximately $90 million exchange plant gross book cost and $22 million of associated annual expenses, thereby reducing the intrastate revenue requirements of the Bell System companies in every State and increasing the revenue requirements applicable to interstate long-distance telephone service, as more fully discussed in the previous section on Investigation of Bell System Rates.

Toll rate study.—The toll rate study referred to in the 1951 annual report was completed and the report of the FCC–NARUC committee, entitled "Message Toll Telephone Rates and Disparities" was issued by the NARUC prior to its convention in October 1951. The report, in printed form with 429 pages, is for sale by the National Association of Railroad and Utilities Commissioners, Washington 4, D. C.

OTHER REGULATORY MATTERS

State telephone rate cases.—Within the limits of budget and staff availability, the Commission continued to give technical assistance to State commissions and municipalities in connection with telephone rate increases proposed by Bell System companies. This assistance was generally in the form of consultation in Washington and correspondence on specific questions of mutual concern in State and Federal regulation. A condensed compilation of selected earnings and balance sheet data for each Bell telephone company and for the Bell System as a whole has been prepared and distributed to State commissions at 6-month intervals in recent years. Because of the apparent usefulness of these data to the State commissions, the NARUC's committee on telephone regulatory problems in January 1952 requested continued distribution of these as well as other related data.

Charges for interstate telephone service within the Washington metropolitan area (WMA) (Dockets 8110 and 8112).—On March 26, 1952 the Chesapeake & Potomac Telephone Cos. of Virginia and Baltimore City petitioned the Commission to dismiss the above proceedings which involve the reasonablness of increased charges for interstate telephone calls between metropolitan area points in Virginia and Maryland, and the jurisdiction of the Commission over such charges. In the alternative, the companies ask relief from an order of the Commission requiring them to keep records of charges collected in excess of the previously effective rates for the purpose of possible refunds to subscribers. This matter is currently receiving attention.

Depreciation.—Further progress was made in carrying out the Commission's continuing program of prescribing, pursuant to section 220 (b) of the Communications Act, depreciation rates for telephone com-

panies. Depreciation rates were prescribed during the year for six additional companies of the Bell System, namely, Illinois Bell, Ohio Bell, Indiana Bell, Southern New England Telephone Co., and for each of the operating areas served by Southwestern Bell in six States and by Northwestern Bell in five States. The rates prescribed for these six companies resulted in annual depreciation charges aggregating $93,388,200 and represented a total reduction of $6,838,200, or 6.8 percent in the annual charges based on the depreciation rates in effect prior to the Commission's action. In addition, the Commission modified certain of the depreciation rates previously prescribed for the Bell Telephone Co. of Pennsylvania, Southern Bell, and New Jersey Bell. In the case of these three companies, the represcribed rates produced annual charges amounting to $73,913,300 and represented a total reduction of $1,069,800, or 1.4 percent in the annual charges based on the rates prescribed previously.

By the end of the fiscal year, the program of prescribing depreciation rates for telephone companies has been carried out with respect to 18 Bell companies, including the long-lines department of the A. T. & T., out of a total of 23 companies within the system. The net effect of these prescribed rates, estimated on the basis of the annual depreciation charges for 12 months ending April 30, 1952, represents a total reduction of over $27,000,000 or 7.8 percent in these charges on an annual basis. This net effect does not reflect a reduction in depreciation charges of the Pacific Telephone & Telegraph Co. As noted in the last annual report, this company has adopted on its own initiative the depreciation rates recommended by the Commission's staff, although formal prescription of these rates has been deferred pending completion of further studies conducted by certain of the State commissions within the territory served by the company. Studies have been completed looking toward prescription of rates for two additional Bell companies and revision of certain of the rates previously prescribed for the four telephone companies comprising the Chesapeake and Potomac group.

Due to considerable increase in telephone plant facilities, depreciation expense charges of telephone companies continued to increase in spite of the downward adjustments in depreciation rates noted above. For the 12 months ending April 30, 1952, these charges in the case of the 23 companies within the Bell System amounted to almost $387,500,000, an increase of $25,000,000, or 6.9 percent over the charges for the previous 12 months. This increase, however, was proportionately less than the increase in plant average book cost which was 8.3 percent during the corresponding period.

NARUC committee on depreciation.—The Commission's representatives actively participate in the work of this committee. During the year the committee initiated inquiries and studies looking toward the

development of (*a*) new improved service-life study methods for classes of property for which mortality data are not available; (*b*) improved depreciation practices and accounting with respect to telephone apparatus and other station equipment; and (*c*) possible modification of the system of accounts to classify station installations and drop and block wires as depreciable accounts.

Western Electric earnings and prices.—Cooperation with the NARUC special committee on telephone regulatory problems was continued during the year on the matter of prices, costs, and profits of Western Electric Co., Inc. The position of this company as the manufacturing and supply unit of the Bell System means that the prices it charges the Bell operating companies for equipment, supplies, and services can have a considerable influence on rates and charges for telephone exchange, and intrastate and interstate toll service. Such sales to Bell companies amounted to $805 million in the calendar year 1951. Western Electric in that same year realized a return on its net investment in assets of over 9 percent. Effective April 1, 1952, Western reduced its sales prices by about 11 percent on switchboards of its own manufacture. These price reductions amount to about $45 million annually at Western's current level of sales. Prior to the announcement of the price reductions, the Commission had called Western's attention to the level of its earnings with a suggestion that price reductions appeared to be in order.

Bell System Federal income taxes.—As a result of changes introduced into the income tax laws by the Excess Profits Tax Act of 1950, A. T. & T. commenced filing consolidated Federal income tax returns for itself and those of its telephone operating subsidiaries eligible for inclusion in such returns. The consolidated basis of filing necessitates an allocation of the consolidated tax liability among the companies included in the return. There are a number of methods of allocation. The method adopted by the Bell System is esentially allocation on the basis of source of consolidated return taxable income with a provision that no subsidiary shall bear more taxes than it would have had it continued to file a separate return. The staff of the Commission discussed the matter with representatives of the A. T. & T. and also with representatives of State regulatory commissions. While the question had not been finally resolved at the close of the year, it appeared that no changes may be required at this time in accounts of the Bell System companies, but that they would undertake to make available periodically to the various regulatory bodies full information on the tax allocation including the effects on income taxes of the parent and each subsidiary of apportioning the corporate debt of the parent A. T. & T. among the subsidiaries before computing the tax allocations.

NARUC committee on accounts and statistics.—During fiscal 1952 this committee made substantial progress in drafting proposals for revised uniform accounting rules which incorporate recommendations of the several regulatory agencies, the affected industries, and Nation-wide accounting organizations. These proposals will be of value to the Commission in future revisions of its rules and regulations. The committee also recommended that the several State commissions exercising jurisdiction over telephone carriers adopt the interpretations issued by this Commission and the revised CPR rules referred to hereinafter.

During the year the committee conducted studies and discussions with respect to appropriate allocation among the companies included in the consolidated tax return of the Federal taxes on income of A. T. & T. and its telephone subsidiaries.

The Commission's staff participated actively and furnished a substantial portion of the data used in these studies and discussions.

Continuing property records.—The detailed studies reported in the last annual report were continued during fiscal year 1952 and resulted in the drafting of revisions of CPR requirements prescribed in part 31 of the Commission's rules. At the end of the fiscal year these revisions were in process of rule making.

Pensions and relief.—In the calendar year 1951, pension and other benefit costs for the Bell System, including manufacturing and research activities, amounted to approximately $217,000,000. As of December 31, 1951, the combined pension trust funds of these companies totaled approximately $1,385,000,000. Periodic studies are made to determine the reasonableness of the selection of data underlying each of the basic actuarial factors used in the Bell System pension studies.

During the fiscal year 1952 studies were continued with respect to the treatment acorded pension costs in numerous state rate cases and the relationship thereof to prescribed accounting regulations.

Preservation of records.—In cooperation with the United States Senate Special Committee to Investigate Organized Crime in Interstate Commerce, the Commission required retention, for periods in excess of normal, of toll call records by telephone companies. Since the committee's purposes have been served, the normal periods of retention of these records have been restored.

An interpretation of the microfilm rules, permitting utilization of the full capacity of microfilm reels in storing records, had the effect of permitting more economical usage of this method of record-keeping.

Restatement of plant accounts on basis of original cost.—The accounting for several current acquisitions of plant (including mergers of small companies) at original cost was handled during the fiscal year. As stated in the 1951 report, the restatement of telephone plant

accounts on basis of original cost has been substantially completed. There remain, however, a few significant items among Bell System companies and several items among non-Bell companies where final adjustments of the accounts have not been affected. Certain of these items are being given current attention and efforts are being made to complete the remaining adjustments as soon as possible. In this connection, during the fiscal year the Commission was successful in obtaining a transfer of $1,665,449.09 from the surplus account to the depreciation reserve account of the New England Telephone & Telegraph Co., as part of its efforts to restate plant investment on a sound basis.

Annual and monthly report forms.—A complete revision of Annual Report Form M (applicable to class A and class B telephone companies) was adopted during the year. While continuing to provide for the filing with the Commission of information needed for regulatory purposes, the revised report form eliminates many of the details included in previous forms. The revised form also makes use of modern reproduction processes, effecting considerable saving in costs to both the Commission and the respondents.

The monthly report form required to be filed with the Commission by class A telephone companies (those having annual operating revenues exceeding $250,000) was also revised. The revision incorporated a few additional items needed by the Commission on a monthly basis, and clarified the instructions, in addition to making use of modern reproduction processes.

Annual Report Form L (applicable to nontelephone company common carriers operating in the Domestic Public Land Mobile Radio Service) was modified through the issuance of a letter of instruction to the respondents, permitting further condensation of the information filed with the Commission by these common carriers.

Uniform systems of accounts for telephone companies.—Amendments to the accounting rules were made effective which relieved the smaller carriers from keeping the more detailed accounts formerly required. Likewise, existing rules were clarified by the issuance of revised accounting interpretations which, in one instance, relieved the carriers from performing detailed accounting with respect to smaller acquisitions of property and, in another instance, provided for simplification of the accounting with respect to certain types of work performed by the carrier, for which work it is reimbursed for the costs incurred. An interpretation was issued with respect to appropriate accounting for acquisitions by Bell System companies of farmer lines and service stations.

At the end of the year staff studies were in progress which have for their objectives the amendment or clarification of the accounting rules for the purpose of (*a*) coordination of the accounting prescribed for class C telephone companies with that prescribed for class A and

class B companies; (*b*) revision of the lists of retirement units (which are used in determining whether costs are to be included in the operating expense accounts or the capital accounts); and (*c*) recognition in the accounting rules of modern concepts of accounting applicable to public utilities, which are presently in process of development by several national accounting organizations.

Revised classification of telephone employees.—On October 10, 1951, the Commission adopted a comprehensive revision of part 51 of its rules, including a change of title to "Occupational Classification and Compensation of Employees of Class A and Class B Telephone Companies". The revised rules simplify and condense the data required to be prepared by these carriers and exempt the class C companies from preparing such information.

Accounting research.—Many of the telephone companies that are subject to the accounting requirements of the Commission are subject, also, to State regulation, and section 220 (i) of the act requires the FCC to consider the views and recommendations of State commissions concerning accounting requirements. Some of the telephone companies engage in other public utility services such as furnishing gas or electric services, and all of the larger companies are subject to regulations (including accounting regulations) issued by the Securities and Exchange Commission and certain other Federal agencies. Constant research and review of current accounting regulations of other agencies, as well as contacts with the several accounting organizations, is necessary to avoid issuance of conflicting rules or interpretations with respect to accounting requirements for these telephone companies.

During fiscal 1952, problems of joint property ownership between telephone companies and electric utilities (particularly joint use of poles) occasioned research with respect to both past and current accounting practices of these industries, as well as a determination of the needs of the Rural Electrification Administration in accounting for joint projects of this nature. Research was also conducted with respect to the credit-extension practices of the Bell System companies, and the effect of such practices on the write-off of uncollectible accounts. Research was made for the purpose of determining the reasons underlying changes in accounting regulations, as revealed by five new uniform systems of accounts adopted or proposed by other regulatory agencies, and the desirability of incorporating similar changes in the accounting regulations promulgated by the Commission.

At the close of the fiscal year research studies were in progress with respect to the accounting concepts and practices of various industries, accounting organizations, and regulatory agencies in (*a*) determination of current income, and (*b*) disposition of the cost of issuance of capital stock.

3. DOMESTIC TELEGRAPH

GENERAL

The Western Union Telegraph Co.'s land-line telegraph system comprises substantially the entire domestic message telegraph industry in the United States. (Although Western Union renders private line and other nontransmission telegraph services, the telephone companies furnish a major portion of such services, as well as teletypewriter exchange service.)

During fiscal 1952, Western Union experienced marked set-backs in the improvement in financial and operating conditions enjoyed in the previous fiscal year. Western Union became obligated to increase wages on July 1, 1951, and again on September 1, 1951. Following hearings before the Commission, increased rates for interstate telegraph service to offset, in part, the July wage increases were permitted to become effective in the latter part of August and on September 1, 1951. The interstate rate increases, together with similar increases for intrastate services, were designed to increase Western Union's revenue about $10,500,000 a year.

In the third calendar quarter of 1951, operating results turned downward, reflecting the 2-month lag in effecting rate increases to offset wage increases. For the calendar year 1951, Western Union reported for its system-wide operations (including international ocean-cable as well as domestic land-line telegraph operations) net income before Federal income taxes of $10,305,000 as compared with $9,820,000 in 1950. The effect of Federal income taxes, $2,500,000 in 1950 after applying Federal income tax net operating loss carry-overs of prior years and $4,900,000 in 1951, with the loss carry-over benefits no longer available, brought 1951 net income down to $5,405,000, compared with $7,320,000 for 1950. Regular dividend payments, which were resumed in December 1950 amounted to $2 per share in 1951 with an extra dividend of 75 cents per share declared in December 1951 and paid in January 1952. The dividend rate was increased to $3 per share annually as reflected by the quarterly declarations for the first half of 1952. Western Union also effected a change in its capital stock in April 1952; although legal capital remained unchanged, its no-par capital stock, having a book value of approximately $85 per share, was changed to common stock of $10 par value. This change was undertaken for the alleged purpose of securing for Western Union's stockholders the benefit of the lower Federal capital stock transfer taxes.

The reduction of the Federal excise tax rate on telegrams from 25 percent to 15 percent effective November 1, 1951, reduced the public's annual telegraph bill by $14,000,000.

Employees of Western Union engaged in a Nation-wide strike which lasted from April 3 to May 25, 1952. In settlement, the company agreed, among other things, to the establishment of a 40-hour basic workweek and wage increases to be effective concurrently with the effective date of an FCC approved revision in telegraph rates sufficient to offset the additional cost of the wage adjustments, and subject to other governmental approvals. The cost of the proposed wage adjustments is estimated to add $9,800,000 to operating expenses annually. In June 1952, Western Union filed proposals for increased telegraph rates which would add $13,000,000 to operating revenues on an annual basis, for the purpose of recovering the cost of the wage increases agreed to in May 1952 and the cost of the September 1951 wage increase, the recovery of which was not provided for in the 1951 rate increases. Commission analysis of the voluminous data underlying the proposed rate increases, the effective date of which had been postponed from time to time, was underway at the close of fiscal 1952.

SERVICES AND FACILITIES

Speed of service.—The quality of domestic telegraph service rendered by Western Union during fiscal 1952, as measured by the company's daily speed of service studies made at 25 of its largest offices and reported monthly to the Commission, showed slight improvement (with the exception of messages delivered by telephone) when compared with the preceding fiscal year. The average origin to destination speed of service (interval between the time a message is filed by sender and the time it is delivered to addressee, or first attempt) and the average office relay drag (time required to relay a message through a large message center) as reported to the Commission by Western Union for fiscal years 1951 and 1952 are shown in the following table:

	Average speed in minutes	
	1951	1952 (10 months)[1]
Origin to destination:		
Delivered by—		
Telephone	41.2	41.6
Messenger	45.4	45.1
Private tie-line	37.9	37.5
Office relay drag	8.7	8.5

[1] Speed of service studies suspended during April and May 1952, because of strike of telegraph employees.

When possible, the Commission's Common Carrier Bureau makes spot checks of service conditions. However, due to limited personnel and funds, these investigations are necessarily restricted to the most pressing situations. On February 13, 1952, the Commission adopted

a program whereby the Field Engineering and Monitoring Bureau personnel located in some 17 district offices will, to the extent feasible, assist the Common Carrier Bureau by making routine inspections of Western Union offices and agencies during their regular field inspection trips.

Western Union modernization program.—There were no outstanding developments in Western Union's mechanization program during 1951. The most important phase of the program (the installation of automatic and semiautomatic equipment for the intercity relaying of messages) was completed in November 1950 with the inauguration of the reperforator switching center at Portland, Oreg. By the end of 1951, 99 branch offices in nonreperforator cities had been furnished with direct circuit connections to distant reperforator cities for sending messages only. In addition, all branch offices in San Francisco and St. Paul were operating into the reperforator offices at Oakland and Minneapolis, respectively, for both sending and receiving messages. During the year, Western Union provided additional Canadian message centers with direct connections to reperforator switching centers in the United States.

Western Union continued to operate its microwave triangle connecting New York, Washington, and Pittsburgh, for relaying telegrams, but had undertaken no construction to the south or west.

During the year, Western Union continued the development and use of the facsimile process for picking up and delivering telegrams. As of January 1, 1952, approximately 3,800 small machines, known as "Desk-Fax", were in operation on customers' premises, and 7,400 installations were planned for 1952.

The sixteenth and seventeenth annual reports referred to the investigation instituted by the Commission on December 23, 1949, to determine whether or not it is necessary or desirable in the public interest to require interconnection of the intercity video transmission facilities of the Bell System companies with existing and proposed intercity video transmission facilities of Western Union (Docket 9539). Hearings were completed on June 30, 1950, and the examiner's initial decision, issued in January 1951 concluded that such interconnection is not necessary or desirable. Oral argument was held before the Commission in July 1951 and at the end of the fiscal year the matter was awaiting final decision.

Construction of wire facilities.—The Commission received five requests from Western Union covering wire telegraph construction and extensions. Three such applications were carried over from the preceding year, making a total of eight, all of which were granted. The applications granted covered the leasing by Western Union of 196,836 telegraph channel miles of line at an annual rental of $299,612 and the

construction of 43,873 telegraph channel miles of line and associated equipment at a cost of $2,175,000.

Discontinuance, reduction, or impairment of service.—During the year 1,149 applications for reduction in hours of service or closure of public telegraph offices were filed by Western Union. In addition, 156 such applications were pending at the beginning of the year. Of the total, 1,138 applications were granted, 19 were withdrawn and 148 were pending at the close of the fiscal year. Generally, where hours were reduced or offices closed, substitute service was made available.

The last annual report referred to the Commission's report and order issued on January 18, 1950, in Docket 8088, in which it granted Western Union's application for authority to close permanently a branch office in Dallas, Tex. At that time, the Commission reserved jurisdiction to consider whether conditions should be imposed for the protection of employees who may have been adversely affected by the discontinuance of the office. On February 25, 1952, the Commission adopted a supplemental report and order terminating its jurisdiction and concluding that the public convenience or necessity did not require the imposition of conditions providing for the protection of adversely affected employees. In its report, the Commission referred to its memorandum opinion of February 21, 1951, in which it concluded that public convenience and necessity did not require that such conditions be attached to certificates or authorizations for the discontinuance, reduction, or impairment of service by communications carriers.

RATES AND TARIFFS

Tariff schedules.—At the end of the year, 40 domestic telegraph carriers had tariffs or concurrences on file with the Commission. During the year, they filed 1,098 tariff publications establishing or changing rates, regulations, practices, and classifications of service, including concurrences.

Western Union filed revised tariff schedules reflecting its acquisition of the message telegraph business of the Pacific Telephone & Telegraph Co. and the Bell Telephone Co. of Nevada. Tariff schedules filed by Western Union also reflected its discontinuance of public message toll telephone service and its withdrawal from the business of leasing private-line frequency circuits for voice, music, or program transmission, pursuant to the authority granted by the Commission in its decision and certificate in Docket 9235, issued April 9, 1951.

Special permissions.—Thirty-two applications for special permission to make changes in tariffs or file new tariffs to become effective on less than statutory notice, or involving waiver of certain requirements of the Commission's rules, were granted.

Western Union domestic rates.—As previously reported, Western Union filed revised tariff schedules to become effective June 1 and

July 1, 1951, containing certain new and increased rates for interstate message telegraph, money order, and miscellaneous services. By order of May 23, 1951, the Commission, on its own motion, suspended the operation of these schedules and entered into an investigation of the matter (Docket 9980). After public hearings, the Commission on August 24, 1951, concluded that the rate adjustments proposed with respect to Telemeter Service, CND Services, and Leased Facility Services, and the adjustments in the money order premium charges should be permitted to become effective. The Serial Service classification was held to be an unjust and unreasonable classification and Western Union was required to amend its tariffs accordingly. The rate adjustments proposed with respect to message and money order service were found to contain certain discriminatory and other objectionable provisions and Western Union was required to design new schedules eliminating these discriminations and objectionable provisions. It did so, effective September 1, 1951. Subsequently, corresponding intrastate tariff revisions were filed with the various State commissions and have become effective.

On June 6 and 10, 1952, Western Union filed revised tariff schedules, effective July 6 and 10, 1952, respectively, containing certain new and increased charges and regulations for interstate message telegraph, press, money order, and miscellaneous services. The increased charges, according to the company, are designed to produce additional revenues required to offset the major part of a $13,200,000 annual increase in operating expenses, consisting of additional wage expenses which became effective September 1, 1951, in an annual amount of $3,402,000, and further wage expenses in an annual amount of $9,779,000 to be incurred as from the effective date of the subject rate revision as provided for in agreements with the telegraph unions. The effective dates of the new and increased rates for telegraph services subsequently were deferred by the company until September 1, 1952.

On June 20, 1952, Western Union filed revised tariff schedules, effective September 1, 1952, containing certain new and increased charges and regulations applicable to the United States-Canada and St. Pierre-Miquelon Islands message and money order services. These new and increased charges, according to the company, are designed to produce the additional revenues necessary to recover the added wage expense incident to the previously mentioned wage increases and at the same time to place the United States-Canada rates on a uniform and consistent basis.

Leased facility-teleprinter "ticker" equipment charges.—Western Union filed revised tariff schedules to become effective July 6, 1952 (subsequently deferred until August 1, 1952), establishing new and increased charges and new regulations applicable to "tickers" used in

leased facility service. The company estimated that the increased rates would produce additional annual revenue in the amount of about $69,000, based on current volume. The company advises that the New York Stock Exchange plans to lease from Western Union ticker networks for the purpose of disseminating to the public its stock and bond quotations. Up to this time, Western Union has distributed such information directly to the public subscribing to its Commercial News Department, Quotation Ticker Service. The telegraph company estimated that it will receive approximately $1 million per annum less revenue for the lease of the ticker networks to the stock exchange than it receives from the CND Quotation Ticker Service which will be displaced.

Use of leased telegraph facilities for transmission of horse- or dog-racing news.—Western Union amended its tariffs applicable to interstate and foreign leased facilities service used for the transmission of horse- and dog-racing news to become effective February 1, 1952, restricting such service to (1) a press association; (2) a publisher of a newspaper or other periodical entered as second-class matter in the United States Post Office Department; (3) a radio station; or (4) a person, firm, or corporation engaged in the collection or transmission of horse- or dog-racing news to press associations, newspapers, or radio stations for publication or broadcasting. Requests for suspension were received; and, by order of January 30, 1952, the Commission suspended the new tariff provision and ordered a hearing thereon (Docket 10112). Hearings were held in June 1952, and a decision was pending at the close of the fiscal year.

Original cost of plant and continuing property records.—Over a period of 6 years Western Union has made substantial progress in complying with the Commission's accounting regulations that became effective January 1, 1943, which required a revised plant account classification, the restatement of plant investment to basis of original cost, and the establishment of continuing property records of plant and equipment. The Commission has been engaged in a comprehensive analysis of these plant accounting records and procedures in order to be assured of the propriety and reasonableness of the final results.

Depreciation.—As a result of a depreciation study Western Union's depreciation reserve applicable to landline plant was increased and depreciation rates were prescribed effective January 1, 1948. In cooperation with the Commission staff, Western Union is modifying these depreciation rates to reflect developments since that date in connection with plant classifications, changes in the art of record communication and underlying service life and salvage characteristics of plant.

OTHER REGULATORY MATTERS

Uniform system of accounts.—During fiscal year 1952, Western Union changed its outstanding no-par common stock to common stock of a par value of $10 per share. This transaction required an interpretation of the accounting rules to assure retention in the capital accounts of the amounts in excess of par value that had been paid in by stockholders.

Accounting research.—The sale by Western Union, during the year 1948, of its office building at 60 Hudson Street, New York City, and lease back for a term of 25 years, created a problem as to the appropriate accounting thereof. This required research both as to disposition of the amounts received in connection with the transaction and the distribution of annual rental charges.

4. INTERNATIONAL TELEGRAPH AND TELEPHONE

GENERAL

The upward trend of international telegraph business which began in the middle of the calendar year 1950, has continued.

In calendar 1951, the United States cable and radiotelegraph carriers handled a total of 536,608,633 paid words, an increase of 3½ percent over the 1950 level of 518,523,407 paid words.

Revenues from message traffic accruing to the international telegraph carriers in 1951, amounted to $46,466,766, an increase of 9.4 percent over 1950 revenues of $42,469,888. Net operating revenues before Federal income taxes amounted to $7,861,188, an increase of 58.5 percent over 1950 when the comparable figure was $4,960,545.

The volume of international radiotelephone calls in 1951 as well as revenues therefrom reached new highs. The chargeable calls in 1951 advanced to 932,484, an increase of 25.2 percent over 1950. The revenues (including associated landline charges) for 1951 amounted to $10,128,354, which were 23.6 percent more than the revenues for 1950.

INTERNATIONAL SERVICE

Telegraph circuits.—At the close of fiscal 1952, 84 foreign countries and overseas points were served by United States radiotelegraph carriers, either by direct radiotelegraph circuits or via the Tangier, North Africa, relay stations. Of this number, 73 were served via direct circuits and eleven via Tangier. In addition, a number of countries in the Far East, which were not reached by these means, were served by relay stations operated by the United States carriers at Manila in the Philippine Islands. Connections with the facilities of foreign carriers made possible communication with most other points in the world. As in previous years, the United States radiotelegraph carriers continued to transmit program material to various foreign coun-

tries originating, among others, with the United Nations and the Department of State.

Telephone circuits.—Radiotelephone message toll service was in effect with 93 foreign countries and overseas points at the close of the year. Of this number, 55 were served directly while the rest were served through connecting carriers. The Bell System companies provided program transmission service to 61 foreign countries and overseas points and private line service was available to 12 foreign countries and overseas points.

Applications.—During the fiscal year, licensees in the international fixed public service filed a total of 711 applications for authorizations for additional frequencies, additional transmitters, and additional points of communication, as well as applications for renewal of licenses and temporary authorizations. Licensees in the radiotelegraph service accounted for 472 of these applications while the balance was filed by licensees in the radiotelephone service. The Commission acted on 608 of these applications.

Applications for authority to use additional frequencies continued to constitute a large proportion of the total number received and acted upon. This resulted to a considerable extent from the necessity of shifting operations to frequencies which are "in band"; that is, frequencies which are in accordance with the Atlantic City Table of Frequency Allocations, as agreed upon at the Extraordinary Administrative Radio Conference held in Geneva during August–December 1951. (See "International conferences".)

In addition, the Commission received and acted upon a number of miscellaneous applications filed by international carriers. These included requests for authorization to hold interlocking directorates in two or more companies, authorizations to decrease or discontinue service, and authorizations to supplement facilities of the international companies by the use of wire lines.

Discontinuance of service.—The past year saw the cessation of communications service by the Commercial Pacific Cable Co., the only United States cable company operating between this country and points in the Pacific ocean area. On November 14, 1951, the Commission granted Commercial Pacific's application for authority to discontinue service over its submarine cables between San Francisco and Honolulu, Honolulu and Midway Island, Midway Island and Guam, Guam and Manila, Manila and Shanghai, and Guam and Japan. In approving the discontinuance, the Commission noted that some of the cables had been interrupted since 1941; that others were subject to frequent interruptions requiring heavy expenditures for repairs; that the company was losing money on its operations; and that adequate substitute service to the points served by Commercial

Pacific is available by means of radiotelegraph circuits to and from the United States.

Docket cases.—In preceding annual reports, reference was made to the applications of Mackay Radio & Telegraph Co. for authority to communicate with Portugal, Surinam, and the Netherlands (Docket 8777). In the seventeenth annual report it was noted that the Commission's decision in this case, adopted February 21, 1951, had been appealed by RCA Communications, Inc., and that this appeal was then pending before the United States Court of Appeals for the District of Columbia. On May 20, 1952, oral argument in this matter was heard by the court, and a decision is now pending.

In the last annual report reference was made to the proceeding (Docket 9362) occasioned by the complaint of the International Bank for Reconstruction and Development and the International Monetary Fund against certain United States telegraph carriers. This case presented for determination by the Commission the question of whether these agencies should be accorded the same rates for their outbound official telegraph communications as those accorded to certain other governments for similar communications. Hearings were concluded in February 1951 and, on November 20, 1951, the hearing examiner's initial decision was issued. In this decision it was held that the rate charged by the defendant carriers for official messages of the bank and fund should not exceed, for any message, the rate charged by such defendant carriers for a similar message sent from the United States by a foreign government, which is a member of the bank and fund, to its own territory. Exceptions to the initial decision and replies to the exceptions were filed and the matter is now awaiting oral argument before the Commission.

Decision in Docket 9292 is also pending before the Commission. This proceeding, referred to in the seventeenth annual report, concerns complaints involving the lawfulness of certain agreements between Western Union, on the one hand, and Globe Wireless, Ltd., and Tropical Radio Telegraph Co., on the other hand, for the exchange of specified international telegraph traffic. Exceptions to the hearing examiner's initial decision, wherein it was held that the agreements were illegal, were filed, and on December 10, 1951, oral argument was heard by the Commission.

During March 1952, hearings were held on the applications of Mackay Radio & Telegraph Co. and All America Cables & Radio, Inc., for modification of their licenses to permit them to operate a radiotelegraph circuit between the United States and Puerto Rico on a regular instead of an emergency basis (Docket 10056). A grant of the applications was opposed by RCA Communications, Inc. Proposed findings have been filed, and the hearing examiner's initial decision is pending.

Western Union divestment.—Section 222 of the Communications Act, which authorized the merger of the Western Union Telegraph Co. and Postal Telegraph, Inc., specifically required that any plan for such merger should provide for the divestment by Western Union of its international telegraph operations within a reasonable time, as soon as its legal obligations permitted, and after the Commission found the compensation for the property to be commensurate with its value. In its order approving the aforementioned merger in 1943, the Commission required Western Union to exercise due diligence to effect such divestment (Docket 6517). Since Western Union has not as yet effected this divestment, the Commission, by order dated March 5, 1952, instituted an investigation and hearing (Docket 10151) into all phases of the matter of divestment in order to determine what action the Commission should take or recommend in this matter. Hearing in this matter was scheduled to begin October 7, 1952.

Equipment and operating techniques.—New interest has been evidenced in the International Control Service as improved equipment has become available for the ultra high frequency bands between 1,850 and 3,000 megacycles allocated to this service. Stations in this service are used for transmitting traffic by radio, instead of by wire lines, over relatively short distances between message centers, transmitting stations, and receiving stations of the international carriers. In addition to the two stations previously authorized for International Control Service, one company in the New York area was granted an experimental license and another company in the same area has applications pending for four new stations.

Development of new methods of multichannel transmission continues. During the past year multichannel telegraph transmissions have been authorized which utilize new single sideband and frequency shift techniques. This development will assist in accommodating the growing service demands within the reduced spectrum space allocated to the Fixed Services.

International conferences.—The Commission participated in the Extraordinary Administrative Radio Conference held in Geneva, Switzerland, August–December 1951. At this conference agreement was reached on certain new international frequency lists, frequency assignment plans for some services, and a method of gradually transferring Fixed Service operations to frequencies which are in accordance with the Atlantic City Table of Frequency Allocations, with a view eventually to bringing this table into force for the entire range between 14 and 27,500 kilocycles. Most of the world's medium and long-distance radiocommunication services are conducted within this frequency range.

As a result of the United States effort to carry out this agreement, new assignments of frequencies in the appropriate Atlantic City bands

have been made to licensees in the International Fixed Public Service. Such assignments have been made on a temporary basis pending trial to determine their workability.

Steps toward implementation of the Atlantic City table have also been taken on a "frequency band" basis. For example, all assignments between 20,000 and 27,500 kilocycles have been adjusted so as to be in accordance with the table. This process required that the Fixed Services vacate the band 21,000–21,450 kilocycles so that it could be made available to the amateur service. The band 14,350–14,400 kilocycles previously used by amateurs has been allocated to the Fixed Services and new assignments have been made therein.

The Commission and licensees in the Fixed Services are now engaged in intensive studies and meetings with a view to completing the transfer of operations to the proper Atlantic City frequency bands as rapidly as possible. (For a more detailed discussion of the results of the above conference, see chapter on frequency allocation and treaty activities.)

RATES AND TARIFFS

Tariff schedules.—At the end of the fiscal year, 101 international cable and radiotelegraph carriers had tariffs or concurrences on file with the Commission. During the year, these carriers filed 2,042 tariff publications establishing or changing rates, regulations, practices, or classifications of service.

Special tariff permissions.—During fiscal 1952 the Commission received and acted upon 54 applications wherein special permission was requested to make changes in existing tariff schedules or to establish new schedules on not less than 1 day's notice.

Contract filings.—The international and marine telegraph carriers filed 367 new contracts, 727 amendments to existing contracts, and 119 reports of negotiations with other carriers or with foreign administrations. In addition, the various international telegraph carriers filed 1,386 statements showing revisions in the divisions of charges for telegraph messages exchanged between these companies and their overseas correspondents.

Marine rate case.—As was noted in the previous annual report, during 1950 the Commission received requests from marine radiotelegraph carriers for rate relief. At the same time, Western Union, which originates and terminates much of the marine traffic, also advised the Commission that it desired to revise its landline charges for handling this traffic. This proposed revision also made provision for establishing uniform division of charges with the various marine carriers. On March 14, 1951, the Commission adopted an order instituting an investigation (Docket 9915) into the matter of the charges for coast station and landline handling of marine traffic as well as the

legality of the divisions of charges between Western Union and the various marine carriers.

The Commission had pending before it a formal complaint by Tropical Radio Telegraph Co. against Western Union (Docket 9822) wherein it was charged that Western Union had failed to comply with the provisions of the formula for the distribution of outbound marine traffic in its division of tolls for marine traffic. Since this complaint involved issues which were similar to those before the Commission in its general marine investigation, the Commssion consolidated this complaint with the proceeding in Docket 9915. Hearings were held in this consolidated proceeding during June, July, and August of 1951. Proposed findings were filed by the carriers in November 1951, and the case is awaiting decision by the Commission.

OTHER REGULATORY MATTERS

Depreciation.—Limited progress was made in studies to determine the reasonableness of annual depreciation rates and charges, and the recorded depreciation reserves, and to determine the propriety of the depreciation practices of the international telegraph carriers. Pending completion of such a study, tentative approval was given to the proposal of one carrier to effect changes in its annual depreciation accrual rates, and the carrier was required to make certain adjustments in its depreciation accounting. Studies will be continued with the view of developing information necessary for the Commission to prescribe annual rates of depreciation for these carriers as required by section 220 (b) of the Communications Act.

Continuing property records.—The three international telegraph carriers that had not completely fulfilled the requirement to establish and maintain continuing property records at the end of fiscal 1951 made substantial further progress during the year, and are expected to complete their records during fiscal 1953. The Commission's staff gave advice and assistance to these carriers, and further pursued the verification of the form and content and evaluation of the effectiveness of these records.

Relief and pensions.—Three carriers introduced changes in their pension arrangements during fiscal 1952, primarily to effect liberalization of benefits.

Reclassification of plant.—Although further progress was made during fiscal 1952 toward completing the restatement of the plant of the international telegraph carrriers on the basis of original cost, final adjustments in the accounts of four carriers were not consummated. It is expected that the work will be completed next year.

Uniform systems of accounts.—Progress was made in the drafting of unified accounting rules to be incorporated into a new uniform system of accounts for international telegraph carriers (both cable

and radio). It is anticipated that such unified rules can be made applicable, also, to the domestic operations of Western Union.

During the year accounting interpretations were issued with respect to (*a*) Western Union's program for equalization of cable-maintenance costs; (*b*) appropriate recording of transactions with respect to the quasi-reorganization of Press Wireless, Inc.; (*c*) the use of delayed income accounts in connection with original cost adjustments; and (*d*) the stock transaction of Western Union that was referred to under the subject of domestic telegraph.

Preservation of records.—Interpretations were issued during the year as to the intent of the rules with respect to (*a*) tape recordings of Scheduled Transmission Service; and (*b*) retention of the records of Commercial Pacific Cable Co. which ceased operations and is in process of dissolution.

Accounting research.—Extensive accounting research, including several of those projects listed under "Domestic telephone" was required in connection with the afore-mentioned interpretations and in anticipation of the new international system of accounts.

5. STATISTICS

TELEPHONE CARRIERS

Reports were filed on an annual basis by 230 common carriers and 25 controlling companies for the calendar year 1951. The reports received from common carriers include those from 89 telephone carriers and 119 carriers engaged in rendering mobile radiotelephone service. Selected financial and operating data concerning large telephone carriers for the year 1951 as compared with 1950 are shown in the following table:

Telephone carriers [1]

Item	1950	1951	Percent of increase (or decrease)
Investment in plant and equipment (as of Dec. 31)	$10, 704, 134, 171	$11, 546, 812, 614	7. 87
Depreciation and amortization reserves	$2, 980, 061, 346	$3, 186, 343, 655	6. 92
Net investment in plant and equipment	$7, 724, 072, 825	$8, 360, 468, 959	8. 24
Local-service revenues	$2, 058, 311, 931	$2, 258, 925, 770	9. 75
Toll-service revenues	$1, 245, 351, 804	$1, 403, 479, 156	12. 70
Total operating revenues	$3, 445, 154, 483	$3, 817, 536, 794	10. 81
Operating expenses	$2, 464, 080, 999	$2, 698, 098, 095	9. 50
Taxes	$526, 043, 113	$659, 279, 145	25. 33
Net operating income after all taxes	$455, 030, 671	$460, 159, 854	1. 13
Net income	$371, 502, 086	$377. 423, 081	1. 57
Dividends declared	$269, 770, 556	$303, 374, 705	12. 46
Company telephones:			
Business	11, 775, 231	12, 346, 101	4. 85
Residence	26, 269, 563	27, 568, 621	4. 95
Number of calls originating during the year:			
Local [2]	65, 327, 982, 660	66, 620, 928, 423	[3]
Toll [2]	2, 115, 425, 304	2, 140, 402, 887	[3]
Number of employees at end of October	565. 105	586, 809	3. 84
Male	196, 996	198, 209	0. 62
Female	368, 109	388, 600	5. 57
Total compensation for the year	$1. 798, 193, 304	$1, 975. 535, 384	9. 86

[1] Intercompany duplications, except in minor instances, have been eliminated.
[2] Partly estimated by reporting carriers.
[3] The number of calls shown are not comparable, as many calls were reclassified from "Toll" to "Local" during 1951, due to enlargement of numerous local calling areas.

BUSINESS AND RESIDENCE TELEPHONES BY STATES

There were 45,636,400 telephones in the continental United States of which 31,911,000 are located in residences, and 13,725,400 in business establishments, as of January 1, 1952. The number of telephones, arranged by States, are shown in the following table. The figures were compiled by the American Telephone & Telegraph Co. and are partly estimated.

State	Business	Residence	Total
Alabama	130,500	334,800	465,300
Arizona	66,100	110,000	176,100
Arkansas	83,800	179,100	262,900
California	1,369,200	2,692,200	4,061,400
Colorado	147,600	323,200	470,800
Connecticut	229,000	602,700	831,700
Delaware	39,400	88,300	127,700
District of Columbia	249,500	274,600	524,100
Florida	305,000	447,000	752,000
Georgia	195,900	431,100	627,000
Idaho	42,100	105,700	147,800
Illinois	1,008,900	2,140,100	3,149,000
Indiana	300,000	896,500	1,196,500
Iowa	172,400	671,100	843,500
Kansas	143,300	477,100	620,400
Kentucky	134,900	361,700	496,600
Louisiana	163,200	393,000	556,200
Maine	59,800	176,900	236,700
Maryland	206,200	508,800	715,000
Massachusetts	482,800	1,166,200	1,649,000
Michigan	562,500	1,593,100	2,155,600
Minnesota	233,900	713,100	947,000
Mississippi	71,600	170,400	242,000
Missouri	347,700	850,600	1,198,300
Montana	46,500	109,300	155,800
Nebraska	100,900	317,100	418,000
Nevada	23,100	31,500	54,600
New Hampshire	38,700	115,600	154,300
New Jersey	508,300	1,252,000	1,760,300
New Mexico	55,500	75,600	131,100
New York	2,090,100	3,778,300	5,868,400
North Carolina	185,100	434,200	619,300
North Dakota	32,600	97,300	129,900
Ohio	703,800	2,062,900	2,766,700
Oklahoma	174,400	422,300	596,700
Oregon	138,300	327,600	465,900
Pennsylvania	893,200	2,430,400	3,323,600
Rhode Island	73,400	176,800	250,200
South Carolina	85,300	193,200	278,500
South Dakota	37,500	122,200	159,700
Tennessee	186,600	491,800	678,400
Texas	650,500	1,395,000	2,045,500
Utah	60,600	152,200	212,800
Vermont	24,800	72,900	97,700
Virginia	234,000	510,300	744,300
Washington	233,200	559,000	792,200
West Virginia	99,400	271,200	370,600
Wisconsin	277,800	749,300	1,027,100
Wyoming	26,500	55,700	82,200
United States	13,725,400	31,911,000	45,636,400

LAND-LINE TELEGRAPH

Annual reports containing statistical data for the calendar year 1951 were received from 21 domestic and international telegraph carriers. Financial and operating data compiled from the report received from the Western Union Telegraph Co. relating to its domestic land-line operations for the calendar year 1951 as compared

with 1950 are shown in the following tabulation. The data pertaining to its international ocean-cable operations are included in a subsequent table relating to ocean-cable carriers.

The Western Union Telegraph Co.[1]

Item	1950	1951	Percent of increase or (decrease)
Investment in plant and equipment (as of Dec. 31)	$294,451,126	$284,293,024	(3.45)
Depreciation and amortization reserves	$128,226,700	$123,825,430	(3.43)
Net investment in plant and equipment	$166,224,426	$160,467,594	(3.46)
Message revenues	$152,248,121	$161,739,467	6.23
Total operating revenues	$177,993,880	$192,089,102	7.92
Operating expenses, depreciation, and other operating revenue deductions	$167,279,568	$182,022,613	8.81
Net operating revenues	$10,714,311	$10,066,489	(6.05)
Income taxes	$2,050,000	$4,007,000	95.46
Net income	$7,352,472	$4,711,159	(35.92)
Dividends declared	$2,458,972	$3,381,229	37.51
Revenue messages handled	[2] 188,946,490	[2] 189,636,984	.37
Number of employees at the end of October	40,482	40,319	(.40)
Total compensation for the year	$116,936,815	$127,818,175	9.31

[1] Represents data for landline operations. Figures covering cable are included in another table.
[2] Includes domestic transmission of transoceanic and marine messages (about 8,462,000 in 1950 and about 8,882,000 in 1951).

RADIOTELEGRAPH AND OCEAN-CABLE CARRIERS

There are set forth in the tables below financial and operating data tabulated from the annual reports filed by radiotelegraph and cable carriers furnishing international communications service. The tables compare the figures for the calendar year 1951 with those for 1950.

Radiotelegraph carriers

Item	1950	1951	Percent of increase or (decrease)
Investment in plant and equipment (as of Dec. 31)	$38,885,097	$38,812,497	(0.19)
Depreciation and amortization reserves	$18,845,689	$18,508,966	(1.79)
Net investment in plant and equipment	$20,039,408	$20,303,531	1.32
Message revenues:			
Domestic [1]	$1,743,566	$1,901,113	9.04
Transoceanic	$19,223,350	$21,974,835	14.31
Marine	$1,271,847	$1,400,484	10.11
Total operating revenues	$25,683,717	$29,887,139	16.37
Operating expenses, depreciation and other operating revenue deductions	$23,110,006	$25,258,232	9.30
Net operating revenues	$2,573,711	$4,628,907	79.85
Provision for Federal income taxes	$706,220	$2,450,580	247.00
Net income	$2,373,280	$2,577,215	8.59
Dividends declared	$7,500	$10,000	33.33
Number of revenue messages handled:			
Domestic [2]	52,886	57,957	9.59
Transoceanic	9,938,645	10,980,288	10.48
Marine	895,347	958,473	7.05
Number of employees at end of October	5,264	5,472	3.95
Total compensation for the year	$18,208,915	$20,082,510	10.29

[1] Includes revenues from the domestic transmission of transoceanic and marine messages and revenues from domestic classifications (primarily Canadian and Mexican).
[2] Represents domestic classification messages (primarily Canadian and Mexican).

Ocean cable carriers (including cable operations of the Western Union Telegraph Co.)

Item	1950	1951	Percent of increase (or decrease)
Investment in plant and equipment (as of Dec. 31)	$97, 283, 249	$88, 497, 874	(9. 03)
Depreciation and amortization reserves	$63, 910, 819	$55, 419, 954	(13. 29)
Net investment in plant and equipment	$33, 372, 430	$33, 077, 920	(. 88)
Message revenues:			
Domestic [1]	$157, 521	$187, 605	19. 10
Transoceanic	$20, 073, 604	$21, 002, 729	4. 63
Total operating revenues	$24, 649, 414	$27, 061, 680	9. 79
Operating expenses, depreciation, and other operating revenue deductions	$22, 262, 580	$23, 829, 399	7. 04
Net operating revenues	$2. 386, 834	$3, 232, 281	35. 42
Provisions for Federal income taxes	$450, 000	$1, 053, 000	134. 00
Net income	$2. 165, 793	$1, 949, 012	(10. 01)
Dividends declared	$883, 670	$353, 468	(60. 00)
Number of revenue messages handled:			
Domestic [2]	41, 168	79, 037	91. 99
Transoceanic	9, 856, 802	9, 903, 807	. 48
Number of employees at end of October	5, 495	5, 453	(. 76)
Total compensation for the year	$12, 030, 892	$13, 037, 247	8. 36

[1] Includes revenues from the domestic transmission of transoceanic messages and revenues from domestic classification messages (primarily Canadian).
[2] Represents domestic classification messages (primarily Canadian).

INTERNATIONAL TELEGRAPH TRAFFIC

Reports of international traffic statistics received from cable and radiotelegraph carriers indicate that a total of 536,608,633 paid words were handled during the calendar year 1951. The outbound traffic during the year amounted to 265,970,828 words, while inbound traffic accounted for 270,637,805 words. The following table contains an analysis of the traffic handled between the United States and the principal countries of the world.

International telegraph (radio and cable) traffic, 1951

Country	Number of words	
	Out-bound from the United States	In-bound to the United States
EUROPE, AFRICA, AND THE NEAR EAST		
Algeria	189,553	153,287
Arabia	840,355	873,643
Austria	1,521,892	1,779,432
Belgian Congo	373,962	315,536
Belgium	5,359,112	4,788,204
British East Africa	243,408	224,237
British West Africa	257,489	273,112
Czechoslovakia	794,251	690,257
Denmark	1,764,553	1,252,056
Egypt	1,558,923	1,602,758
Ethiopia	151,118	211,675
Finland	578,011	587,376
France	15,997,237	14,863,574
French West Africa	131,601	98,659
Germany	9,992,004	11,110,647
Greece	2,099,777	1,677,790
Hungary	352,649	213,315
Iceland	174,158	182,140
Iran	882,467	1,413,629
Iraq	268,664	206,921
Ireland	922,040	1,254,471
Israel	3,352,806	3,412,372
Italy	9,130,429	7,906,367
Lebanon	1,087,551	1,118,925
Liberia	503,595	586,434
Luxembourg	101,770	89,412
Morocco—French	681,626	639,813
Morocco—Tangier	638,007	558,987
Netherlands	6,467,623	5,887,376
Norway	2,651,310	2,067,060
Palestine	123,089	175,090
Persian Gulf	332,392	406,356
Poland	507,725	390,560
Portugal	1,479,465	1,034,603
Rhodesia	87,867	113,189
Roumania	127,346	62,037
Spain	3,102,109	2,434,952
Sweden	3,347,991	3,046,324
Switzerland	7,641,340	5,434,540
Syria	251,767	246,112
Transjordania	306,699	122,726
Trieste, Free Territory of	195,318	158,672
Turkey	1,176,425	831,046
Union of South Africa	3,067,426	3,114,844
U. S. S. R.	5,551,989	2,460,854
United Kingdom	47,858,245	47,813,541
Yugoslavia	991,083	815,542
All other places	1,163,870	2,366,499
Total	146,380,087	137,066,952
WEST INDIES, CENTRAL, NORTH, AND SOUTH AMERICA		
Argentina	7,586,353	9,172,153
Bahamas	746,453	837,330
Barbados	190,298	166,938
Bermuda	1,039,924	963,928
Bolivia	834,787	863,516
Brazil	11,426,811	12,110,080
British Guiana	161,896	154,930
British Honduras	122,793	138,298
WEST INDIES, CENTRAL NORTH AND SOUTH AMERICA—continued		
British West Indies [1]	140,111	106,734
Canada	7,081,480	8,274,347
Canal Zone	791,513	736,342
Chile	2,655,866	3,134,848
Colombia	4,362,014	3,778,797
Costa Rica	772,838	582,263
Cuba	6,279,402	8,591,839
Dominican Republic	1,173,470	1,102,808
Ecuador	1,218,329	810,141
Guatemala	1,173,373	1,304,771
Haiti	793,068	715,207
Honduras	639,062	592,117
Jamaica	813,640	656,194
Mexico	2,013,789	1,461,961
Netherlands West Indies	1,104,499	1,235,427
Nicaragua	684,054	554,270
Panama	1,024,089	773,303
Paraguay	240,479	285,248
Peru	2,157,444	1,697,060
Puerto Rico	3,394,948	2,976,812
Salvador	828,227	684,463
Surinam	123,941	112,337
Trinidad	545,008	403,094
Uruguay	2,142,172	1,923,566
Venezuela	6,269,957	7,041,815
Virgin Islands	270,256	276,321
All other places	142,861	76,746
Total	70,945,205	74,296,013
ASIA AND OCEANIA		
Afghanistan	165,668	136,567
Australia	4,221,715	3,679,472
Burma	689,981	182,998
Ceylon	635,855	562,877
China (excluding Hongkong)	183,779	198,659
Formosa	922,915	994,399
French Indo China	207,174	294,486
Guam	540,047	729,655
Hawaii	4,595,485	4,475,284
Hongkong	2,170,486	810,100
India	5,189,246	5,314,132
Indonesia	2,444,792	2,788,327
Japan	12,238,070	21,171,045
Korea	920,564	600,146
Malaya, Federation of	1,618,718	1,856,593
New Zealand	1,207,309	1,141,260
Okinawa	355,070	636,351
Pakistan	1,896,872	1,874,150
Philippines	5,034,121	6,415,045
Society Islands	140,840	141,413
Thailand (Siam)	1,354,333	1,214,645
All other places	138,621	152,765
Total	46,871,661	55,370,374
Unknown destination or origin	1,773,875	3,904,466
Grand total	265,970,828	270,637,805

[1] Points not listed separately.

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CHAPTER IV—SAFETY AND SPECIAL RADIO SERVICES

1. GENERAL
2. MARINE RADIO SERVICES
3. AERONAUTICAL RADIO SERVICES
4. PUBLIC SAFETY RADIO SERVICES
5. AMATEUR RADIO SERVICE
6. DISASTER COMMUNICATIONS SERVICE
7. INDUSTRIAL RADIO SERVICES
8. LAND TRANSPORTATION RADIO SERVICES
9. CITIZENS RADIO SERVICE
10. ENFORCEMENT UNIT
11. STATISTICS

1. GENERAL

Most of the nonbroadcast radio services are grouped together in what is known as the Safety and Special Radio Services. They constitute the greatest number of radio stations licensed by the Commission. Utilization of these services by individuals, industry, commerce, and state and local government comprise a broad field of operations in connection with protection of life and property, industrial and agricultural production, transportation, disaster, and civil defense.

The services fall into four main categories:

Safety services.—Aeronautical, Marine, Police, Fire, Forestry-conservation, Highway Maintenance, Special Emergency, and State Guard.

Industrial services.—Power, Petroleum, Forest Products, Special Industrial, Low-power Industrial, Relay Press, Motion Picture, Agriculture, and Radiolocation-land.

Land transportation services.—Railroad, Urban Transit, Intercity Bus, Taxicab, Automobile Emergency, Highway Truck, and Citizens.

Amateur and disaster services.

As can be seen from the statistical tables at the end of this chapter, these services, now comprising over 212,000 radio stations, continue to expand. The need for full employment of the capabilities of radio in connection with police and fire protection, aids to navigation (both ship and aircraft), emergency calls for doctors and ambulances and other activities directly related to the public safety is readily apparent.

The indirect public benefit from the employment in commerce of modern radio equipment and procedures is gaining increased recognition. More and more industries, in addition to the transportation, pipe line, power and other utilities, are finding that the efficiency of their operations may be greatly increased by the use of radio techniques. Thus, the licensing and regulatory problems become progressively complex as additional transmissions are introduced into the available spectrum space. Since one may not operate a transmitter without regard to other licensees, it is necessary that there be maintained a high level of compliance with the detailed regulations governing operation and maintenance of radio stations. This places an increasing importance upon the function of enforcement on a nationwide scale.

2. MARINE RADIO SERVICES

GENERAL

Marine radio stations licensed by the Federal Communications Commission consist of stations on land and aboard ships. Most of these stations intercommunicate and serve marine safety, navigation, operational and general communication purposes. Some of these stations, however, such as ship radar stations, do not "communicate" in the ordinary sense of the word but simply emanate and receive radio signals which are useful to assist ships in navigating safely.

Marine radio stations may be classified into various categories which often overlap but which also possess important characteristics unique to each category. For example, ship stations may be divided into radiotelephone and radiotelegraph, public correspondence and nonpublic correspondence, domestic and international, compulsory installed and voluntarily installed. Except for the latter, marine stations on land may be divided into similar categories. Further divisions may be made on the basis of the portion of the radio spectrum used by marine radio stations for they are also unique in the extent to which frequencies utilized are scattered throughout the radio spectrum.

Because of the multiplicity of these overlapping categories of marine radio stations, developments in any particular category of marine radio station often affect various other categories as well.

SAFETY AT SEA

The basic radio laws currently governing marine safety at sea are contained in the International Convention for the Saftey of Life at Sea, Title III, Part II of the Communications Act, and the Ship Acts of 1910 and 1912. These laws require for safety purposes the installation of radio equipment, and provide for qualified radio operators and other features desirable for the creation and maintenance of a

marine radio system. They apply respectively to certain classes of ships engaged on international voyages and which are registered in countries signatory to the Safety Convention, to vessels of the United States when navigated on the high seas (as of June 30, 1952 approximately 1,850 ships) and to vessels on the Great Lakes. In addition, vessels of countries not parties to the Safety Convention are subject to the requirements of Title III, Part II of the Communications Act when leaving United States ports.

In 1948 a new Safety Convention was negotiated at London. During the past year a sufficient number of ratifications of the convention were completed so that under its terms it will come into force on November 19, 1952. The new convention will impose radio installation requirements which, in several respects, exceed those now contained in the Communications Act or the 1929 Safety Convention. Cargo ships of from 500 to 1,600 gross tons not heretofore compusorily equipped with radio installations will be compelled to carry radio installations (either radiotelegraph or radiotelephone). Cargo ships of 1,600 gross tons and over will be required to carry radio direction finders. Ships will be required to carry portable radio installations capable of being used in lifeboats. There will also be a number of minor additional radio requirements applicable to vessels navigated on international voyages. In order to translate these new requirements into rules for the guidance of industry and to facilitate Commission administration, several studies were instituted during the past year, although as of June 30, 1952, much of this work had not been completed because of insufficient staff.

Aside from the matter of necessary implementation of the Safety Convention, changes in Title III, Part II of the Communications Act were found to be desirable in order to avoid inconsistencies between the two laws, and to bring the requirements of the act up to those of the new convention. A study of such changes to the act has been completed. Formal proposals to Congress for amendment of the act in this regard have not yet, however, been submitted.

In 1940 the Commission completed a report to Congress on marine radio safety requirements for the Great Lakes. Further action in this regard was, however, withheld because of World War II. Subsequent to the termination of the war, discussions with Canada were instituted and finally on February 21, 1952, at Ottawa, Canada, an "Agreement for the Promotion of Safety on the Great Lakes by Means of Radio" was signed. This agreement, which will come into force two years after the date on which the instruments of ratification are exchanged between Canada and the United States, will require that several hundred Great Lakes vessels be equipped with radiotelephone installations and maintain radio watches for safety purposes. These

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requirements are in contrast to existing radio safety requirements contained in the Ship Act of 1910 and 1912, under which an extremely limited number of passenger ships are required to be equipped with radiotelegraph installations.

Significant developments took place during fiscal year 1952 in maritime safety radio systems using radiotelephony. Traditionally, such systems have been based upon the use of telegraphy. The heart of a maritime safety radio system is the use of a common distress and calling frequency. For radiotelegraphy, this has been the frequency 500 kilocycles. In 1947, however, at the International Telecommunication and Radio Conference (Atlantic City), the frequency 2182 kilocycles was selected as the future international calling and distress frequency for maritime stations using telephony. At Geneva in 1951, international agreement was reached on a world-wide effective date for use of this frequency beginning May 1, 1952. The Great Lakes Treaty referred to above is based upon the use of 2182 kilocycles by ship radiotelephone stations as are the provisions of the 1948 Safety Convention dealing with compulsorily installed radiotelephone stations. In addition and beyond the radio installations subject to these international requirements, Commission rules adopted on April 23, 1952, will eventually require coast and ship stations voluntarily employing radiotelephony within the frequency band 1600 to 3500 kilocycles to be equipped to transmit and receive on 2182 kilocycles as well as maintain a watch on that frequency during their hours of service.

In connection with the establishment of marine radiotelephone safety systems, efforts have continued to be made looking toward the adoption of a universal radiotelephone automatic alarm signal. The International Radio Consultative Committee (CCIR) at its sixth meeting in Geneva, Switzerland, in June of 1951, established a study program of international scope for the purpose of determining the suitability of a provisionally adopted radiotelephone automatic alarm signal on the basis of thorough practical tests. This signal is for use on the maritime radiotelephone distress frequency 2182 kilocycles. Since the CCIR recommendation for a radiotelephone auto alarm signal stands to be incorporated in the future in international agreements, the selection of the signal involves an important, precise, and long-term decision. The Commission, because of other demands on its personnel, has not found it possible to participate actively in the study program. The Radio Technical Commission for Marine Services, looking toward the possible participation of commercial interests in the program, has brought the matter to industry attention but, because of defense, economic, and other considerations, no activity has been developed in the study program. Reports from abroad indicate that the French and United Kingdom administrations are actively par-

ticipating in the study program. Commercial prototype auto alarm equipment is being constructed and tested and those two administrations are proceeding with coordinated field tests.

The Commission is authorized by the Communications Act and the Safety of Life at Sea Convention to exempt certain categories of ships from radio installation requirements if it finds that the route or the conditions of their voyages or other circumstances are such as to render compliance with these requirements unnecessary or unreasonable. Pursuant to this authority, the Commission renewed for 1 year blanket exemptions for passenger vessels of 15 or less gross tons when navigated in coastal waters of the United States not more than 20 nautical miles from the nearest land or more than 200 nautical miles between two consecutive ports, and also renewed or reestablished blanket exemptions for passenger vessels of less than one hundred gross tons when navigated within three designated coastal areas. Individual applications for ship radio exemption received during the year numbered 45 of which 42 were granted. Renewal of exemption was granted to several cargo vessels used as tenders and moored most of the time to oil well drilling platforms located within 15 miles of the Louisiana coast in the Gulf of Mexico. These vessels are voluntarily equipped with two-way radiotelephone installations capable of communicating with similarly equipped ships, with nearby coast stations and with stations of the United States Coast Guard.

In connection with its responsibility for maritime safety through the use of radio, the Commission conducts continuing studies of distress cases and radio distress logs. These logs indicated that the radiotelegraph distress signal "SOS" was used throughout the world 225 times during the year. This includes its use by 32 United States ships, on all but one of which the majority of all of the personnel abroad were rescued or possible loss of the ship averted.

Such rescues and prevention of property loss serves to demonstrate the importance of radio as an element of safety at sea. One of the major marine disasters during the fiscal year involved the United States vessel *Flying Enterprise* which, on December 28, 1951, sent an SOS reporting that the ship had developed a crack in her hull during a hurricane in the North Atlantic and was drifting helplessly with a 45 degree list. A number of vessels responded and rescued the passengers and crew. The ship's master elected to remain aboard, and personally continued to use the ship's compulsorily installed radiotelegraph equipment as well as radiotelephone equipment voluntarily carried to summon further aid and direct salvage attempts.

RADIO AIDS TO NAVIGATION

Authorizations were renewed for operation on a developmental basis of shore-based radar stations in the harbors of Long Beach, San

Francisco, and Los Angeles, Calif., and New York, N. Y. These stations are being developed for the purpose of providing information to assist in the safe piloting of ships entering, leaving, or mooring within the harbor. Since the Coast Guard has the responsibility of providing and supervising public aids to marine navigation, the establishment of these private aids is effected only with the concurrence of that agency. Very high frequency maritime radiotelephone systems are being used developmentally by these radar stations to communicate with pilots on board ships to furnish navigational information.

The experimental shore based radar station established in the New York harbor area has been of particular interest since the experiments have involved the use of 3 centimeter radar, 10 centimeter radar, VHF and UHF transmitting equipment as well as special plotting techniques and the use of a method of ship identification on the radar screen. Reflection type plotters permitting direct plotting on the radar indicator including the placing of permanent buoy and other landmark positions have been used. This type of plotter may find a ready application to future and existing shipboard radar installations.

The method of ship identification on the shore based radar involves the use of a special but comparatively simple equipment on board the ship to be identified for tracking purposes. Two manufacturers have developed and tested identification equipment in connection with the experimental radar installation. The equipment involves triggering by the shore based radar and the return of a signal that appears on the radarscope adjacent to the target pip. The experiments have also demonstrated the efficiency of portable VHF FM radiotelephone equipment. A radio frequency power as low as ¼ watt has been used for an effective communication range of about 7 miles.

Eight developmental authorizations were renewed for shore-based radar stations used in connection with the training of merchant marine deck officers in shipboard radar operation on the Great Lakes and on the seaboard.

As of June 30, 1952, there were more than 1,950 United States merchant ships authorized to use radar.

Pursuant to an international agreement, the ship transmitting frequency 375 kilocycles will, after November 1, 1952, no longer be assignable as a direction-finding frequency. The new frequency for this purpose is 410 kilocycles. To permit a transition period for readjustment or modification of ship radiotelegraph transmitting equipment on compulsorily equipped ships, the Commission amended its rules to accept either 375 or 410 kilocycles as the required direction finding frequency until November 1, 1952, and, thereafter 410 kilocycles.

INTERNATIONAL FREQUENCY COORDINATION

The International Telecommunications Conference, Atlantic City, 1947, extensively revised allocations of frequencies for the maritime mobile service in the bands below 27,500 kilocycles. However, it was not until the past year at the Extraordinary Administrative Radio Conference, Geneva, that agreement was reached as to methods and dates for implementation of the Atlantic City allocations. Since this agreement was reached, various studies have been initiated and several affirmative administrative moves have been made with a view to facilitating the movement of maritime radio stations to frequency assignments in accordance with the Geneva agreement.

COAST STATIONS

Coast stations are normally located near the sea, lakes, rivers or other waterways for the purpose of communicating with ships. There are two classes of coast stations authorized by the Commission; namely, public and limited. A public coast station is open to public correspondence whereas a limited coast station is not open to public correspondence but serves the operational and business needs of ships associated with the particular coast station.

During the fiscal year, public radiotelephone facilities operating in the 2 megacycle band were added to station WLO at Mobile, Ala. Public coast stations employing telegraphy at Mackinac Island, Mich. (WHQ), and at Lake Charles, La. (WNE), have discontinued operation. The Commission has received an application from Tropical Radio Telegraph Company for the discontinuance of public coast telegraph station, WBF, at Hingham, Mass. Station WBF has indicated a decline in telegraphic traffic due largely to coastwise vessels shifting to the use of radiotelephone.

There were 35 coast stations licensed to use telegraphy in the United States at the end of the fiscal year. In addition 53 coast stations were using telephony for regional service (2 to 3 megacycle band) exclusive of Alaska. There are five coast stations in the United States employing telephony on high frequencies for long-distance public service with oceangoing vessels.

In the very high frequency band, a number of coast stations employing telephony have been authorized in the regular service which were formerly authorized as class 2 experimental stations. The Commission's records indicate that 12 limited coast stations, 2 public coast stations, and 1 receiver test station are authorized to use VHF on a regular basis. There are 66 limited coast stations, 18 public coast stations and 5 marine receiver test stations operating experimentally which are required to be licensed on a regular basis by November 1, 1952, if operation of these stations is to be continued.

During the past year the Commission was able to bring about adjustments in frequency allocations which permit uniformity of frequency assignments to all public coast stations using VHF telephony. Previously, the frequency assignments available for such stations in the Chicago area differed from those which were common to all other areas. This change in frequency assignments relieved operational and ship station equipment problems which had resulted from the previous lack of uniformity.

VOLUNTARY USE OF RADIO TELEPHONY

There are approximately 30,350 vessels of United States registry with licensed radiotelephone stations for operation on frequencies in the 2000–3000 kilocycle band. These vessels may communicate with shore stations or with other vessels for public correspondence, navigational and safety purposes. Since the frequencies in this band are relatively congested, the Commission is constantly endeavoring to control and regulate their use in order that they may more effectively serve their intended purposes. The Extraordinary Administrative Radio Conference (Geneva, 1951) has provided a list of frequency allocations for marine radiotelephone use in the 2000–3000 kilocycle band which, when cleared for use, will make further frequencies available for this rapidly growing radiotelephone service.

One of the ways in which it is anticipated that congestion in the band 2000–3000 kilocycles may be relieved is by increasing use of the very high frequencies in the 152–162 megacycle band. Experience with the marine communications system now established in the VHF band indicates that there is available a highly satisfactory communication service for many comparatively short-distance purposes. The quality of the circuits is excellent, interference being at a minimum. For many there is provided a much needed expansion of channels for public correspondence, safety, business and operational purposes. A feature in the use of maritime mobile frequencies was recently introduced by the Commission in permitting communication on maritime mobile very high frequencies between land stations and mobile stations on land when the latter stations are required to expedite ship construction or repair activities in commerce. These stations will be authorized for secondary communication as a "shipyard base station" and "shipyard mobile station" to licensees of limited coast stations.

Since many ships travel on international voyages, it has been a traditional purpose in marine radio to achieve world-wide standardization. However, a serious obstacle to such standardization in VHF telephony has arisen because of a divergence in types of modulation used. In region 2, which includes North and South America, frequency modulation is required by international agreement. Although

international regulations recommend, but do not prescribe, the use of frequency modulation in Regions 1 and 3, information received indicates a trend by European nations toward use of amplitude modulation. Commissioner Edward M. Webster is now in Europe conferring with British authorities in this regard.

An important development in the field of voluntary radiotelephony during the past year was the adoption by the Commission of a group of rules (docket 9797) which look toward the use of a calling-working method of operation in the medium and very high frequency bands. These provisions require, after certain effective dates, ship stations and public coast stations to be equipped to transmit and receive on the safety (distress) and calling frequencies 2182 kilocycles and 156.8 megacycles respectively—dependent upon whether the station operates in the medium or very high frequency bands. Further, the rules create certain watch requirements and provide for initial ship-to-ship calling and answering on the designated frequency. It is believed that the adoption of a calling-working frequency method of operation in the bands involved will mean more efficient use of frequencies at the same time serving maritime safety purposes.

MARITIME FIXED SERVICES

In this service the Commission has licensed 62 marine fixed stations. These stations use ship radiotelephone frequencies as they are normally located in waters adjacent to the coast and are authorized to communicate with nearby public coast stations primarily for safety purposes. This class of station is intended to meet the communication needs of the petroleum industry in off-shore, oil-well drilling operations.

The Commission has licensed one marine control station. This class of station provides for the remote control of transmitters by radio where this is necessary in lieu of land wires. Operation of these stations are in the 72–76 megacycle band.

FIXED PUBLIC SERVICE AND MARITIME MOBILE SERVICE IN ALASKA

Due to the scarcity of wire facilities in Alaska, radio communication between communities is carried on to a large extent by radiotelephone and radiotelegraph. Special frequencies are allocated for communication between communities in Alaska, with the Alaska Communications System, and between coast stations and ship stations in Alaskan waters. The main intra-Alaska communications routes are operated by the Alaska Communication System (ACS) under the Department of National Defense. The Alaska Communication System routes message traffic to all parts of the world. The Commission maintains liaison with the ACS in coordinating communications facilities in Alaska to serve the public interest.

The Commission has under study the revision of Part 14 of the Rules Governing Radio Stations in Alaska dealing with the fixed public and coastal services. Several administrative problems exist because of the obsoleteness of the present rules, an increasing need of frequencies for public communication by non-Government and Government stations in Alaska, and the possibility of a growing duplication of radio facilities as between the Alaska Communication System and the non-Government stations at certain locations. The necessary corrective action has been delayed because the limited Commission staff must give priority to more pressing work.

At the close of the fiscal year, there were, exclusive of Government stations, 484 point-to-point telephone stations and 84 point-to-point telegraph stations operating in the fixed public service, a total of 568 stations. In addition, 367 public coast stations employing telephony and 12 public coast stations employing telegraphy are authorized, a total of 379 stations; making a grand total of 947 stations licensed by the Commission serving the Territory of Alaska.

RULES GOVERNING STATIONS IN THE MARITIME MOBILE SERVICE

On July 23, 1951, the Commission made effective an extensive revision of Part 7 of the Rules Governing Stations on Land in the Maritime Mobile Service and Part 8, Rules Governing Stations on Shipboard in the Maritime Mobile Service. Because of certain questions raised by comments on the proposed rules (docket 9797), the Commission held oral argument on these controversial sections and on April 23, 1952 issued a Second Report and Order further revising the rules. With that issuance, the Commission completed an overall revision of the rules regulating the maritime services which was first initiated in 1950.

RADIO TECHNICAL COMMISSION FOR MARINE SERVICES

The Radio Technical Commission for Marine Services (RTCM), which is a cooperative association of the United States Government-industry marine telecommunication agencies, continued to be closely associated with the Commission's marine activities. The Commission is furnishing an electronics engineer who is devoting full time as Executive Secretary to that organization.

Seven Government agencies which include the Department of State, Department of the Treasury (Coast Guard), Department of the Army, Department of the Navy, Department of Commerce, Federal Communications Commission, and the Maritime Administration, work by committees in the RTCM with representatives from 130 marine telecommunication industry groups.

The RTCM operates, in part, by establishing special committees composed of technical experts to study problems. It would be im-

possible for individual organizations to purchase the talent which the RTCM provides for technical studies. The various agencies, Government and non-governmental, which have responsibilities for regulating or for implementing marine electronic services, work together in a review of the problems from every viewpoint involved. The special committees produce a report which normally will contain their recommendations. This report, after approval by the RTCM Executive Committee, is circulated to the entire membership and other interested agencies.

On March 18, 1952, the RTCM completed a "Review of Existing United States Policy with Respect to Medium Distance Navigational Aids". The special committee making the study was under the chairmanship of Captain R. M. Cross, Coast Guard.

On April 22, 1952, the RTCM completed a study of the portable radio lifeboat equipment required by the Safety of Life at Sea Convention (1948). The special committee making the study was under the chairmanship of R. E. Simonds of the Radiomarine Corporation of America and the study was made at the request of the Federal Communications Commission.

On May 27, 1952, the RTCM completed the study on the timing tolerance of the 500 kilocycle auto alarm with a recommendation for the interpretation of Regulations of the Safety of Life at Sea Convention (1948) to meet the international requirements. This study was made at the request of the Federal Communications Commission and William N. Krebs, Chief of the Commission's Marine Division, was chairman of the special committee.

Other RTCM special committees were established during the past year to study: (1) The Marine Identification Problem, whereby one ship equipped with a radar, may be able to identify a particular ship and be able to communicate with the other vessel. This special committee is under the chairmanship of E. F. Phillips of the National Federation of American Shipping; and (2) the standardization of marine radiotelephone channels. A special committee is presently working on selective signaling and ringing devices for marine radiotelephony.

3. AERONAUTICAL RADIO SERVICES

Radio communication facilities are essential in connection with the operation of aircraft under all weather conditions, both from the standpoint of safety of life and property as well as for efficient, expeditious, and economical operation of aircraft in general.

Under the Commission's jurisdiction and supervision, the Aeronautical Radio Services provide these facilities through Aircraft radio stations, aeronautical Land and Aeronautical Fixed stations,

Airdrome Control stations, Aeronautical Mobile Utility stations, Aeronautical Advisory stations, Flying School stations, Flight Test stations, Aeronautical Public Service stations, Civil Air Patrol stations, and Navigational Aid stations which includes radio beacons, ranges, radar devices, direction-finding systems, approach and instrument landing systems, and distance measuring devices.

The use of aviation radio has expanded rapidly. At the close of the fiscal year 1946 there were 6,205 aeronautical stations of all kinds. At the close of the fiscal year 1952 there were 32,239 authorized aircraft and ground radio stations.

AVIATION ORGANIZATIONS AND CONFERENCES

Flight safety and regularity require a well-planned communication service for air transportation. This factor coupled with need for realizing maximum utility of the frequency spectrum available to the aeronautical services makes it essential for the Commission to devote considerable time to and actively participate in the work of those committees and international organizations concerned with aeronautical telecommunication problems. The more prominent domestic committees are the Air Coordinating Committee and the Radio Technical Commission for Aeronautics. The international organizations are the International Civil Aviation Organization and the International Telecommunications Conference (ITU).

The Radio Technical Commission for Aeronautics (RTCA) is a cooperative association of the United States Government—Industry Aeronautical Telecommunications Agency. It conducts studies of aeronautical telecommunication problems and related matters for the purpose of providing guidance to, and coordinating the efforts of, the organizations concerned. One of the major and continuing activities of the Commission involves participation in the Executive Committee, and special technical committees of the the RTCA. During the past year the RTCA has studied and is making recommendations on matters such as:

(1) Implementation of the very high frequency (VHF) utilization plan and review of transition period communication requirements.

(2) High altitude grid plan for VHF omnidirectional radio range and distances measuring equipment (VOR/DME) frequency pairing.

(3) Minimum performance requirements for airborne electronic equipment for the transition period common system.

(4) Amended program for implementation of the common system of air navigation traffic control, and

(5) Evaluation of the necessity for VOR test signals.

The ITU is an international organization of states formed in order to improve the efficiency of telecommunication services and provide a means for effecting collaboration in the allocation, allotment and assignment of frequencies. The final acts of the ITU and Radio Conferences, Atlantic City, 1947, allocated exclusive frequency bands to the aeronautical service.

The International Administrative Aeronautical Radio Conference (IAARC) Geneva, 1948–49, developed a frequency allotment plan for the aeronautical mobile service. This plan was adopted by the Extraordinary Administrative Radio Conference (EARC) Geneva, 1951, and a program was evolved for bringing the exclusive aeronautical mobile bands into force. The Commission participated in the preparation of a United States position for the EARC and nominated a representative to assist the chairman of the United States delegation on aeronautical telecommunications problems. Based on the final agreements of this conference, voluminous work has already been accomplished by the Commission in collaboration with special committees and other Federal agencies to plan for an orderly implementation of the program adopted by the EARC to bring into force the Atlantic City table of frequency allocations below 27,500 kilocycles.

The Air Coordinating Committee is a Federal interdepartmental committee with responsibility for coordinating United States policy in the field of aviation. The committee was primarily established to examine aviation problems affecting more than one participating agency and to make recommendations directed toward resolving these problems. The Air Coordinating Committee is composed of standing committees, panels, subcommittees, ad hoc committees, and working groups. Since many of the problems submitted to the ACC relate to aeronautical telecommunications, the Commission finds it necessary to participate as a member in the following committees and subcommittees:

Technical Division:

Air Traffic Control and Navigation Panel.
Airmen Qualification.
Airspace—Rules of the Air and Air Traffic Control.
Aeronautical Communications & Electronic Aids.
Search and Rescue.

Some of the major activities of the Air Coordinating Committee in which the Commission participated are as follows:

(1) Continuing the implementation of the common system all-weather traffic control program.

(2) Conducting aeronautical study of applications for antenna towers which may become a hazard to air navigation.

(3) Formulating policy for the guidance of the United States representatives to the ICAO on particular international aeronautical telecommunication problems.

(4) Review and study of the over-all domestic aeronautical telecommunications policy.

(5) Study of the United States policy and program for long distance aids to air navigation.

(6) Preparation of United States position to regional meetings of the ICAO.

The International Civil Aviation Organization (ICAO) was established by the Convention on International Civil Aviation for the purpose of developing standards and recommended practices for international civil aviation in order to insure a safe, regular and efficient air transportation system. There are 57 contracting states in the ICAO. The organization consists of an Assembly, a Council of 21 contracting states (including the United States), the Air Navigation Commission, the Air Transport Committee, the Finance Committee, the Committee on Joint Support, and the Legal Committee. The administrative functions of the organizations are under the Secretary General. Technical conferences, regional and special meetings are convened as necessary and with participation by interested contracting states.

The Commission has taken an active part in the preparation of a United States position on communication matters for two ICAO regional meetings during the fiscal year and furnished an adviser to each delegation. These meetings were: The South American–South Atlantic Regional Air Navigation meeting, Buenos Aires, October 1951, and the Third European–Mediterranean Regional Air Navigation meeting, Paris, February 1952.

AIRCRAFT RADIO STATIONS

At the close of the fiscal year there were 29,599 authorized aircraft radio stations, which was about the same number as in 1951. Of this figure 27,678 were private aircraft.

During the year many aircraft authorizations were modified to permit communication with aeronautical advisory stations regarding the condition of runways, type of fuel available, wind conditions, weather, and other information necessary for aircraft operation. Further, aircraft authorizations, in increasing numbers, have been modified to permit operation in the very high frequencies (VHF) which have been made available for assignment to aircraft.

AERONAUTICAL LAND AND AERONAUTICAL FIXED RADIO STATIONS

These facilities, of which there are 1,183 authorized for operation, provide the necessary communication for the safe expeditious, and

economical operation of aircraft. Aeronautical land stations are used for communicating with aircraft whereas aeronautical fixed stations are used for point-to-point communications.

In the United States, aeronautical fixed stations are used primarily as "back-up" circuits for land-line facilities; however, in international operations, aeronautical fixed stations provide the primary service. Civil Air Regulations require domestic air carriers to maintain radiotelephone communication facilities at terminal and at such other points as may be deemed necessary by the Government to insure a satisfactory two-way ground-air communication service over the entire aircraft route.

CIVIL AIR PATROL RADIO STATIONS

These stations are used in connection with the Civil Air Patrol activities and emergencies pertaining to the protection of life and property. The stations, operating on frequencies made available by the United States Air Force, are also used by members of the Civil Air Patrol in connection with air shows, missing aircraft search missions, training missions, and communication systems at encampments, bases, and official meetings. There are now 798 Civil Air Patrol ground radio stations and over 10,000 associated mobile units.

AIRDROME CONTROL RADIO STATIONS

Airdrome control radio stations, for the most part, are operated by the Civil Aeronautics Administration. These stations are used for communicating necessary control instructions to aircraft arriving at and departing from airports. Such control is mandatory in directing such aircraft so as to maintain safe separation of aircraft to prevent collisions and to provide an efficient flow of air traffic into and out of airports. These stations may also communicate with aeronautical mobile utility stations installed aboard vehicles essential to the operation of an airport. There are now 59 stations of this type licensed by the Commission.

AERONAUTICAL MOBILE UTILITY STATIONS

This facility is installed aboard ground vehicles which are essential to the operation of an airport and provide communication between such vehicles and the airdrome control tower and aircraft on the ground. The airdrome control tower radio operator maintains direct contact and control over these stations at all times. This service is used by many municipalities and individuals concerned with the care and upkeep of airports. There are 105 aeronautical mobile utility stations authorized for operation.

AERONAUTICAL NAVIGATIONAL AID RADIO STATIONS

These stations involve the transmission of special radio signals intended solely to assist in the determination of aircraft position, including that relative to collision hazards. The navigational aid stations include radio beacons, radio direction-finders, radio ranges, localizers, glide path, marker beacons, ground control approach, instrument landing, radar, and distance measuring stations. Air navigation aid facilities are usually operated by the Civil Aeronautics Administration. However, the frequencies which these facilities employ are available for licensing by the Commission at those locations where an applicant justifies the need for such service and the Government is not prepared to render this service. At the close of the fiscal year, 166 aeronautical navigational aid type facilities had been authorized.

FLYING SCHOOL RADIO STATIONS

Aircraft and ground flying school radio stations are used for communication pertaining to instruction to students or pilots while actually operating aircraft. There were 20 such stations authorized for operation.

FLIGHT TEST STATIONS

Aircraft and ground flight test stations are used for the transmission of essential communications in connection with the tests of aircraft or major components of aircraft. This operation involved 100 stations.

AERONAUTICAL PUBLIC SERVICE RADIO STATIONS

Aircraft public service radio stations are used for private telephonic communications between individuals aboard aircraft in flight and persons on the ground using land-line facilities. The aeronautical public service station connects with the nation-wide land-line telephone system through the facilities of public coast stations.

4. PUBLIC SAFETY RADIO SERVICES

POLICE RADIO SERVICE

The Police Radio Service, the oldest of the Public Safety Radio Services, is intended primarily to provide for the radiocommunication needs of police departments; however, the Commission, realizing that there are instances where a police radio system serving the smaller communities may also be used advantageously to provide for the needs of other departments, has extended the scope of service to include the transmission on a secondary basis of messages essential to other official activities of the licensee pertaining to the public safety.

Constantly expanding, the Police Radio Service now serves virtually every square mile of the country. There were 7,008 stations

authorized at the end of the fiscal year. To simplify the work related to the licensing of these systems, the Commission has adopted the practice of issuing one station license for each base station and all associated mobile stations. Therefore, to estimate the number of transmitters actually used in the police service it is necessary to reappraise the number of stations given above. Experience gained in making statistical surveys in the past indicates that on an average there are 12 mobile stations for each base station. So it may be presumed that the 7,000 licensed stations cover the operation of 85,000 mobile stations.

The successful completion of an intensive search for a complement of frequencies with suitable propagation characteristics to enable the Territory of Alaska to establish and intercommunicate between police radio stations located throughout the entire Territory was completed when the Commission on November 14, 1951, allocated the frequency 5135 kilocycles for use by fixed police radio stations in Alaska with radiotelephone emission.

The relatively long distances between population centers, the very meager landwire facilities and extreme weather conditions posed a communication problem which differs quite radically from the usual situation in the United States where the service area of a station normally extends over distances of a few miles and networks of these stations can be connected by teletype circuits or radio stations using medium high radio frequencies of the order of 2 megacycles. At the very outset it was clear that all frequencies with suitable propagation characteristics were already in use throughout the Territory and the United States. Only after a frequency-by-frequency study of all radio stations—both military and non-Government—and by shifting a number of military stations to other frequencies was it possible to clear the use of the frequency 5135 kilocycles in Alaska. This frequency along with 2442 kilocycles and 7480 kilocycles which were previously cleared for the police service of the Territory of Alaska are used to maintain communication between 11 fixed stations scattered throughout the Territory and mobile stations patroling the highways connecting its cities.

Heretofore intercommunication between Federal Government stations and stations in the Public Safety Radio Services has been possible only when each party installed receivers tuned to the other's frequency, or, alternatively, the Federal Government installed under the authority of a general regulation appearing in an Executive Order of the President a transmitter tuned to the frequency of the Public Safety Radio Station.

In order to provide means for even closer coordination between Public Safety stations and Government stations, the Commission,

after consulting with other Federal agencies through the Interdepartment Radio Advisory Committee, amended Part 10 of its rules, effective May 15, 1952, to permit assignment of frequencies to Public Safety stations which are assigned under Executive Order of the President to Federal Government stations upon an appropriate showing that such assignment is necessary for intercommunication with Government stations or required for coordination with Federal activities.

By permitting the shared use of frequencies by Federal Government stations and Public Safety stations, the agencies involved have greater latitude in the preparation of their plans to cope with any particular problem that may arise.

Many police systems have during the year installed auxiliary equipments at dispersed locations in connection with their civil defense preparation. Such installations increase the assurance that these vital communications will perform satisfactorily in the event of a widespread emergency and enhance the ability of police departments to accomplish the greatly expanded job which will result from such an emergency and the full activation of the civil defense activity.

FIRE RADIO SERVICE

The Fire Radio Service may be used by all governmental agencies except the Federal Government. Other organizations such as volunteer fire departments and commercial companies established to provide a fire-fighting service may also obtain license upon proof of their responsibility for fire protection in a particular area.

This service is primarily designed to provide communication from fire headquarters to mobile units of fire apparatus on call and between such mobile units on the fire scene including hand carried transmitters and receivers used by firemen frequently inside of a burning structure. Increasing use, however, is being made of several secondary provisions of the service, the more important being one way transmissions from headquarters to receivers in the homes and places of business of volunteer firemen giving the address and details of a fire call so that they may proceed directly to the fire as well as intercommunication between various fire headquarters for mutual aid and civil defense preparedness.

This service continues to grow steadily. For the second consecutive year the number of stations has increased over 50 percent. At the end of the fiscal year 764 fire stations were authorized to operate an estimated 12,000 radio transmitters.

FORESTRY-CONSERVATION RADIO SERVICE

Forestry-Conservation radio stations are used primarily by State governmental departments for fire protection of forest areas and

other conservation activities. A small number of municipalities and counties have obtained licenses to cover stations used to communicate with State-operated forestry stations so that in time of emergency the fire fighting facilities of the cities may be used to supplement the State-owned equipment. This form of coordinated operation occurs primarily in the New England and West Coast States where forest areas and population centers are interwoven.

This service provides an extremely rapid, flexible, and reliable means of communication that cannot be obtained in any other way. In practice, fire wardens stationed in the fire towers detect and locate the exact position of the fire by triangulation methods. Upon receipt of a report of the existence of a fire, field crews with radio equipped mobile vehicles and fire fighting apparatus are rushed to the scene of the fire. Here men carrying small, lightweight transceivers approach the actual fire and make an on-the-spot appraisal of what is needed to extinguish the fire. Their report is usually relayed by the nearby mobile stations to headquarters where it can receive immediate attention.

Prompt action in extinguishing fires is an absolute must. So important is time that many States use aircraft to drop men and equipment by parachute at the scene of the fire. By such methods it oftentimes is possible to put the fire out without additional aid. If more men and equipment are needed, the man on the ground uses his radio to report his needs to the aircraft or nearby base station.

During the fiscal year ending June 30, 1952, the number of stations grew to 2,070, operating an estimated 16,000 radio transmitters.

HIGHWAY MAINTENANCE RADIO SERVICE

The Highway Maintenance Radio Service is restricted to States, Territories, possessions, and other governmental subdivisions including counties, cities, towns, and similar governmental entities.

The use of radio by highway departments has proved to be so effective that the prompt location and dispatching of road-clearing equipment to clear road obstructions such as wrecked automobiles, fallen rocks, road and bridge washouts has proved to be an inestimable service to the motoring public. By equipping the mobile highway vehicles with radio it is possible to direct their operation very closely to obtain the maximum service. Through the use of radio, many licensees have been able to demonstrate that the total cost of such installations is recovered in 1 to 2 years through improved supervision and utilization of the road construction equipment and personnel.

The Highway Maintenance Radio Service—established in 1949—reached a total of 555 stations at the end of the fiscal year 1952.

SPECIAL EMERGENCY RADIO SERVICE

The Public Safety Services described previously are intended primarily to provide radio communication for governmental agencies to aid them to discharge their official duties. On the other hand, the Special Emergency Radio Service is intended to provide emergency communication for individuals and companies who provide an emergency service such as beach patrols, public ambulance companies, and physicians normally practicing or operating in remote areas where other communication facilities are not available. Other classes of eligibles are persons operating in remote locations where other communication facilities are not available, organizations established for relief purposes in emergencies and which have a disaster communication plan, school bus operators, and communication common carriers.

Physicians and ambulance services received the greater part of the licenses issued; however, a more significant and undoubtedly equally important increase has occurred in the group of organizations which are setting up disaster relief systems in their civil defense plans in the Special Emergency Radio Service. Many municipalities are engaged in organizing radio communication networks using special emergency stations to provide intercommunication with the regularly established public safety stations and to connect designated civil defense locations where supplies and assistance will be available. At the close of the fiscal year 670 stations were authorized.

The Commission on April 18, 1952, issued a notice of proposed rule-making involving a major revision to the rules governing the Special Emergency Radio Service. Experience gained while administering the present rules showed a need for clarification and a broadening of the eligibility provisions. A study of the comments and recommendations filed by interested parties is under way and final action is expected in the near future.

STATE GUARD RADIO SERVICE

State Guard Radio Service may be used only by State military organizations under State directions. These stations are used primarily for the transmission of emergency communication relating to the public safety and the protection of life and property. In addition, these stations may be employed during drill and training period to develop proficiency in the use of the equipment and more efficient organization. Seventy-six State Guard stations had been licensed by the close of the fiscal year.

During the year the Commission maintained close liaison with licensee groups in the Public Safety Services through representation at a number of national meetings of the services involved as well as through attendance at Government called meetings in Washington.

The importance of these services such as Police, Fire, and Forestry has placed this activity of the Commission in the very middle of civil defense planning in every area of the country. The increasing volume of work in connection with the expansion and integration of Public Safety Radio Systems into the civil defense picture is reaching proportions which cannot be satisfactorily handled with the available personnel.

5. AMATEUR RADIO SERVICE

The Amateur Radio Service is the area in the field of radio development and operation reserved as a training ground for future radio experts and technicians and for persons who desire to engage in radio operation as a hobby. It is one of the oldest radio services and many authorities on radio can attribute present success in various communication fields to an earlier interest in amateur or "ham" radio operation.

Eligibility in this service is based upon United States citizenship and ability to pass prescribed amateur operator examinations in International Morse Code, radio theory, operation and laws, treaties and regulations to the extent that they relate to amateur radio operation. Existing rules provide six graduated classes of amateur operator licenses for which examinations are progressively more difficult. Eligibility for the two higher grade licenses requires certain experience under one or more of the lower grade licenses.

The Amateur Radio Service is open to any United States citizen regardless of age, race, or sex. Communications may be local, or long distance, including communication with amateurs in various foreign countries. Many persons participating in this service develop outstanding ability in one or more of the various phases of the art of radio communication. Through the exercise of their respective skills in designing, developing, constructing, and experimenting with radio equipment, developing communication techniques, and by providing scientific observation, as well as the handling of third party messages, the radio amateurs have continued, through the past year, to demonstrate that the privileges they have been granted are well justified.

As of June 30, 1952, there were some 113,092 amateur radio station licenses and 110,968 amateur operator licenses in effect, an increase of approximately 22,500 and 22,200, respectively, during the year. The number of amateur stations remains slightly higher than the number of amateur operators as a result of many of the latter being licensees of more than one amateur station, either as trustee-licensees of stations used by amateur radio clubs, or by military units, or as owners of personal stations at more than one address. The number of these additional stations is balanced somewhat by a corresponding number of amateur operators who do not have amateur station licenses due,

principally, to being in the armed forces or otherwise unable to locate an amateur station at a permanent address.

The popularity of the new Novice Class license, issuance of which commenced July 17, 1951, is reflected by the fact that 12,827 such licenses were issued in somewhat less than 1 year. A total of 3,615 new Technician Class licenses were issued during the same period. The number of Extra Class licenses at the close of business on June 30, 1952, was over 900. This class of license first became available on January 1, 1952.

Despite the enviable record of self-policing on the part of amateur licensees, it was necessary for the Commission to issue a number of citations in cases of frequency deviation or other infractions of its rules. The Commission also suspended the licenses of 11 amateurs involved in more serious violations of rules, and revoked four licenses. In addition to the licenses revoked, it was necessary to designate three applications for hearing. In the first of these cases (docket 9955), the applicant filed a petition asking that his application for renewal of license be considered on the basis of information already in the Commission's files. The petition was denied. In the second case (docket 10114), a hearing was held beginning June 17, 1952, and the case is now pending decision. A third application, for a new Novice Class license, is scheduled for hearing.

Several important changes were made in the amateur rules during the past year. By far the most important change was the adoption on June 26, 1952, of new rules to govern the use of amateur radio stations and operators in providing civil defense communications. This new service is known as the Radio Amateur Civil Emergency Service (RACES). These rules, which will become effective August 15, 1952, divide Part 12 into two subparts of which the first includes all present rules governing amateur radio service and the second comprises new rules prescribing requirements for the use, under a separate or additional authorization, of amateur radio stations for civil defense communications. The rules are limited in their force and effect to the period of the present national emergency as proclaimed by the President on December 16, 1950.

Persons now holding amateur radio licenses can apply for this additional authorization but must furnish proof that the operation proposed would be under and in accordance with approved civil defense plans. A station in this service may be comprised of one or several transmitters. Stations are to operate together in so-called networks which will be under the direction of a civil defense official called the Civil Defense Radio Officer. A communications plan, approved by the State civil defense organization having jurisdiction of the particular area to be served and by the Federal Civil Defense Administration,

is essential to the establishment of a network. Stations in this service may intercommunicate or may exchange messages with stations in other services, including stations operated by the United States Government. Communications may relate to any phase of civil defense work whether it be practice tests and drills or communications directly concerning safety of life, preservation of property, maintenance of law and order, or related emergencies. Unless the present national emergency intensifies to the extent that normal amateur communication must be suspended, operation of stations in this service must be upon a shared basis with normal amateur operation on the same or adjacent frequencies.

Other changes in the amateur rules during the year include the provision of a procedure whereby persons who held an amateur license on or before April 1917, may qualify for the Extra Class operator license without additional examination; exemption in the case of persons holding the Conditional Class license from the requirement of reporting for reexamination upon change of residence and station to a new site within an area where regular examinations are held, and elimination of the requirement for the filing of an application for modification of license in the case of persons residing, temporarily, at a location other than that specified in the station license.

Several changes were made in respect to frequencies available for use of amateur radio stations and emissions which may be used with such frequencies. These changes provided additional space in the frequency bands 3500–4000 kilocycles and 14,000–14,350 kilocycles for operation with narrow-band frequency and phase modulation for radiotelephony and deletion of the frequency band 14,350–14,400 kilocycles from those available for use of amateurs in order to conform with the Table of Frequency Allocations set forth in the International Telecommunications Convention (Atlantic City, 1947). At the same time, and in accordance with the same Table of Frequency Allocations, the Commission opened up a new frequency band: 21,000–21,450 kilocycles for use of amateurs. However, in making the new frequencies available for such operation the only emission provided was A1, or radiotelegraph, and rule-making concerning classes of amateur operators, emission, bandwidth, and other particulars of operation in the new band is now pending.

In addition to the foregoing rule amendments, the Commission extended for another year the provisions under which an amateur serving overseas in the armed forces of the United States is exempt from the showing that he actually operated an amateur radio station during the last year of the license period in order that a renewal of his license may be granted.

During the year, the Commission received somewhat conflicting petitions in respect to providing for frequency-shift (Type F–1 emis-

sion) for radioprinter (teletype) operation on frequencies in the band 7000–7300 kilocycles. Also a petition was received for amendment of rules to provide for frequency-shift keying (Type F–1 emission) on all amateur frequencies below 27 megacycles for radioteleprinter and other similar operation. Rule-making was instituted in which it is proposed to provide more frequency space for frequency-shift keying; permit some radiotelephone communication in the frequency band 7000–7300 kilocycles; provide more frequency space for Novice Class operators; revise rules relating to station identification; and prescribe standards to be observed in radioteleprinter operation. The extent to which these proposals are adopted will depend largely upon the comments made by interested amateurs.

The Commission also proposes to eliminate certain restrictions in respect to operation in the amateur frequency bands 3800–4000 kilocycles and 14,200–14,300 kilocycles to the extent that holders of Conditional or General Class licenses at present are not permitted to operate in those bands with radiotelephony. If adopted, this amendment would open up additional frequency space, formerly reserved for holders of the Advanced and Extra Classes of licenses, to persons holding General and Conditional licenses. At the time the Commission initiated this proceeding, it denied a petition from the American Radio Relay League requesting that the Commission continue to issue new Advanced Class licenses after December 31, 1952, which is the cut-off date for issuing such new licenses.

Interference to the reception of television broadcasting continues to be a matter of concern to the Commission and to amateurs throughout the United States. The Commission is continuing to conduct studies with a view to clarifying individual responsibilities in cases where the operation of amateur stations causes interference to TV reception; however, definite standards have not yet been adopted for this purpose.

The Commission's field engineers, individual amateurs, and amateur committees have accomplished outstanding results in clearing many interference cases. Upon investigation, a great number of cases attributed to amateur operation have been found to be due to other causes. In a majority of cases where the interference was due to an amateur station, the inherent sensitivity of TV receivers to frequencies outside the TV channels has been the fault. Usually, simple filtering and shielding applied to the TV receiver has eliminated the interference. In most cases where the radiation of spurious and harmonic emissions by an amateur transmitter in the TV channels has caused interference, the amateurs have been able to satisfactorily eliminate such interference.

More widespread international communication was made possible for American amateurs during the past year by the fact that the Neth-

erlands Antilles, which formerly prohibited amateur radio stations, revived amateur operation and notified interested administrations that the exchange, internationally, of amateur communications between its amateurs and those in foreign countries is no longer prohibited. Also, the exchange of third party amateur communications with persons residing in the Republic of Cuba was approved in a formal agreement concluded between the United States and that country.

Radio amateurs, traditionally, have contributed generously of their time and equipment in any emergency or disaster, and it appears that the contributions made by them in this respect may have been greater in the last fiscal year than in any previous year. Most notable was the work done by amateurs following tornadoes in the States of Arkansas, Tennessee, and Kentucky during the period March 21 to 23, 1952. In Arkansas, which was hardest hit, the towns of Dierks, England, Georgetown, Searcy, and Bald Knob were badly damaged and the town of Judsonia was completely swept away by the storm. Wire lines were down or inoperative and radio amateurs worked heroically for several days and nights furnishing communications in the stricken area. Their work consisted of handling messages on behalf of the American Red Cross, United States Post Office, National Guard, Weather Bureau, Salvation Army, the Governor, and many individuals. It is reported that town officials set up a routine priority system for the handling of these amateur messages and persons wishing to send communications were required to file them at desks set up for that purpose. Medical and Red Cross communications received priority. In all, several hundred amateurs participated in this emergency, both in the disaster area itself and in supporting roles in adjacent areas.

On November 25, 1951, six mobile amateur radio stations of the Birmingham, Ala., Amateur Radio Club assisted at the wreck of two crack passenger trains on the Southern Railroad near Woodstock, Ala. Other stations of the Alabama Emergency Net acted as control and contact points for the purpose of arranging hospital accommodations, notifying relatives of victims of the crash, and handling inquiries about persons on the train.

Amateur radio is said to have been the only communication out of Pierre, S. Dak., during a sleet and snow storm which completely isolated that city and surrounding area during the period December 6 to 9, 1951. Local amateurs handled train information, dispatched telephone crews, called doctors, relayed weather reports between Civil Aeronautics stations, sent news dispatches, and relayed many personal inquiries and messages.

The value of amateur radio to physically handicapped persons cannot be overestimated. The Commission receives many reports of its therapeutical and morale-building influence on the lame and infirm.

Blind persons find amateur radio a satisfying diversion, and the Commission has licensed a considerable number of such amateurs. Amateurs confined to beds or wheel chairs are able to converse with other amateurs all over the world, handle messages for third parties, and even participate in amateur civil-defense activities.

6. DISASTER COMMUNICATIONS SERVICE

The Disaster Communications Service is a relatively new radio service, still in the developmental stage. This service is designed to provide essential communications in connection with disasters or other incidents which involve loss of normally available communication facilities or which require temporary establishment of communication facilities in addition to those normally available. The frequency band allocated to this service, 1750 to 1800 kilocycles, was set aside for disaster communications pursuant to a proposal made in the Commission's Report of Proposed Frequency Allocations Below 25,000 kilocycles of May 21, 1945, although the service was not actually established until March 21, 1951.

Any person eligible, under the provisions of the Communications Act, to hold a radio station license is eligible for a license in the Disaster Communications Service, provided it is shown that the station will constitute an element of a bona fide communications network organized, or to be organized, and operated in accordance with a locally or regionally coordinated disaster communications plan. Stations of the United States Government may also operate in this service if authorized to do so by their controlling agencies.

When there is no impending or actual disaster, stations in this service may communicate only with respect to drills and practice sessions and conduct necessary equipment tests. When there is an emergency or disaster they may be used for all communication necessary or essential to relief work, including the transmission of communications concerning personal matters in the case of individuals directly affected by the disaster.

Emphasis during the past year has been on civil defense matters, and, for the most part, applications submitted and disaster communications plans filed related to use of the stations for civil defense purposes. On June 30, 1952, 71 Disaster Communications station licenses were outstanding. These licenses covered 123 portable and 212 mobile transmitters. These were held by only 15 licensees of which one, the Civil Defense Council of Winnebago County, Ill., had 32 different stations throughout the county. The State of Connecticut holds licenses for 12 separate stations operated at strategic locations within that State. About a dozen applications for licenses in this service

were returned without action, chiefly because the communications plans submitted were incomplete or inappropriate.

Several amendments of the Disaster Communications Service rules were adopted during the year. For the most part, these amendments were made necessary by the Commission's action in Docket 9233 wherein provision was made for establishment of a new Radiolocation Service which, together with certain other frequencies specified in the Commission's order in that proceeding, would be permitted to use the frequencies allocated to Disaster Communications Service upon a time-sharing basis under which stations in the Radiolocation Service would have priority during daytime hours and Disaster Communications stations would have priority during nighttime. Operation of either service on these frequencies at times other than those specified would have to be by special arrangement among the licensees, except that stations in the Disaster Communications Service have priority on any of these frequencies when needed for an actual or imminent disaster. The new rules require that liaison be maintained among licensees of these two classes of stations in order to insure orderly use of the frequencies to be shared.

7. INDUSTRIAL RADIO SERVICES

As the result of a hearing held in June 1951, a new radio service—the Industrial Radiolocation Service—was added to the Industrial Radio group effective February 1, 1952. This brings the total number of radio services in this group to eight; namely, the Power, Petroleum, Forest Products, Motion Picture, Relay Press, Special Industrial, Low-Power Industrial, and Industrial Radiolocation Services. In these services, radio facilities are made available to various industrial enterprises which for safety purposes or other necessity, require radio communication in order to function efficiently.

The number of persons licensed in this group continued to grow steadily throughout the year and the problem of administering an expanding service without a corresponding increase in Commission personnel is becoming serious. As in the past, industry advisory committees functioning in the power, petroleum, and forest products groups have continued to render substantial aid to the Commission in the matter of frequency assignments by supplying applicants with information relative to selection of frequencies.

One important rule amendment, effective September 24, 1951, provided for a new class of station designed to receive communications from one mobile station and automatically retransmit them to other mobile stations. Termed a "mobile relay station," it is used in radio systems which require mobile-to-mobile communications over extended

distances. As the result of a hearing held May 24, 1952, the Commission has determined that persons who establish eligibility for mobile relay stations should be permitted to use their vehicular frequency for control stations to actuate the relay from fixed points. However, it was decided that the basis for mobile relay station eligibility, as established September 24, 1951, should not be extended to include situations where the relay would be used solely for extending the range from a fixed point to mobile units.

A major problem of increasing importance as these services expand is that of providing sufficient frequency space in an already crowded spectrum. One of the means by which this congestion may be relieved is the possibility of "channel-splitting," which the Commission is currently considering. By increasing the number of frequency channels in this manner interference would be alleviated. Some of the congestion may also be relieved by developments in the 450-megacycle band in which operations are expected to increase as equipment becomes available.

Of increasing importance is the group of frequencies above 890 megacycles more commonly known as the microwave portion of the spectrum available for communication between fixed points. All operations on these frequencies are on a developmental basis at this time; however, the Commission is making preparations for permanent rules to govern the use of these frequencies. In this connection, the pending theater television hearing which involves a request for a portion of the industrial microwave spectrum for a nation-wide competitive theater television service is of interest.

POWER RADIO SERVICE

Established to provide communication facilities for persons engaged in generating, transmitting, collecting, purifying, storing, or distributing by means of wire or pipeline, electrical energy, or natural gas, water, or steam for use by the public, the Power Radio Service has continued to grow at a rapid rate.

As in past years, the principal use of radio in this service is by utility companies in connection with the restoration of service after interruption due to fire, storm, flood, accident, or other mishap, and for routine maintenance activities necessary in the efficient operation of the industry.

Radio systems for communication between fixed points have been increasing in number in this service. These are used primarily for multichannel radio circuits for central control of load dispatching. In the past these systems have been operated in the 72–76 megacycle band in localities where interference would not be caused to television reception. An expanding TV service, however, is making it more

difficult to find areas where interference-free operations can be had. This has led to increasing interest in the use of frequencies above 900 megacycles for these purposes. Fixed point-to-point systems in this service are often integrated with mobile service systems and are used to control mobile operations.

PETROLEUM RADIO SERVICE

Established to provide communication facilities for persons engaged in locating, producing, collecting, refining, or transporting by means of pipelines, petroleum or petroleum products including natural gas, the Petroleum Radio Service has expanded at a phenomenal rate.

Petroleum is usually found in remote areas, far removed from communication facilities where the installation of wire lines would be impractical and economically infeasible. In such areas radio is necessary to maintain communications between well site, field headquarters, and mobile units during drilling operations. This provides close supervision of an extremely hazardous and costly operation. Other uses are in connection with studies of subsurface structures in geophysical exploration and mobile radio systems to maintain or restore pipeline service.

In the production and pipeline phases, the industry is relying more heavily than ever before upon their radio facilities which are used to control the flow in pipelines and for pipeline maintenance. For this use the industry is looking more and more to frequencies in the microwave regions which are available for point-to-point use. Several microwave systems, each more than 1,000 miles in length are in operation with others under construction or being planned. Generally, such fixed point-to-point systems are of the multichannel type and provide voice, as well as signaling and telemetering circuits. Many of these systems are integrated with mobile service systems and place load dispatching and maintenance control in centralized locations for the most efficient operation.

FOREST PRODUCTS RADIO SERVICE

Established to provide communication facilities for those persons engaged in actual woods operations such as tree logging, tree farming, or related woods operation, the Forest Products Radio Service has experienced a slow but steady growth from the two experimental systems operating in 1947, to the more than 25,000 transmitters presently authorized in a total of 123 forestry operations. The greatest usage of this service continues to be located in the Pacific Northwest where approximately 77 percent of the total radio operations are located; approximately 18 percent being located in the southern United States.

Radio is used in connection with fire detection, prevention and suppression, and to promote safer, more efficient and more economical logging operations.

MOTION PICTURE RADIO SERVICE

Established to provide communication facilities for persons engaged in the production or filming of motion pictures intended for public showing, use of the Motion Picture Radio Service has not increased materially the past year. Radio is used to coordinate and expedite the shipment of supplies to remote locations, and to coordinate the filming of action scenes taking place on outdoor sets.

RELAY PRESS RADIO SERVICE

Established to provide communication facilities for persons engaged in the publication of a newspaper or in the operation of an established press association, the Relay Press Radio Service is used principally by the metropolitan dailies. The chief use of this service is in the dispatching of reporters and photographers to the scene of a newsworthy event. At least one large newspaper is considering the installation of facsimile and teletype equipment to facilitate the filing of copy and photographs from the scene of a news event.

SPECIAL INDUSTRIAL RADIO SERVICE

Established to provide communication facilities for persons engaged in an industrial activity primarily devoted to production, construction, fabrication, manufacturing, or similar processes, the Special Industrial Radio Service is available to a great variety of users.

Since the demand for facilities, especially in urban areas, has been so great that there are not enough frequencies to provide service for everyone desiring it, an applicant must show that: (1) the activity for which radio is desired is being conducted in a remote and sparsely settled region; or (2) the operation is a construction project of a public character; or (3) the use of radio is required within the yard area of a single plant. Upon showing that operation outside the yard area is required to maintain plant security in the interest of the national defense, operation may be authorized outside the physical limits of a plant.

Typical operations include directing the movement of rail cars and trucks within steel mill yards and within large manufacturing plants; large ranching and farming operations; fruit and vegetable processing plants; mining operations, including pospecting; and contractors engaged in public construction, such as highways, bridges, tunnels, and dredging operations.

LOW-POWER INDUSTRIAL RADIO SERVICE

Established to provide communication facilities for any person engaged in a commercial enterprise or industrial activity, the Low-

Power Industrial Radio Service is available to all business organizations whenever they have a need for short-distance mobile-to-mobile communication to promote more efficient and safe conduct of their operations. This service provides for the operation of any desired number of units, which are limited to very low power with restrictions on the design of the antenna in order to restrict the range to short distances and thereby allow a large number of transmitters to operate on the same frequencies. All stations authorized in this service are classified as mobile stations.

INDUSTRIAL RADIOLOCATION SERVICE

Designed to be used in connection with geological or geophysical activities, the new Industrial Radiolocation Service is available to persons engaged in a commercial or industrial enterprise who have a substantial need in connection therewith to establish a position, distance, or direction by means of radiolocation devices for purposes other than navigation. Since, at this time, there does not appear to be any single system of radiolocation which is satisfactory in all respects, all operation is authorized on a developmental basis to encourage the development of radiolocation techniques.

As a result of a hearing held June 4, 1951, the frequency band 1750–1800 kilocycles was made available on a shared basis with the Disaster Communications Service for use within 150 miles of the shoreline of the Gulf of Mexico for radio-location purposes in connection with the offshore exploration for petroleum only. Since radio-location activities will be predominantly a daytime operation and drills in the Disaster Communication Service will take place chiefly at night, it is anticipated that interference can be controlled by a time-sharing arrangement. There are two radio-location systems presently authorized in the Gulf of Mexico area and applications for eight additional systems have been received.

In addition to the frequency band 1750–1800 kilocycles, several bands of frequencies in the UHF and SHF portions of the spectrum are also available for radio-location purposes.

8. LAND TRANSPORTATION RADIO SERVICES

The Land Transportation Radio Services provide radio communication facilities for the Nation's land transportation carriers. Included in this group are the Railroad, Urban Transit, Taxicab, Intercity Bus, Highway Truck, and Automobile Emergency Radio Services.

The year marked a continuation of the expansion in radio facilities authorized for these transportation services. The rate of expansion was not, however, as great as that which followed the finalization of the Land Transportation Radio Service Rules in 1949.

The major problem in these services, as they continue to expand, is that of providing sufficient frequency space in an already crowded spectrum. All frequencies available are shared with other users and in many of the more crowded urban areas, where the greatest use of these frequencies occurs, several licensees may share a single channel. It is anticipated that at least a temporary relief of this congestion will occur with the opening up of the 450-megacycle mobile band. As equipment for operation in this band becomes more readily available and as the results of operations now in progress are made known, it is expected that a considerable number of new users will look to this band for their radio facilities. As in other services, the Commission is also considering "channel-splitting" as a means of increasing the number of radio channels without adding additional spectrum space.

RAILROAD RADIO SERVICE

The Railroad Radio Service provides communication facilities for persons regularly engaged in offering to the public a passenger or freight transportation service by railroad common carrier. The use of radio by the Nation's railroads has continued to progress on a sound, conservative, carefully planned basis. Radio is continuing to provide these carriers with an economical and dependable means of end-to-end train, of train-to-wayside station, and wayside-to-wayside station communication. It has improved the efficiency and safety of yard and terminal operations under conditions of unfavorable weather, and has been of substantial aid in preventing accidents and reducing repair time.

The use of radio in railroad communication continues to be centered on main-line operations. This has resulted in increased interest being shown in the portion of the spectrum above 890 megacycles known as the microwave region where several frequency bands are available for fixed point-to-point systems. Microwave radio links are beginning to come into use by the railroads to replace sections of their wire line communications systems which are particularly susceptible to storm damage, as well as to provide communications in areas where the installation of wire lines is impractical.

URBAN TRANSIT RADIO SERVICE

The Urban Transit Radio Service provides communication facilities for persons regularly engaged in furnishing scheduled common carrier public passenger land transportation service along fixed routes primarily within urban or suburban communities. The use of radio facilities provides efficient dispatching of passenger-carrying vehicles during rush hours and other critical traffic periods; aids in dispatching supervisory cars and repair trucks to reroute lines during fires, traffic jams, and other emergencies.

TAXICAB RADIO SERVICE

The Taxicab Radio Service provides communication facilities for persons regularly engaged in furnishing to the public for hire a non-scheduled passenger land transportation service.

Since the Taxicab Radio Service was established on a regular basis in 1949, it has grown at a phenomenal rate and in the larger cities most of the operating frequencies are shared by two or more companies. For this reason, the coordinated assignment of frequencies is of primary importance if all users are to obtain maximum benefits from the use of radio. As in years past, the Commission has actively encouraged cooperation and coordination of frequency assignments among the various taxicab operators and their frequency coordinating committees.

Of considerable importance is the increased interest shown in the 10 channels available in the region around 452 megacycles. With the availability of equipment to operate on these frequencies, several new developmental operations have been authorized in four large cities. Use of these frequencies appears to offer this service a chance to continue its growth.

INTERCITY BUS RADIO SERVICE

The Intercity Bus Radio Service provides communication facilities for persons regularly offering to the public a scheduled common carrier passenger service over public highways and primarily between established city terminals. Municipal bus and street-car companies generally operate in the Urban Transit Radio Service.

Radio communication systems of the type required by the larger bus operators necessitate detailed coordinated planning and, due to the extensive nature of the operations and the extensive areas of coverage, are necessarily quite costly. For this reason, bus operators are proceeding slowly in the installation of radio systems and the service has experienced a rather slow growth.

HIGHWAY TRUCK RADIO SERVICE

The Highway Truck Radio Service communication facilities are for persons regularly engaged in the operation of trucks on a route basis outside of metropolitan areas. This service may not be used by persons operating truck routes or offering a distribution service within a single metropolitan area. The chief purpose of this service is to provide for trucks operating in more remote areas where other means of communication are not available.

AUTOMOBILE EMERGENCY RADIO SERVICE

The Automobile Emergency Radio Service provides communication facilities for associations of owners of private automobiles which give emergency road service and for private garages operating emergency

road service vehicles. This service is intended to be used in dispatching cars and trucks to assist stalled or disabled automobiles. The use of radio has proven effective in controlling emergency vehicles which keep the masses of automobiles moving on crowded highways and contribute toward public safety. The greatest use of this service occurs in large cities where the single 35 megacycle frequency is heavily loaded. Two additional frequencies are available in the region around 453 megacycles; however, the limited availability of suitable equipment has prevented extensive use of these frequencies. It is anticipated that widespread use will be made of these higher frequencies as equipment becomes available.

9. CITIZENS RADIO SERVICE

Established to provide a radiocommunication service in the frequency band 460–470 megacycles for the individual citizen who is not eligible for any of the other established radio services, the Citizens Radio Service is available to any citizen of the United States who is at least 18 years of age.

One important rule amendment during the year added a new frequency in the 27 megacycle region to this service and provides for a new class of station which may be used to control objects such as model planes, model boats, and garage doors by radio. Another amendment clarified the rules with respect to eligibility to provide for duly authorized state and local civil defense activities in this service.

As in past years, the absence of readily available low-cost radiotelephone equipment designed to operate in the 460–470 megacycle region has been the chief handicap to the expansion of this service, although the number of authorizations increased 150 percent in the past year. Use of the new 27 megacycle frequency is increasing at a rapid rate, and it is anticipated that operation in the 460–470 megacycle band will be extended in the near future since operating equipment now appears to be commercially available.

10. ENFORCEMENT UNIT

This was the second year of operation of a separate Enforcement Unit in which is centralized all enforcement and compliance activities of the Safety and Special Radio Services Bureau. In addition to this activity, the unit is assigned another important function, which is not indicated by its title, namely, that of legal adviser to the Chief of the Bureau. It become apparent during the year that the time of the staff of this unit must be about equally divided between enforcement matters and the special legal, policy, and legislative problems which require attention in the office of the Chief of the Bureau. In this connection, the attorneys of the unit are also

available for consultation with attorneys of the Bureau's divisions and for legal advice to the chiefs of these divisions on important problems arising in their offices.

During fiscal 1951, the processing of routine violation reports referred to the unit had been standardized to a large degree, and procedures were adopted appropriate to the handling of a large number of recurring cases. In the past year, however, it was found necessary to put in effect additional standards for screening violation matters before they are referred to this unit. The very small staff available for actual enforcement proceedings, plus the volume of irregularities resulting from a rapid increase in the number of outstanding licenses, indicated that the public interest would best be served by a more selective approach and the application of more severe penalty measures in individual cases.

An important segment of such enforcement activities concerned the imposition of monetary forfeitures under title III, part II, of the Communications Act. Vessels and their masters who violate the compulsory radio provisions of title III, part II, by reason of the navigation of the ship in the open sea contrary to these provisions incur forfeiture liabilities prescribed by the act. The Commission is empowered to remit or mitigate the forfeitures so incurred. In the course of the year, notifications of forfeiture liability were made against 20 ships and their masters. This figure exceeded the total number of forfeiture cases previously handled in the years since the forfeiture provision was enacted into the law in 1937. Ten of these cases were disposed of and closed during the year and 10 are still pending. A total of $9,975 was collected. There are indications that the prompt application of these penalties, even though many were mitigated for nominal sums, has been effective in improving the general level of compliance.

The changing economic and technical factors affecting the variety of safety and special radio services necessitates a constant scrutiny and reappraisal of the policies and regulations under which these services are administered. The unit was required to devote a considerable portion of its time during the year to a study of proposed changes in policy or regulation with the purpose of advising the Chief of the Bureau as to their legal adequacy and their effect in regard to consistency of administration within the Bureau and throughout the Commission.

11. STATISTICS

Number of Stations in Safety and Special Radio Services

Stations in the Safety and Special Radio Services (exclusive of experimental, which are treated in a separate chapter) exceeded 212,000 at the close of the fiscal year. This represents a net increase

of almost 35,000 during the year, as compared to a net increase of about 23,000 during fiscal 1951. The number of authorized stations in the various services are shown in the following table:

Class of station	June 30, 1951	June 30, 1952	Increase or (decrease)
Aeronautical Services:			
Carrier aircraft [1]	2,173	1,921	(252)
Private aircraft [1]	28,113	27,678	(435)
Public service aircraft [1]	546	364	(182)
Aeronautical land and fixed [2]	1,310	1,183	(127)
Civil air patrol [2]	1,483	798	(685)
Airdrome control	56	59	3
Aeronautical navigational	155	166	11
Flight test	86	100	14
Flying school	18	20	2
Aeronautical utility mobile	88	105	17
Aeronautical advisory	33	209	176
Total	34,061	32,603	(1,458)
Marine Services:			
Ship	26,681	32,229	5,548
Ship radar	1,625	1,958	333
Coast	116	107	(9)
Alaskan coastal	344	379	35
Alaskan fixed public	517	568	51
Maritime radiolocation [3]		22	22
Maritime fixed [3]		64	64
Other	261	173	(88)
Total	29,544	35,500	5,956
Public Safety Services:			
Police	6,198	7,008	810
Fire	432	764	332
Forestry-Conservation	1,728	2,070	342
Highway maintenance	408	555	147
Special emergency	313	670	357
State guard	50	76	26
Total	9,129	11,143	2,014
Land Transportation Services:			
Railroad	604	757	153
Urban transit	111	110	(1)
Intercity bus	31	34	3
Taxicab	3,152	3,639	487
Highway truck	270	341	71
Automobile emergency	85	146	61
Citizens	560	1,401	841
Total	4,813	6,428	1,615
Industrial Services:			
Power	5,016	6,065	1,049
Petroleum	2,416	3,787	1,371
Forest products	453	685	232
Special industrial	1,451	2,760	1,309
Low power industrial	150	259	109
Relay press	35	51	16
Motion picture	21	23	2
Agriculture	9	9	0
Radiolocation land	0	41	41
Total	9,551	13,680	4,129
Amateur and Disaster Services:			
Amateur	90,585	113,092	22,507
Disaster communications	2	71	69
Total	90,587	113,163	22,576
Grand total	177,685	212,517	34,832

[1] The apparent decrease in the number of aircraft stations resulted from the deletion of approximately 9,141 expired licenses from the files. There were actually 7,970 new aircraft licenses issued during fiscal 1952.

[2] The apparent decrease in the number of aeronautical and Civil Air Patrol stations resulted from reclassifying certain aeronautical as CAP stations, and continuing the consolidation of CAP-station licenses into single-system licenses for an entire CAP wing. There were actually 332 new CAP-system licenses issued during fiscal 1952.

[3] These classes were grouped with "other" in the seventeenth annual report.

NOTE.—A station is defined as a separate license or construction-permit authorization. For example, 65 mobile units operating on 1 license are counted as 1 station.

Applications Received in Safety and Special Radio Services

More than 141,000 applications for stations in the Safety and Special Radio Services were received during 1952. This represents an increase of more than 34,000 applications compared with the previous year, an increase of almost 32 percent. The number of applications received in each service is shown in the following table:

Class of station	Received 1951	Received 1952	Increase or (decrease)
Aeronautical Services:			
Aircraft [1]	19,602	18,252	(1,350)
Ground	2,830	3,761	931
Total	22,432	22,013	(419)
Marine Services:			
Ship [2]	18,757	16,893	(1,864)
Ship radar	1,196	1,084	(112)
Coast [3]	177	113	(64)
Alaskan coastal [3]	503	255	(248)
Alaskan fixed public [3]	647	318	(329)
Maritime radiolocation [4]		26	26
Maritime fixed [4]		161	161
Other	307	165	(142)
Total	21,587	19,015	(2,572)
Public Safety Services:			
Police	6,104	6,823	719
Fire	801	881	80
Forestry-Conservation	1,337	1,548	211
Highway maintenance	555	571	16
Special emergency	447	910	463
State guard	90	140	50
Total	9,334	10,873	1,539
Land Transportation Services:			
Railroad	550	870	320
Urban Transit	78	105	27
Intercity bus	11	70	59
Taxicab	3,602	4,414	812
Highway truck	416	591	175
Automobile emergency	125	220	95
Citizens	192	246	54
Total	4,974	6,516	1,542
Industrial Services:			
Power	4,467	4,786	319
Petroleum	2,661	3,671	1,010
Forest products	656	800	144
Special industrial	2,378	4,039	1,661
Low power industrial	160	383	223
Relay press	37	54	17
Motion picture	29	14	(15)
Agriculture	14	19	5
Radiolocation land	0	105	105
Total	10,402	13,871	3,469
Amateur and Disaster Services:			
Amateur	38,469	69,175	30,706
Disaster Communications	11	90	79
Total	38,480	69,265	30,785
Grand total	107,209	141,553	34,344

[1] A campaign by the Commission's Field Engineering and Monitoring Division in 1951, against unlicensed operation abnormally increased aircraft applications during 1951, resulting in an apparent decrease in 1952.

[2] The decrease in ship applications for 1952 may be attributed to increasing the license term from 3 to 4 years in 1948, granting modified licenses for full term instead of unexpired term, and use of one license to cover both east and west coasts.

[3] The licenses for these classes of stations are renewable in odd-numbered years, decreasing the number in 1952.

[4] These classes were grouped with "other" in the seventeenth annual report.

Number of Transmitters in Safety and Special Radio Services

More than 537,000 transmitters are authorized to operate in the Safety and Special Radio Services. Of this total over 137,000 were land or fixed stations and 400,000 were portable or mobile units. These figures were compiled on the basis of records as of January 1, 1952.

The breakdown follows:

Class of station	Land or fixed station transmitters	Mobile station transmitters	Total transmitters
Aeronautical Services:			
Aircraft [1]		39,307	39,307
Ground [1]	2,716		2,716
Total	2,716	39,307	42,023
Marine Services:			
Ship		32,229	32,229
Ship radar		1,958	1,958
Coast	141		141
Alaskan coastal	376		376
Alaskan fixed public	450		450
Other	135		135
Total	1,102	34,187	35,289
Public Safety Services:			
Police	4,878	76,231	81,109
Fire	511	10,461	10,972
Forestry-Conservation	1,489	12,588	14,077
Highway maintenance	414	3,845	4,259
Special emergency	387	1,347	1,934
State guard	53	87	140
Total	7,732	104,559	112,291
Land Transportation Services:			
Railroad	534	8,640	9,174
Urban transit	70	1,669	1,739
Intercity bus	28	387	415
Taxicab	3,317	122,037	125,354
Highway truck	237	2,984	3,221
Automobile emergency	116	1,439	1,555
Citizens [2]		3,000	3,000
Total	4,302	140,156	144,458
Industrial Services:			
Power	4,186	46,946	51,132
Petroleum	2,787	12,406	15,193
Forest Products	414	4,781	5,195
Special industrial	1,245	14,370	15,615
Low-power industrial		2,305	2,305
Relay press	21	428	449
Motion picture	11	173	184
Agriculture	10		10
Radiolocation	2	9	11
Total	8,676	81,418	90,094
Amateur and Disaster Services:			
Amateur [2]	113,092		113,092
Disaster Communications [3]	67	335	402
Total	113,159	335	113,494
Grand total	137,687	399,962	537,649

[1] This count includes an estimated 750 land and 9,000 mobile Civil Air Patrol stations.
[2] Estimated.
[3] As of June 30, 1952.

CHAPTER V—RADIO BROADCAST SERVICES

1. TELEVISION (TV) BROADCAST SERVICE
2. STANDARD (AM) BROADCAST SERVICE
3. FREQUENCY MODULATION (FM) BROADCAST SERVICE
4. NONCOMMERCIAL EDUCATIONAL FM BROADCAST SERVICE
5. FACSIMILE BROADCAST SERVICE
6. BROADCAST AUXILIARY SERVICES
7. BROADCAST RULE CHANGES
8. STATISTICS

1. TELEVISION (TV) BROADCAST SERVICE

TELEVISION "FREEZE" LIFTED

The Commission on April 11, 1952, brought to a conclusion its television rule-making proceedings (dockets 8736 et al.) by adoption of the Sixth Report and Order amending the Commission's rules and regulations and engineering standards concerning the Television Broadcast Service.

Chronology of TV Proceedings.—These proceedings were instituted on May 6, 1948, by a "Notice of Proposed Rule Making" designed to amend the table of television channel assignments for the United States, set out in Section 3.606 of the Commission's rules and regulations. During the hearing held pursuant to this notice, evidence was introduced which indicated the necessity for a revision of the rules, regulations, and standards with respect to the technical phases of the TV broadcast service.

On September 30, 1948, the Commission issued a report and order, commonly referred to as the "freeze order." In general, this order provided that no new or pending applications for the construction of new TV broadcast stations would be acted upon; and that new and pending applications for modification of existing authorizations would be considered on a case-to-case basis with action thereon depending on the extent to which the requested modification affected the issues in the proceeding. In adopting the "freeze order," the Commission pointed out that a national TV assignment plan and the rules, regulations and standards must be based upon, and must reflect, the best available engineering information. The Commission noted that it could not continue to make assignments under the existing table since

the evidence presented at the hearing raised serious questions concerning the validity of the bases upon which the table was constructed. Also, the granting of additional TV authorizations would make more difficult any revisions in the table made necessary by subsequent changes in the rules and standards.

The general phase of the TV proceeding was initiated on July 11, 1949, by the issuance of a "Notice of Further Proposed Rule Making." Attached to this notice were four appendixes: Appendix A set forth the Commission's proposals to amend its TV rules, regulations, and engineering standards; Appendix B set forth the methods and assumptions upon which the Commission's figures and values specified in Appendix A were based; Appendix C contained the Commission's proposed revision of its table of TV channel assignments throughout the United States and the Territories; and Appendix D contained illustrative assignments for Canada, Mexico, and Cuba indicating the manner in which it might be necessary to take into account the use of channels by these countries.

In September 1949, the Commission began its hearings on the color TV issues in this proceeding and its first and second color reports were issued on September 1, 1950, and October 11, 1950, respectively.

Subsequently, on October 16, 1950, the Commission began hearing the testimony of interested parties who had filed comments concerning the general issues set forth in Appendixes A and B of the notice of July 11, 1949. These extensive hearings continued until January 31, 1951, when the Commission recessed in order to study the record and determine whether it should proceed with the hearings on Appendixes C and D in the light of the evidence adduced on the general issues.

On March 22, 1951, the Commission issued its "Third Notice of Further Proposed Rule Making." In Appendixes A and B of the Third Notice, the Commission set forth its conclusions based on the hearing record developed with respect to the general issues. The Commission at the same time afforded interested parties the opportunity to object to the conclusions in Appendixes A and B by filing statements of objections.

Appendixes C and D of the third notice contained a new proposed table of TV channel assignments for the United States and the Territories and new illustrative assignments for Canada and Mexico. Pursuant to paragraph 12 of this notice, parties were permitted to file comments and oppositions to such comments as might be filed by other persons with respect to the proposals in Appendixes C and D.

On June 21, 1951, the "Third Report" was adopted in the proceedings. In this report, the Commission decided that it could not, at that time, take action to effect a partial lifting of the "freeze." On July 12, 1951, the Commission issued its "Fourth Report and Order" which allocated to TV broadcasting the frequency band 470–

500 megacycles. On July 25, 1951, the Commission adopted its "Fifth Report and Order" amending its "freeze order" to permit consideration on a case-to-case basis of applications by existing licensees and permittees for special temporary authority to increase power within certain defined limits.

On July 25, 1951, the Commission issued an order cancelling the oral hearings which were scheduled to take place pursuant to the third notice. This order provided all parties with an opportunity to file sworn statements or exhibits fully setting out their position in support of the pleadings they had filed. In addition, parties were permitted to submit sworn statements or exhibits directed against statements or exhibits offered by other parties and to file briefs with respect to any matter of fact or law raised by the evidence. The Commission also provided for oral presentations in addition to the submission of sworn statements or exhibits with respect to any issue which in the Commission's judgment could not be satisfactorily considered and disposed of without oral presentation.

More than 1,500 comments, sworn statements and briefs were filed and considered in this portion of the proceedings.

Final TV Report.—The Sixth Report and Order lifted the "freeze" on the authorization and construction of new TV stations, assigned 70 UHF channels (between 470–890 megacycles) in addition to the 12 VHF channels (between 54–216 megacycles) which were in use, promulgated a new nation-wide table of TV frequency assignments making available 2,053 assignments in 1,291 communities throughout the United States, its Territories and possessions, and provided for a change of frequency for 30 of the then existing 108 VHF stations. The new combined VHF-UHF assignment table supplants the old VHF assignment table which made available about 400 assignments in 140 metropolitan areas.

In establishing the assignment table, consideration has been given to the fact that TV signals do not respect international boundaries. The channel assignments were accordingly worked out in negotiations with Canada and Mexico with respect to communities in the border areas. The conferences and negotiations with Canada and Mexico have been carried on over a period of years. Such conferences and negotiations were conducted under the auspices of the Department of State with the continued technical advice and assistance of the Commission.

The report and order establishes a new class of TV stations—noncommercial educational television stations—and makes channel assignments in 242 communities for use exclusively by these stations. Forty-six channels have been assigned to communities designated as "primarily educational centers." Of the channels assigned for educational use 80 are VHF and 162 are UHF.

The report and order further amended and recodified the rules governing television broadcast stations. These rules implement the decisions adopted in the Commission's report and order. The amended rules provide that TV stations will operate in accordance with new tables of minimum and maximum power. Power can, however, vary with antenna height. Maximum effective radiated power on VHF Channels 2–6 is fixed at 100 kilowatts, on VHF Channels 7–13 at 316 kilowatts, and on UHF Channels 14–83 at 1000 kilowatts.

Three geographic zones were established with channels assigned in accordance with minimum mileage separations designated for each zone. Cochannel assignment separations of 170 miles for VHF channels, and 155 miles for UHF channels, have been established for Zone I which encompasses the entire States of Massachusetts, Rhode Island, Connecticut, New Jersey, Maryland, Pennsylvania, Delaware, District of Columbia, Ohio, Indiana, Illinois, and parts of Maine, New Hampshire, Vermont, New York, Virginia, West Virginia, Michigan, and Wisconsin.

Minimum cochannel assignment separations of 190 miles for VHF channels, and 175 miles for UHF channels, have been established in Zone II, which includes the Territories and possessions, and the entire States of Kentucky, Tennessee, North Carolina, South Carolina, Missouri, Iowa, Minnesota, Arkansas, Kansas, Nebraska, Oklahoma, North Dakota, South Dakota, Utah, Idaho, Arizona, New Mexico, Montana, Wyoming, Nevada, Colorado, Oregon, Washington, and California, and parts of Maine, New Hampshire, Vermont, New York, Virginia, West Virginia, Georgia, Alabama, Mississippi, Louisiana, Michigan, Wisconsin, and Texas.

Minimum cochannel assignment separations of 220 miles for VHF channels, and 205 miles for UHF channels, have been established in Zone III, which includes Florida and parts of Georgia, Alabama, Louisiana, Mississippi, and Texas.

The report and order fixed July 1, 1952, as the date for beginning the processing of applications for new TV stations and established temporary procedures which determine the order of processing.

Temporary TV Processing Procedure.—Basically, this procedure is designed to bring their first TV service to the greatest number of people in the shortest time, and to provide for a local TV station first in those places now without one. To achieve this end, two processing groups have been established.

Group A includes all cities situated 40 or more miles from the nearest television station in operation as of April 14, 1952. Cities are arranged in the order of their 1950 population, with the cities having the larger population being processed first. Group A also includes applications from those presently operating stations that are required to change frequency pursuant to the Sixth Report and Order.

Group B is somewhat more complicated and seeks to achieve two aims. The first is, as stated above, to provide for a local station in those places now without such a station, and the second is designed to stimulate the growth of TV broadcasting in the UHF band. To accomplish these ends, first priority in Group B is given to cities within 40 miles of a single existing TV station but with no local station and with only UHF channels assigned for use in those cities. The cities in this category and in the following categories are arranged in the order of their 1950 populations. Second priority is given to cities having one or more local TV stations, but in which only UHF channels remain open for assignment to new stations. Third priority is given to cities in which there are no local TV stations operating but which are within 40 miles of only one operating TV station, and in which both VHF and UHF channels are available for assignment. Fourth priority is given to cities in which there is a single operating local TV station but which are located 40 or more miles from any other operating TV station, and fifth priority is given to cities located less than 40 miles from two or more operating TV stations arranged in an order determined first by the number of operating TV stations within 40 miles and within each such group by population.

Lowest priority is given to applications from existing TV stations to make changes in existing facilities (other than those stations required to change frequency by the Sixth Report) and to applications for license to cover a post-freeze construction permit.

Under the temporary processing procedure, applications for new TV stations in the Territories and possessions and for new educational television stations are processed as received.

The distance of 40 miles used in establishing the above procedure is not a determination of the service area of all TV stations but is considered to be a reasonable figure for this purpose. It is planned to have the processing of applications in Groups A and B progress simultaneously as far as is practicable.

OTHER TELEVISION DEVELOPMENTS

The past year witnessed an awakening on the part of the viewing public that TV is not only a medium of entertainment and information but that it gives people an opportunity to observe their Government in action. The several hearings and investigations that were conducted before TV cameras and the widespread use of this medium by political aspirants demonstrated the impact of video broadcasting on the national scene. Millions of people saw televised for the first time an actual explosion of an atomic bomb, a large Chicago fire, the aftermath of aircraft and railroad disasters, and other big news events. Elaborate plans were made for TV coverage of the national political conventions.

During the year a number of TV stations obtained authority pursuant to the Commission's Fifth Report and Order to increase power and elevate their antennas, thereby bringing new or improved service to millions of people. With the lifting of the "freeze" and the prospect of a resumption of application processing after July 1, 1952, applicants and prospective applicants reviewed their proposals and began the preparation of new applications and amendments. Of particular significance was the sudden surge of interest in UHF television. Manufacturers of transmitters announced that suitable equipment would be available and receiver manufacturers demonstrated that they had solved the problems of UHF reception.

EXPERIMENTAL TELEVISION SERVICE

Experimental TV stations are authorized on showing that a program of research and experimentation will be conducted which promises substantial contribution to the advancement of video broadcasting. Such experimental licenses are held by several manufacturers of TV equipment and are used for the development and testing of improved transmitters, antennas, etc.

Authorizations have also been issued to applicants desiring to collect engineering data with respect to the propagation characteristics of radio signals in the TV bands and as a source of signal in connection with the development and testing of receivers, particularly UHF receivers and color receivers. Several of the existing TV broadcast stations have been authorized to transmit color signals on an experimental basis employing the so-called compatible color system being developed by the NTSC (National Television System Committee).

Experimentation has continued with various scrambled or subscription types of TV transmission including "Phonevision", "Skiatron Subscribervision" and a new system know as "Telemeter" which employs a coin-operated device to unscramble the picture. In addition, authorizations have been issued to permit limited experimentation with various systems of "satellite" and "booster" operation intended to improve TV reception in areas beyond the normal range, and for the operation of equipment by prospective applicants to test the suitability of various sites for their proposed stations.

TELEVISION BROADCAST AUXILIARY SERVICE

The Television Broadcast Auxiliary Service includes three classes of stations: (1) Television pickup stations which are portable or mobile and are used to relay program material for on-the-spot broadcasts of special events, parades, sporting contests, fairs, conventions, and important news happenings, and are also employed to provide temporary circuits from the scenes of recurring events such as weekly religious services, regularly scheduled sporting events, con-

certs, etc.; (2) television STL (studio-transmitter link) stations are fixed installations used to provide a suitable circuit for the relaying of program material between the studios and the transmitter of TV stations; (3) television intercity relay stations are also fixed installations and are used to interconnect TV broadcast stations for network operation in places where suitable common carrier coaxial or microwave relay facilities are not available.

During the past year this service has grown steadily, not only in the number of authorizations but in more frequent and varied use. Perhaps the most elaborate use of TV pickup facilities was planned in connection with the national political conventions and the ensuing campaigns. TV pickup facilities were used during the year to bring to the nation-wide public newsworthy events, as well as innumerable events of local interest to local audiences. TV broadcasters are coming to rely more and more heavily on this service for greater diversity in programing.

2. STANDARD (AM) BROADCAST SERVICE

While the increase in the number of AM authorizations was not as great as during the year previous, the use of the standard broadcast band continued to grow. At the close of the fiscal year, the number of anthorized AM stations totaled 2,420, which was a net increase of 45 for the year. Of this number 2,333 held licenses.

Fewer AM authorizations were canceled during fiscal 1952 than during either of the previous 2 years. The number of applications received for new AM stations or major changes in the facilities of existing stations, while on the down grade, still kept around the 300 mark.

In spite of a decrease of about 40 percent in number of applications for new AM stations or changes in facilities filed during the year, the trend of the last several years toward an over-all reduction in the number of such pending applications was reversed this year with about a 6-percent increase in this figure between the beginning and end of the year. The backlog of AM applications "awaiting processing" (i. e., nonhearing status) increased over 100 percent. This was intimately related to the 22-percent reduction in force suffered by the Aural Facilities Division.

On June 18, 1952, the Commission proposed to add the channel 540 kilocycles to the standard broadcast band. This is in conformity with international agreement which specifies the AM broadcast band for use in the United States at 535 to 1605 kilocycles instead of the present 550 to 1600 kilocycles.

CLEAR CHANNELS

No action was taken during the year on the so-called Clear Channel Hearing (docket 6741) and Daytime Skywave Hearing (docket 8333),

because of the pendency of the new North American Regional Broadcasting Agreement (mentioned hereafter).

These hearings, the records of which have been closed for several years, are directed primarily to the question as to how to make best use of the clear channels of the standard broadcast band assigned by international agreement for use by the United States. The clear channels are necessary for AM broadcast service to rural areas since channels which are shared by a multiplicity of stations, the so-called regional and local channels, are bound to be cluttered with interference, particularly during nighttime propagation conditions, to such an extent that each station can serve only out to a relatively short distance where its signals are strong enough to override the interference. Rural areas beyond these distances thus receive no service on such channels and must rely on the 10 kilowatt to 50 kilowatt clear channel stations.

At present the Commission's rules provide a maximum of 50 kilowatts power for these and, on 25 clear channels which are assigned for use by "Class 1–A" stations, they prohibit the nighttime operation of a second station. An improvement in the extent and technical quality of rural reception on these channels may be accomplished by permitting higher power, by permitting one or two additional stations, or by some combination of these.

NORTH AMERICAN REGIONAL BROADCASTING AGREEMENT

This treaty, which is intended to regulate the assignment and operation of standard broadcasting stations in North America in such a manner as to minimize the unavoidable interference between AM stations, was signed on November 14, 1950, by representatives from all countries of the region save Mexico and Haiti.

The new agreement was negotiated to replace an interim agreement, which extended and modified the provisions of the First North American Regional Broadcasting Agreement. The interim agreement expired on March 29, 1949, after the Government of Cuba refused to agree to its further extension. Subsequently, Cuba made a number of new station assignments and changes in existing assignments which would not have been permitted under the terms of the expired treaty, and which resulted in serious interference to stations in the United States. The other North American countries, by more or less informal agreement, continued to conduct their radio relations in general accordance with the terms of the first NARBA.

The new agreement provides for the adjustment of differences between Cuba and the United States, and upon its entry into force the interference now being caused by Cuban stations should be substantially reduced. Mainly because of the inability of other countries to satisfy Mexico's requirements for additional clear channels, that country refused to sign the new agreement.

To become effective, the NARBA requires ratification by three of its major signatories or adherents. Cuba ratified the agreement in December 1951. In this country the signed document was submitted by the President to the United States Senate in February 1951, where it was referred to the Committee on Foreign Relations. However, through two sessions of the Congress the pressure of other business precluded action by this committee looking toward ratification of the agreement.

As time passed and it appeared that a considerable delay was in prospect before the NARBA might enter into force, it became necessary to take steps to insure the Commission actions in the AM broadcast field would not result in situations making difficult or even impossible the bringing into force of the new NARBA. This was particularly important in that the unratified agreement was the only one which Cuba would recognize, and embodied provisions and priorities in some cases differing sharply from previous agreements. It furthermore contains a stipulation that actions taken by any participant prior to entry into force of the agreement which are not consonant with its provisions are subject to objection by another participant at such time as the agreement becomes operative.

Because of such considerations, the Commission, on October 26, 1951, issued a public statement of policy to be followed by it with respect to the new NARBA, accompanied by orders providing for appropriate changes in its rules to implement this policy. In essence, these rule changes provide that, pending action with respect to ratification and entry into force of the 1950 NARBA, no application would be granted for new or changed facilities when such facilities, in their effect on stations in signatory countries, are inconsistent with the terms of the new NARBA. With respect to nonsignatory countries, it was provided that, on an interim basis and so long as each such country continues to provide protection for assignments in the United States, no assignments would be made in this country which would result in objectionable interference to stations in a nonsignatory country (i. e., Mexico and Haiti). The criteria in such cases would be in general the standards applying at the expiration of the interim agreement.

With respect to the future relations with Mexico in the standard broadcast field it should be noted that during the past year preliminary negotiations have taken place looking toward the conclusion of a bilateral agreement with that country.

3. FREQUENCY MODULATION (FM) BROADCAST SERVICE

During the year 21 new commercial FM broadcast stations were authorized. All of these grants were to licensees of standard broadcast stations, 11 of which operate with daytime only AM facilities.

The desire to obtain nightime coverage prompts daytime-only standard broadcast operators to request FM facilities. A number of licensees of AM broadcast stations operating unlimited time have found that nighttime coverage is severly limited by interference from other stations and nighttime FM coverage is far superior. Of the 21 new FM stations authorized this past year, 13 were to Southern States. FM's static-free reception has made it especially attractive in that area where static, particularly in the summer months, makes satisfactory AM reception in many places either difficult or impossible.

At the end of the 1952 fiscal year 648 commercial FM broadcast station authorizations were outstanding, whereas at the end of the 1951 fiscal year there were 659 authorizations outstanding. This decrease of only 11 authorizations contrasts rather sharply with decreases of 73, 133, and 155 for the 1951, 1950, and 1949 fiscal years respectively.

Extensive FM promotional campaigns were carried out by the National Association of Radio and Television Broadcasters and the Radio-Television Manufacturers Association during the year in North Carolina, Wisconsin, and Washington, D. C., and similar campaigns are planned for other parts of the country. The increase in FM receiver ownership, the FM promotional campaigns, and the recognition of the superior reception characteristics of FM apparently all have a part in slowing down the rate of decrease in FM authorizations.

Another factor which has undoubtedly been responsible for a number of FM licensees keeping their stations on the air has been the granting of special experimental authorizations for remote control of the FM transmitting equipment. Authorizations have been granted to 22 FM stations for such operation, 14 of which are presently operating by remote control and the remainder making such installations. It is required that the operator on duty at the remote control position have complete control over the transmitter and that meter indications of its operation be available to him. Three of the 22 authorizations are for remote control by radio circuits; the remainder use wire lines for complete operations. The distances between the transmitting equipment and the remote control positions vary from different floors in the same building to approximately 80 miles. In the cases of radio control, multiplexing on the radio circuit carrying programs to the remotely controlled transmitter provides for transmitter control while multiplexing on the controlled transmitter provides a means for sending metering information to the remote control position.

A petition submitted by the National Association of Radio and Television Broadcasters occasioned the Commission's issuance of a

notice of proposed rule making concerning reduction of the operator requirements at AM and FM broadcast stations employing nondirectional antennas and operating with powers of 10 kilowatts or less, and remote control of such stations.

Although an FM station, for microphone to transmitter output, must be capable of transmitting a band of frequencies from 50 to 15,000 cycles, network programs are transmitted over lines having considerably less than this range and transcriptions used at the stations do not provide this frequency coverage. The ordinary FM receivers available to the public cannot receive transmissions covering this frequency range. A considerable number of FM listeners have had custom high-fidelity installations made in their homes to realize the full frequency range capabilities of FM broadcasting. A number of FM broadcast stations throughout the country program a considerable amount of classical music primarily for these listeners and others who prefer this type of music. Indications are that the audience of FM listeners who prefer classical music broadcasts is quite large.

4. NONCOMMERCIAL EDUCATIONAL FM BROADCAST SERVICE

In contrast to the decrease in the number of authorizations for commercial FM broadcast stations during the past few years, noncommercial educational FM broadcast service is continually expanding. During the past year 10 new authorizations were granted. One station which had been in operation ceased operations and its authorization was deleted. This is the first case of an operating station in this service going off the air. At the close of the fiscal year 104 authorizations were outstanding.

Forty-two stations in the noncommercial educational FM broadcast service operate with transmitters rated at 10 watts or less. This provides satisfactory coverage within a few miles of the station and is quite suitable for coverage of a college campus and the small towns in which many are located. One manufacturer of FM transmitting equipment who apparently had a surplus of 250-watt FM transmitters on hand modified them for 10 watt operation for use in the educational FM service.

Due to the close proximity of the FM educational band (88 to 92 megacycles) to TV channel 6 (82–88 megacycles), it has been found necessary to change the frequencies of some educational FM stations to the high end of the band in order to eliminate interference they caused in their vicinities to reception of distant television stations operating on channel 6. Although the interference was primarily due to a lack of selectivity in the TV receivers and the weakness of

the TV signals available and could be eliminated in many cases by installation of suitable wave traps, frequencies were changed in order to maintain good public relations for the stations. One station, WFIU in Bloomington, Ind., operating with an effective radiated power of 33 kilowatts, caused so much interference and had so many objections raised locally to its operation that it was granted authority to operate on a frequency in the higher portion of the commercial FM band (92 to 108 megacycles).

The Wisconsin State Radio Council has received authorizations for two additional educational FM stations to complete its eight-station network. This network will provide coverage to substantially the entire state. A number of plans for proposed State-wide networks of educational stations were submitted to the Commission; however, except in the case of Wisconsin, none of these plans has been carried beyond construction of one station. The University of Michigan, which operates educational FM station WUOM in Ann Arbor, Mich., was given the equipment of an FM station which ceased operations in Flint, Mich. The equipment was modified to operate on a frequency in the educational FM band and the station is now rebroadcasting the programs of WUOM in Flint.

5. FACSIMILE BROADCAST SERVICE

FM broadcast stations may transmit facsimile either on a simplex or a multiplex basis. (Simplex facsimile can only be transmitted when no aural program is being broadcast; multiplex facsimile can be transmitted at the same time an aural program is being broadcast.) Licensees of FM broadcast stations have shown very little interest in facsimile. At the present time only six FM broadcast stations hold authorizations for transmission of multiplex facsimile, five of which stations operate in the Rural Radio Network, New York State.

6. BROADCAST AUXILIARY SERVICES

In addition to the Television Broadcast Auxiliary Service previously mentioned, there are three other types of broadcast auxiliary services.

REMOTE PICKUP BROADCAST SERVICE

Remote Pickup Broadcast stations are operated by broadcast station licensees for on-the-spot coverage of events that occur outside a regular studio such as parades, sporting events, conventions, religious services, concerts, and various news events. Portable or mobile equipment is employed ranging from a fraction of a watt "handi-talkie", that can be carried in one hand, to transmitters installed in

automotive vehicles, boats, or aircraft and capable of transmitting signals over relatively long distances. Most of this equipment is self-powered and can be used to provide emergency communication facilities in the event of disruption of normal circuits resulting from floods, storms, or other disasters. Elaborate use of remote pickup facilities was planned in connection with the national political conventions and the ensuing campaigns.

This service continues to grow steadily and broadcasters are using it more and more to provide a diversity of programing that would not be possible through the use of less flexible wire-line circuits.

BROADCAST STL SERVICE

Broadcast STL (Studio-transmitter link) stations provide a means whereby licensees may locate their broadcast transmitters at favorable sites which may be inaccessible to ordinary wire lines. They are used to provide a radio circuit for the transmission of program material from the studio to the transmitter of standard and FM broadcast stations. During the past year this service has continued to meet the special needs of standard and FM broadcast stations.

DEVELOPMENTAL BROADCAST SERVICE

Developmental Broadcast stations are licensed experimentally to conduct research and experimentation looking toward the advancement of the broadcast art, primarily in radiotelephony. This service is the aural broadcasting counterpart of the Experimental Television Broadcast Service. The service is used extensively by manufacturers of aural broadcasting equipment for the development and testing of improved equipment and antennas. Operation is also authorized from time-to-time for the purpose of collecting engineering data with respect to propagation characteristics of radio signals in various portions of the radio spectrum used for broadcast or auxiliary broadcast purposes. During the past year this service continued to meet the needs of the radio industry in this respect.

7. BROADCAST RULE CHANGES

In addition to the significant revision of the rules affecting television reported at the beginning of this chapter, there were other rule changes, of which the following examples may be mentioned:

The Commission amended its rules relating to the consideration of AM applications in the light of the North American Regional Broadcasting Agreement (NARBA), Washington, 1950, and the existing relationship in the field of standard broadcasting between the United States and other North American countries. Its policy in this respect is outlined in previous reference to the NARBA in this chapter.

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The Commission amended its rules for AM, FM, and TV stations with respect to rebroadcasts. In so doing, it held that the Communications Act of 1934, as amended, does not sanction arbitrary refusal by a broadcast station of consent for rebroadcast of its programs by other stations, and that a refusal to permit a rebroadcast when based upon no reasons at all, or upon unreasonable grounds, may well constitute conduct going to the qualifications of a licensee to operate in the public interest. The amended rules require of each broadcast licensee an explanatory statement for each refusal of consent to a rebroadcast of its programs by another station. Upon petitions for reconsideration filed by National Broadcasting Company, Inc., Columbia Broadcasting System, Inc., and the National Association of Radio and Television Broadcasters, the Commission on June 30, 1952, stayed the effective date of the amended rules.

The Commission denied a petition of the Radio Commission of the Southern Baptist Convention and the Executive Board of the Baptist General Convention of Texas requesting the establishment of a new class of FM broadcast service for tax-exempt nonprofit organizations on the ground that no demand for such a service had been shown.

A section on political broadcasts was added to the rules for noncommercial educational FM broadcast stations to reflect provisions similar to those already in effect for other broadcast services.

The Commission made further announcements with respect to censorship by broadcasters of speeches by political candidates. In its Port Huron decision issued on June 28, 1948, the Commission ruled that under section 315 of the act a broadcaster has no authority to censor a broadcast by a political candidate, whether on the ground that the broadcast contains libelous and defamatory matter or for any other reason. The decision gave rise to uncertainty in the minds of some licensees as to the relationship between State libel laws and the prohibition against censorship in section 315 of the act. Inasmuch as more than 3 years have elapsed since the Port Huron decision and no action to clarify the matter has been taken by Congress or in the courts, the Commission announced that it would no longer accept the plea of doubt and uncertainty in the State of the law and licensees will hereafter be held strictly to account for compliance with section 315 of the act.

Authorization was given to the Engineers in Charge of District Headquarter Field Engineering offices to act upon broadcast licensees' requests for extension of authority for temporary operation without a modulation monitor, frequency monitor, or certain electrical meters, when such authority has been granted by the Chief of the Broadcast Bureau.

The rules concerning the filing of the "Annual Financial Report of Networks and Licensees of Broadcast Stations" (FCC Form 324) were modified to permit the filing of a single copy, instead of the former requirement for filing in duplicate, of this report. At the end of the year further modifications of the report form, looking to the simplification of preparation of the reports by the respondents, were in progress.

8. STATISTICS

BROADCAST AUTHORIZATIONS

As of June 30, 1952, there were more than 4,700 broadcasting authorizations outstanding. This was nearly 200 more than the year previous. A breakdown according to the different types of broadcast services follows:

Class of broadcast station	June 30, 1951	June 30, 1952	Increase or (decrease)
Standard (AM)	2,385	2,420	35
Frequency modulation (FM) [1]	659	648	(−11)
Television (TV)	109	108	(−1)
Television experimental and auxiliary	213	221	8
Noncommercial educational FM	95	104	9
International	40	40	
Remote pickup	1,043	1,175	132
Studio transmitter	42	44	2
Developmental	6	2	(−4)
Total	4,592	4,762	170

[1] Commercial facsimile broadcasting is now authorized over FM facilities.

GROWTH OF BROADCASTING

The growth of AM, FM, and TV broadcast services during the past 10 years is indicated in the following table showing the number of authorized and licensed stations at the close of each fiscal year:

	AM		FM		TV		Total	
	Authorized	Licensed	Authorized	Licensed	Authorized	Licensed	Authorized	Licensed
1943	912	911	48	37	6	6	966	954
1944	924	912	52	45	9	6	985	963
1945	955	931	53	46	25	6	1,033	983
1946	1,215	961	456	48	30	6	1,701	1,015
1947	1,795	1,208	918	48	66	6	2,779	1,352
1948	2,034	1,693	1,020	142	109	7	3,163	1,842
1949	2,179	1,963	865	377	117	13	3,161	2,353
1950	2,303	2,118	732	493	109	47	3,144	2,658
1951	2,385	2,248	659	534	109	81	3,153	2,863
1952	2,420	2,333	648	582	108	96	3,176	3,011

BROADCAST APPLICATIONS

	Pending June 30, 1951	Received	Disposed	Pending June 30, 1952
AM				
New stations	270	174	121	323
Change in facilities	235	128	149	214
Renewals	268	1,038	1,025	281
License	74	274	300	48
Transfers	77	484	489	72
Miscellaneous	76	574	591	59
Total	1,000	2,672	2,675	997
FM[1]				
New stations	12	37	38	11
Change in facilities	38	90	98	30
Renewals	70	312	294	88
License	75	110	124	24
Transfers	12	109	103	18
Miscellaneous	16	150	151	15
Total	186	808	808	186
TV				
New stations	415	337	35	717
Change in facilities	30	100	57	73
Renewals	4	136	100	40
License	15	7	15	7
Transfers	7	18	13	12
Miscellaneous	3	35	32	6
Total	474	633	252	855
All other				
New stations	33	276	243	66
Change in facilities	10	102	64	48
Renewals	99	678	584	193
License	47	250	226	71
Transfers	39	173	145	67
Miscellaneous	2	92	87	7
Total	230	1,571	1,349	452
Grand total	1,890	5,684	5,084	2,490

[1] Includes noncommercial educational FM stations.

BROADCAST AUTHORIZATION DELETIONS

The number of broadcast authorizations deleted in fiscal 1952 was less than half the number for the previous fiscal year. Of the 72 deletions in 1952, 35 were AM, 36 FM, and 1 TV. This contrasts with 161 deletions—70 AM and 91 FM—the year previous. Monthly figures for 1952 were:

Month	AM	FM	TV	Monthly total
1951				
July	2	5	0	7
August	3	3	1	7
September	1	4	0	5
October	1	2	0	3
November	1	7	0	8
December	3	0	0	3
1952				
January	5	3	0	8
February	6	0	0	6
March	3	3	0	6
April	2	5	0	7
May	6	2	0	8
June	2	2	0	4
Year's total	35	36	1	72

BROADCAST RECEIVING SETS

Sets for the exclusive use of broadcast reception are not licensed or otherwise regulated by the Commission. At the close of the fiscal year industry estimated that more than 105,000,000 broadcast receivers were in use. Of this number, more than 18,000,000 were capable of TV reception and approximately 9,000,000 could receive FM broadcast. Many sets offer combination reception. The 1950 census reported 40,970,000 homes with radio sets, or 95.6 percent of all dwellings. Industry further estimates that 27,500,000 passenger cars are equipped with broadcast receivers.

BROADCAST INDUSTRY FINANCIAL DATA

In the calendar year 1951, the grand total revenues of the broadcasting industry (radio and television) reached nearly $700 million, the highest on record. Total revenues, which comprise revenues derived from the sale of time, talent, and program materials to advertisers, were reported at $686.1 million. Radio revenues increased from $444.5 million in 1950 to $450.4 million in 1951, while aggregate TV revenues of $235.7 million in 1951 were more than double the $105.9 million for 1950.

Broadcasting profits of $99.1 million in 1951 were two-thirds greater than those of 1950. The industry reported a profit from television broadcast operations for the first time in 1951, earning $41.6 million compared to a loss of $9.2 million in 1950. Earnings from radio broadcast operations dropped by 16 percent from $68.2 million in 1950 to $57.5 million in 1951. The decrease in earnings from radio operations was the result of a reported drop of almost 50 percent in the earnings of the networks coupled with a slight decline of about 4 percent in the earnings of individual radio stations. All profit figures are before payment of Federal income tax.

The following tables show the comparative calendar year 1950–51 radio and television financial data for the radio and television broadcast industries:

All networks and stations,[1] 1950–51

Item	1950	1951	Increase or (decrease)
	Millions	*Millions*	*Percent*
Total broadcast revenues	$550.4	$686.1	24.7
Radio	444.5	450.4	1.3
Television	105.9	235.7	122.6
Total broadcast expenses	491.4	587.0	19.5
Radio	376.3	392.9	4.4
Television	115.1	194.1	68.6
Broadcast income (before Federal income tax)	59.0	99.1	68.0
Radio[2]	68.2	57.5	(15.7)
Television[2]	(9.2)	41.6	

Footnotes on page 124.

Nation-wide networks only,[1] 1950–51

[Including owned and operated stations]

Item	1950	1951
Revenues:	*Millions*	*Millions*
Radio	$106.0	$99.0
Television	55.5	128.4
Total	161.5	227.4
Expenses:		
Radio	87.3	89.5
Television	65.5	117.4
Total	152.8	206.9
Income (before Federal income tax):		
Radio [2]	18.7	9.5
Television [2]	(10.0)	11.0
Total	8.7	20.5

( ) Denotes loss.

[1] Radio includes AM and FM broadcasting.

[2] Networks engaging in joint radio-TV operations have indicated that certain overhead expenses not readily allocable between radio and television, have been charged to radio. To the extent that this occurred, the above figures may understate radio income and overstate television income.

NOTE.—The 4 Nation-wide radio networks (ABC, CBS, MBS, and NBC) owned and operated a total of 18 stations in 1950 and 1951 and the 4 TV networks (ABC, CBS, DuMont, and NBC) owned and operated a total of 14 stations in 1950 and 15 stations in 1951.

FM broadcast revenues, income and investment, 1950–51

Item	1950		1951	
	Number of stations	Amount	Number of stations	Amount
FM broadcast revenues				
FM stations operated by:				
AM licensees:		*Millions*		*Millions*
Reporting no FM revenues [1]	420		381	
Reporting FM revenues	163	$1.4	179	$1.8
Non-AM licensees	86	1.4	66	1.2
Total FM stations	669	2.8	626	3.0
FM broadcast expenses				
FM stations operated by:				
Non-AM licensees	86	4.0	66	3.0
Industry total		(1)		(1)
Total FM broadcast income (before Federal income tax)				
FM stations operated by:				
Non-AM licensees	86	(2.6)	66	(1.8)
Industry total		(1)		(1)

( ) Denotes loss.

[1] In view of the difficulty in a joint AM–FM operation in allocating FM operation expense separately from AM station operation expense, licensees of such stations were not required to report FM station expense separately. As a result, FM industry totals for expense and income are not available. AM–FM licensees, however, were requested to report separately the revenues, if any, attributable to FM station operation if such data were readily available. In only a few instances did AM–FM licensees state they were unable to segregate the FM revenues.

TV broadcast revenues, income and investment, 1951

[In thousands]

Item	4 networks and their 15 owned and operated stations	93 other stations	Industry total
Revenues from network time sales	$72,871	$24,687	$97,558
Revenues from sale of time to national and regional advertisers and sponsors	17,513	42,220	59,733
Revenues from sale of time to local advertisers and sponsors	11,638	39,666	51,304
Total revenues from time sales	102,022	106,573	208,595
Commissions paid to representatives, etc	18,881	14,457	33,338
Incidental broadcast revenues:			
Revenues from sale of talent, etc	27,543	5,473	33,016
Furnishing material or service	8,368	6,624	14,992
Other incidental revenues	9,330	3,089	12,419
Total broadcast revenues	128,382	107,302	235,684
Total broadcast expenses	117,401	76,685	194,086
Total broadcast income	10,981	30,617	41,598
Investment in tangible broadcast property:			
Original cost	37,902	55,080	92,982
Depreciation to date	11,094	18,738	29,832
Depreciated cost	26,808	36,342	63,150

Radio [1] broadcast revenues, income and investment, 1950–51

[Income before Federal income tax, in thousands]

Item	4 Nation-wide networks and their 18 stations		3 regional networks and their 7 stations [2]		All other stations [3]		Industry total	
	1950	1951	1950	1951	1950	1951	1950	1951
Revenues from network time sales	$83,955	$75,593	$2,099	$2,893	$45,476	$43,548	$131,530	$122,034
Revenues from sale of time to national and regional advertisers and sponsors	17,598	15,273	1,383	1,115	99,844	103,170	118,824	119,559
Revenues from sale of time to local advertisers and sponsors	6,122	6,205	1,500	1,404	195,529	206,910	203,211	214,519
Total revenues from time sales	107,675	97,071	5,042	5,412	340,849	353,628	453,565	456,112
Commissions paid to representatives, etc	22,394	20,338	1,020	978	29,062	30,244	52,476	51,561
Incidental broadcast revenues:								
Revenues from sale of talent, etc	13,072	13,922	268	363	11,862	12,604	25,203	26,889
Furnishing material or service	4,039	4,495	2	16	5,851	6,534	9,893	11,045
Other incidental revenues	3,645	3,895	149	170	3,079	2,675	6,873	6,741
Total broadcast revenues	106,037	99,045	4,441	4,983	332,579	345,197	443,058	449,226
Total broadcast expenses	87,375	89,517	4,120	4,417	280,820	296,041	372,315	389,975
Total broadcast income	18,662	9,528	321	566	51,759	49,156	70,743	59,251
Investment in tangible broadcast property:								
Original cost	28,431	29,533	1,663	1,097	[4] 214,321	[4] 224,100	244,415	254,731
Depreciation to date	16,062	16,446	1,201	984	76,119	87,504	93,382	104,934
Depreciated cost	12,369	13,087	462	113	138,202	136,596	151,033	149,797

[1] Excludes independently operated FM stations, 86 in 1950 and 66 in 1951.
[2] Regional networks operated 8 stations in 1950.
[3] Includes 2,117 stations in 1950 and 2,175 stations in 1951.
[4] *Data available from 2,113 stations in 1950 and 2,161 stations* in 1951.

NOTE.—Figures may not add to totals due to rounding.

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CHAPTER VI—FIELD ENGINEERING AND MONITORING

1. GENERAL
2. MONITORING
3. DIRECTION FINDING
4. MONITORING SURVEYS
5. ENFORCEMENT THROUGH MONITORING
6. INTERFERENCE AND GENERAL MONITORING
7. INVESTIGATIONS
8. FIELD ENGINEERING
9. COMMERCIAL RADIO OPERATORS
10. INSPECTIONS

1. GENERAL

On March 2, 1952, the Commission announced the establishment of the Field Engineering and Monitoring Bureau, formed from the nucleus of the Field Engineering and Monitoring Division, the Commercial Operator Branch, the Experimental and Miscellaneous Branch and the Antenna Survey Branch which previously operated under the Office of the Chief Engineer. The new bureau comprises four divisions—the Field Operating Division and staff divisions for Monitoring, Engineering, and Inspection and Examination. The chief of the bureau was further provided with an administrative assistant and an attorney adviser.

The field engineers inspect radio stations of all types and serve notices for discovered discrepancies, conduct radio operator examinations and issue operator licenses to those found qualified; monitor the radio spectrum to assure that stations operate on their assigned frequencies with prescribed power; locate and close unauthorized transmitters; investigate complaints of interference to various radio services; obtain and correlate technical data for Commission use; furnish fixes and directional information to aircraft which are lost; and provide bearings and fixes on ships in distress. The bureau additionally processes data concerning proposed new or modified antenna construction to insure that no hazard to air navigation will result, and administers parts 15 and 18 of the Commission's rules and regulations pertaining, respectively, to Restricted Radiation Devices and Industrial, Scientific, and Medical Equipment. These activities are outlined in the ensuing sections of this chapter.

2. MONITORING

During the fiscal year the monitoring system operated with 19 monitoring stations consisting of 11 primary and 8 secondary stations. Sixteen of these are located in the continental United States, one in Hawaii, and two in Alaska. All stations are equipped with radio direction finders. Monitoring stations continued to "police" the ether but economy makes fewer engineers available for "around the clock" service.

Due to budget limitations, the Bay St. Louis, Miss., secondary station was reduced to only two engineers during most of the year, and at the year's end only one engineer operated the station in practically a "caretaker" status pending its closing.

3. DIRECTION FINDING

Direction finding continued to play an important part in monitoring activities. Long-range direction finder bearings are necessary for locating illegal or clandestine transmitters and sources of radio interference of an otherwise unidentifiable nature, such as spurious radiations and unmodulated carriers. The latter are usually unintentional, but constitute a serious interference problem nevertheless. Monitoring stations obtained a total of 83,196 bearings, which was a slight increase over the previous year's total of 81,919.

Direction-finder bearings were also obtained and "fixes" furnished in emergency situations involving lost or otherwise disabled ships and aircraft under the Commission's participation in the Air Sea Search and Rescue program. During the year, 138 requests were received in this category compared with 168 requests received in 1951. Instances of long-range bearing service ranged from bearings taken on lost balloons, sometimes mistaken for "flying saucers" and a menace to the airlanes, to bearings taken on a sheriff's patrol car lost high in the Sierras.

4. MONITORING SURVEYS

Monitoring stations engaged in numerous frequency surveys for occupancy data at the request of other agencies and other units of the Commission. The great bulk of this work related to the implementation plan of the Extraordinary Administrative Radio Conference (EARC), whereby 21 entire bands and 455 individual frequencies were monitored to the extent of over 9,000 kilocycles of survey coverage. It is estimated that approximately 1,000 mand-days were devoted to this work during the year.

In addition to the coverage obtained by specific monitoring surveys, much information was obtained and compiled from the bureau's active-station files which are maintained on a continuous basis from moni-

toring data submitted daily by monitoring stations as a product of their surveillance of the radio spectrum. Such monitoring surveys, although time consuming and exacting, are considered of such importance that they have been accomplished at the expense of other work. Due to the magnitude of the job of moving the frequency of hundreds of stations to conform with the Atlantic City Conference Frequency Tables, it is expected that this type of monitoring work will continue during the coming year.

An example of an extensive monitoring and direction finding project performed during the year at the request of a military agency was one where several thousand observations and over 60 direction finder "fixes" were furnished the agency.

5. ENFORCEMENT THROUGH MONITORING

Enforcement of the Communications Act and the Commission's rules is an integral part of monitoring operations. As more and more stations are licensed and new technical regulations are added, more enforcement-type monitoring is needed. This requires a systematic checking of each type of radio service in the United States and its possession for adherence to the laws, treaties, and rules, plus notification to foreign countries when infractions causing interference to domestic services are noted.

Though burdened with increasing interference complaints, surveys, and other work items, the monitoring system observed a mounting number of violations. A total of 10,139 violation notices were issued, representing an increase of 1,360 over the previous year. Additionally, monitoring watches noted hundreds of cases of potential interference and brought them to the attention of operating agencies, thus performing preventive type of monitoring service.

For example, one of the monitoring stations detected a strong rough carrier swinging through several frequencies used by aeronautical stations and obviously a source of interference. Bearings when evaluated showed the source of the signal as being in the Johnstown, Pa., area. Knowing that an industrial heater used for glue drying in a manufacturing plant at Johnstown had caused interference to the Civil Aeronautics Administration and the Coast Guard several years ago, a telephone call was placed there. In less than 5 minutes it was definitely established that this plant was the source of the current interference. The owner agreed to eliminate the excessive radiation immediately.

6. INTERFERENCE AND GENERAL MONITORING

During fiscal 1952 an all-time high since the end of World War II was reached in the number of interference and general monitoring

cases received and processed. A total of 2,745 major monitoring cases were handled, which was 266 more than in 1951.

Operating agencies, both commercial and military, have come to depend upon the Commission's monitoring service for aid in all types of interference problems. Some of these are extremely difficult to solve while others may need only a frequency measurement or bandwidth observation, with the Commission's monitoring engineers serving as arbiters in many cases.

The Commission's coordinated monitoring network is the only one of its kind in this country and functions on a 24-hour basis, being linked together by land-line teletype and radio. This enables the net to either function as an entire group or be divided so that only two or three stations work on a problem.

Field Engineering and Monitoring Bureau has been designated as the centralizing office of the United States for international monitoring for the purposes set forth in Article 18 of the Atlantic City Radio Regulations. In this connection, many requests for monitoring were received from foreign countries. These requests related for the most part to instances of unidentified interference to their nationals which the Commission's monitoring network generally identified satisfactorily.

Monitoring observations played a vital role in enabling the Field Engineering and Monitoring Bureau to detect and locate 114 illegal stations. In the course of regular monitoring, items of interest to defense and security agencies were intercepted and turned over to such agencies as the Department of State, Armed Forces Security Agency, Central Intelligence Agency, and the Federal Bureau of Investigation.

The following table represents a breakdown of monitoring-type interference complaints received from Government and commercial agencies:

U. S. Army	124
U. S. Air Force	292
U. S. Navy	112
U. S. Coast Guard	88
C. A. A.	188
Other Government agencies	99
Law enforcement agencies	37
Commercial airlines	519
Commercial concerns	458
Total	1,917

7. INVESTIGATIONS

During fiscal 1952, the number of interference complaints requiring investigation was 10,124, an increase of 471 over the number received

in 1951. Of these, 6,817 related to television, as compared with 6,002 in 1951. The number of complaints of interference to standard broadcast reception decreased from 2,639 in 1951 to 2,275 in 1952.

Investigations covered a wide range as to types of cases. Although complaints of interference to broadcast reception accounted for a large number of investigations, many cases of interference to aviation and to other communications services, both commercial and military, were investigated. Elimination of interference to such services as aviation is of considerable importance to safety of life and property. The number of complaints of interference to the aviation service rose from 94 in 1951 to 134 in 1952. In some instances the interference was from nearby sources, but frequently the source had to be first localized by the long-range direction finding network and then tracked down by means of mobile direction finding units.

The fact that even a small amount of accidentally radiated energy can result in serious interference is illustrated by an instance at Blountville, Tenn., where "hillbilly" music was causing serious interference to aviation communications. A mobile unit traced the source to be a small homemade phonograph record player using only two ordinary radio receiving tubes—yet it was causing serious interference 15 miles away and was disturbing as far as 500 miles.

In another case, interference from an ordinary heating pad involved serious disruption to aviation radio. Radiating television receivers continued to cause interference to other TV receivers and to aural broadcast reception.

The increasing use of industrial, scientific, and medical equipment utilizing radio frequency energy continued to pose a problem of interference to safety services as well as to TV and other radio services. Complaints of interference from such equipment totaled 641 during 1952 as compared with 593 in 1951. The extent of interference from radio frequency industrial heating equipment used in manufacturing processes, and from diathermy equipment, would undoubtedly have been very much greater but for the fact that the Commission several years ago promulgated rules requiring that equipment manufactured after June 30, 1947, meet certain standards with respect to reduction of interference-causing radiation. Nonconforming devices sometimes cause interference more than 1,000 miles away.

During the year, five cases of illegal radio operation were referred to the Department of Justice for prosecution and nine persons were convicted. Fines ranged from $500 to $3,500. Although not all cases of unauthorized transmissions are prosecuted, particularly if the offense is committed by minors, the tracking down of unlicensed stations and of unidentified and suspicious transmissions is vigorously pursued.

During 1952, a total of 114 illegal stations were located and closed down as compared to 101 in 1951.

Some of these cases involved persons utilizing radio for transmission of race results for the purpose of "beating the bookies." A complaint of interference to the State Highway patrol station at Grand Island, Nebr., resulted in the apprehension of the operator of an unlicensed mobile transmitter, operating on a police frequency, avowedly for the purpose of gaining technical experience in order to obtain employment as a police radio technician.

Another case involved a station signing a Nicaraguan amateur call and claiming to be located in Nicaragua. Bearings by the Commission's monitoring net revealed that the station's location changed daily, indicating it was aboard a vessel proceeding along the Pacific Coast. The vessel was boarded when it arrived at a United States port, and action was taken to suspend the commercial radio-operator licenses and revoke the amateur license of the ship radio operator who made the false transmissions.

In view of the limited investigative staff available, it was necessary to defer many investigations for months in cases in which safety of life and property was not involved, and in many instances only brief attention could be given individual complaints of interference to TV or other broadcast reception.

In November 1951, the Field Engineering and Monitoring Bureau through its regional managers began organizing interference committees outside the Commission. The step was undertaken because of retrenchment of investigative work performed by Commission engineers, and because most amateur TV interference (TVI) problems can be resolved by TV set owners, service men, distributors, and amateurs working together as local committees.

The program was publicized in the daily press and in radio periodicals and talks were given by Commission personnel to amateur groups, radio service people, and other groups concerned with TV interference problems. The American Radio Relay League cooperated through its members and associated groups.

That the program is meeting with success is indicated by the 133 cooperating committees which are established and functioning throughout the country with an additional 32 in the process of being formed.

8. FIELD ENGINEERING

FIELD ENGINEERING FACILITIES

Electronic instruments and other equipment are required at the Commission's field offices and monitoring stations for monitoring and direction-finding activities involving location of unlicensed and clan-

destine stations and sources of interference to authorized stations; for precision frequency measurements, for measurements involving determination of technical performance of licensees' transmitting equipment, field intensity, and other measurements involving enforcement of the Commission's Rules and Standards of Good Engineering Practice; for continuous field-intensity recording programs to gather propagation and other engineering data used by the Commission in connection with promulgation of rules and standards; for frequency-allocation studies, and for numerous other activities.

Providing modern electronic equipment to field installations is a continuing problem due to lack of funds and unavailability of many special types of equipment needed for particular applications. However, progress was made during the year by the acceleration of a program of modernizing long-range direction finders and by purchase of modern communication receivers for monitoring stations and of a number of other new pieces of equipment. Development and construction of suitable equipment or modification of existing equipment has also been carried out.

Some of the major programs involving electronic equipment in which the bureau was actively engaged during the year are described as follows:

The program of installation of remote controlled long-range direction finders to permit their operation from the monitoring building was accelerated and, as of June 30, 1952, such direction finders were in operation at four of the monitoring stations and preparations were being made for similar installations at 12 additional stations. This work is considered particularly important since remote operation of the direction finders permits much more rapid bearings to be taken and saves manpower by elimination of trips to and from the direction finders. An indication of the complexity of the remote installations may be gained from the fact that a typical one requires 88,000 feet of copper wire for the power, control, and other circuits.

The program of replacement of the old mobile investigative units with new investigative cars was continued. Of the 39 fully equipped investigative cars operated by the bureau at the close of the year, 25 were 1949 or newer models and modification of five additional new cars which will replace a like number of the old cars was progressing. Improved battery-charging facilities were also installed in four of the investigative cars to provide better maintenance of the electronic equipment.

A new monitoring station was established near Fairbanks, Alaska. This station is now in regular operation with a long-range direction finder and other appurtenances of a modern monitoring station. With minor exceptions, the entire installation, including construction of the adcock direction finder, was performed by Commission personnel.

ENGINEERING ENFORCEMENT PROJECTS

During the fiscal year, 59 new engineering projects were assigned to the field offices and monitoring stations as a result of requests from the various units of the Commission, from other Government agencies, or originated by this bureau as the need developed. In addition, 102 projects were carried over from the previous year. The total of 161 active engineering projects was equal to the number of active projects during the 1951 fiscal year, although there was a reduction of about 25 percent in the number of man-days spent on projects because of personnel shortages. The field engineers spent approximately 6,000 man-days during the year on engineering studies, investigations, measurements, equipment design, and construction and other projects.

Examples of engineering project assignments are here listed:

The program of continuous VHF and UHF field-intensity recording performed in cooperation with the Central Radio Propagation Laboratory was continued at nine stations and one district office, and the long-range standard broadcast and atmospheric noise-recording program was continued at four stations. In addition, a special program of HF field-intensity recording in cooperation with the Department of State, for the "Voice of America", was carried out at three stations. As of June 30, 1952, 42 field-intensity recorders were in operation, including 28 in the VHF and UHF ranges. Information obtained from these recorders is used in connection with allocation studies and in determining range of coverage to be expected from the various classes of stations. Special mobile field-intensity recording assignments were also completed at seven offices using the test cars to obtain information and data which could not be obtained at fixed locations.

A detailed field-intensity survey was made of a TV broadcast station involving several hundred field-intensity measurements to determine whether the radiation pattern along the ground of its directional antenna system was in compliance with the terms of its authorization. The directional patterns of approximately 100 different standard broadcast stations were also checked and measurements were made of the emissions of nine broadcast stations to determine the degree to which they radiated harmonic and other spurious emissions.

RESTRICTED RADIATION DEVICES AND INDUSTRIAL, SCIENTIFIC, AND MEDICAL SERVICE

The administration of Part 15, Rules Governing Restricted Radiation Devices, and Part 18, Rules and Regulations Relating to Industrial, Scientific and Medical Service, was transferred from the Office of the Chief Engineer to the Field Engineering and Monitoring Bureau in March 1952. This afforded closer coordination between the administration of the rules and the operational enforcement activities.

From March to the end of the fiscal year, the RRD and ISM Section of the bureau handled approximately 800 letters and telegrams and many long-distance telephone calls from the general public and other Government agencies. Through these contacts, a general picture of the effectiveness of parts 15 and 18 of the rules was obtained.

There was a marked increase in interest on the part of operators of diathermy and industrial heating equipment to comply with part 18. Physicians, in general, bought type-approved diathermy machines rather than attempting to remodel their older machines. Remodeling, testing, and certifying old diathermy machines is largely unsatisfactory. In some instances which came to the attention of the Commission, the work of remodeling was performed by engineers who were not fully trained and experienced in the work. Operators of industrial heating equipment encountered some problems in effecting compliance with part 18 because of difficulty in obtaining critical materials necessary for shielding equipment and for filtering electrical circuits.

Many college campus carrier "broadcast" systems were found to be not operating strictly as carrier current systems and their radiation, in some instances, was in excess of the limitations prescribed in part 15 of the rules. The RRD and ISM Section, in an attempt to provide an answer to the problem, has been urging the operators of such systems to change to licensed low-power noncommercial FM broadcasting in accordance with the provisions of sections 3.503 and 3.504 of the Rules Governing Broadcast Services.

ANTENNA OBSTRUCTION MARKINGS

Pursuant to the Communications Act stipulation that the Commission require painting and/or illumination of radio towers if and when in its judgment such towers constitute, or there is a reasonable possibility that they may constitute a menance to air navigation, the Commission promulgated Part 17, Rules Concerning the Construction, Marking, and Lighting of Antenna Towers and their Supporting Structures.

The Antenna Survey Branch was established to administer part 17, which became effective February 15, 1951. The primary functions of this branch are to determine the extent of aeronautical hazard created by proposed new or modified antenna structures, to refer all proposals which violate the criteria of part 17 to appropriate Regional Airspace Subcommittees (ASP) of the Air Coordinating Committee for special study by aviation interests outside the Commission, to approve antennas that do not violate the criteria, and to prescribe, when necessary, obstruction markings for antenna towers in order to minimize their potential hazard to air navigation.

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Prior to the adoption of part 17, the question of the degree of hazard created by a proposed antenna was referred to the Civil Aeronautics Administration for that agency's recommendations. All applications proposing the construction of antennas over 150 feet, or located within 3 miles of an airport, were previously being referred to the CAA at the rate of about 175 per month. Since the adoption of part 17 and the Commission's definite study of antenna hazards, the number of antenna proposals requiring referral to the ASP for special aeronautical study has dropped to approximately 25 per month and is 5 percent of the total antenna proposals processed by the Antenna Survey Branch.

Authorization of construction permits for new television stations has created new interest in the antenna hazard problem. High antenna towers, which are essential for good coverage of TV stations, are a matter of great concern to the aviation industry. Currently, a Government-industry conference is considering the problem of determining a method of achieving uniform treatment by all Regional Airspace Subcommittees of antenna towers over 500 feet high located off presently existing airways, and also standards of obstruction markings for towers up to 1,500 feet in height and their associated guy wires.

Many TV applications filed with the Commission subsequent to the lifting of the "freeze" are reflecting a considerable increase in the number of antenna proposals referred to Regional Airspace Subcommittees for study. The quantity of these referrals is lessened somewhat by a procedure mutually acceptable to the Commission and the ASP, whereby an applicant may request a Regional Subcommittee to make a preliminary study of an antenna proposal prior to the filing of the application, and receive a preliminary recommendation of which the Commission takes official cognizance.

ANTENNA STATISTICS

Statistics of antenna construction proposals processed by the Antenna Survey Branch for the fiscal year follow:

Services	Pending June 30, 1951	Received in ASB	Cleared by ASB	Not cleared by ASB—referred to ASP for special study	Pending June 30, 1952
Broadcasting:					
AM	9	200	153	54	2
FM	5	30	32	1	2
TV	1	265	99	102	65
Experimental	0	18	15	2	1
Common Carrier	4	332	313	23	0
Special Services	804	5,849	5,880	114	659
Total	823	6,694	6,492	296	729

9. COMMERCIAL RADIO OPERATORS

In general, all radio stations licensed by the Commission are required by law to be operated by radio operators also licensed by the Commission. Operators of stations other than amateur are classified for convenience as commercial radio operators. There are now approximately 679,000 commercial operator authorizations of which approximately 179,000 were issued during the past year. The number of commercial operators continues to grow although in a number of rapidly growing radio services the Commission has waived the normal requirement of a licensed operator for certain phases of station operation.

The Commission establishes various classes of operator licenses and prescribes the qualifications necessary for obtaining them. There are nine basic classes of commercial radio operator licenses graded to meet the operating requirements of the various categories of radio stations. There is a wide variation in the required qualifications between the lowest and highest grade licenses, some being based on certain minimum requirements set forth in the International Radio Regulations. Operator licenses are issued by the Commission only to qualified citizens of the United States.

During the year the Commission proposed to amend its rules so as to lower the licensed operator requirement for certain types of coast stations. The proposal would affect all coast stations employing radiotelephony on frequencies above 30 megacycles in the "limited" class, and all such stations in the public classification which utilize a simple type of operating procedure not requiring the use of a special frequency for "calling". Stations affected would be permitted to be operated in normal service by the holder of a restricted radiotelephone operator permit rather than by a third-class radiotelephone operator as previously required. At the end of the year the proposal was still pending.

The shortage of radiotelegraph operators qualified to serve on board ocean-going ships became more acute during the past year and the Commission made certain changes in its requirements designed to increase the supply of marine operators. These changes consisted of an amendment to Part 13 of the Commission's Rules Governing Commercial Radio Operators relaxing the requirements with respect to eligibility for the Temporary Limited Radiotelegraph Second-Class License, a special class of license for ship radio operators created during the previous year.

The temporary waiver with respect to the showing of service or examination normally required for renewal of commercial operator licenses, which was ordered by the Commission in April 1951, continued in force throughout fiscal 1952.

The National Association of Radio and Television Broadcasters petitioned the Commission to amend the license requirements for operators of transmitters of certain broadcast stations employing nondirectional antennas and operating with powers of 10 kilowatts or less, and to provide for remote control of such stations. Except for certain noncommercial educational FM stations, the Commission normally requires that one or more radiotelephone first-class operators be on duty at the place where the transmitting apparatus of each broadcast station is located and in actual charge of it while it is being operated. There is no provision in the Commission's rules for remote control of commercial broadcasting transmitters. The proposal would allow a person holding a restricted radiotelephone operator permit to stand a watch at the transmitting apparatus or at an authorized control point at a distance from the transmitting apparatus.

The Commission decided that the information contained in the petition raised questions of sufficient importance to warrant the institution of rule-making proceedings looking to the possible adoption of amendments to the Commission's rules of the nature proposed. A notice of rule-making was then published in which certain questions were posed and interested persons were afforded an opportunity to respond. The questions were designed to develop detailed information with respect to various aspects of the matter, including the duties of operators standing transmitter watches; the extent to which transmitter failures can be corrected by holders of low-grade operator licenses; the advantages or disadvantages of permitting remote control of broadcast stations and the degree of such control necessary in order to provide satisfactory operation. This proceeding was pending at the end of the year.

A basic statutory provision has prevented foreigners from operating radio stations in this country. In a number of instances a similar limitation in foreign countries has prevented Americans from operating foreign radio stations.

Difficulties arising from these limitations have been most apparent in the case of a United States citizen piloting a Canadian aircraft and vice versa. In both cases pilots have been prevented from using aircraft radio transmitting equipment even for safety purposes. However, during the past year the Governments of Canada and the United States gave final approval to a treaty which provides for certain reciprocal radio operating privileges and should furnish a solution to this and certain other difficulties. Pertinent provisions thereof with respect to aircraft operators are as follows:

With respect to radio equipment installed on civil aircraft of either country and properly licensed by the country of registry for the primary purpose of navigation and safe operation of the aircraft, a United States citizen holding a pilot license and, in addition, a radio operator license issued by the United States

of America, may operate such radio equipment on an aircraft registered in Canada and operated in either country, and a Canadian citizen holding a pilot license and, in addition, a radio operator certificate issued by Canada, may operate such radio equipment on an aircraft registered in the United States of America and operated in either country; provided, that the operation of such radio equipment shall be in accordance with local law and regulation and complementary to his functions or duties as a pilot; provided, also, that either country may require, for security purposes or to assure familiarity with domestic radio operating regulations and procedures, the registration or examination of citizens of the other country and the issuance of a permit for the privileges set forth herein.

The shortage of radiotelephone first-class operators—the class normally required for commercial broadcast stations—continued to be felt during the year. The Commission continued its policy of granting temporary permission to utilize lower-class operators for the normal operation of such stations under the supervision of one or more fully qualified operators, where it is shown that the station concerned has made reasonable efforts to employ first-class operators and has been unable to do so. However, the Commission found that the maximum period of 30 days for which this relaxation was being granted was impracticable in many cases because it resulted in stations having to make a showing of need for temporary relief more frequently than was warranted. Instead of 30-day periods the Commission, by amendment of its rules, provided for a maximum period of 120 days with a showing at the end of 60 days with respect to continuing efforts being made to secure a first-class operator.

OPERATOR EXAMINATIONS AND AUTHORIZATIONS

Examinations for radio operator licenses are given regularly at engineering field offices of the Commission, including Washington, D. C., and at various points in the United States, its Territories and possessions. In addition, examinations are given annually, semiannually, or quarterly at points outside the district offices as the needs of the locality indicate. The places and times of these examinations are made known by publication, semiannually, of an official examination schedule which may be obtained by writing to any of the district engineering field offices listed in the appendix hereto.

Owing, in part, to the establishment of several new classes of amateur licenses there was substantial increase in the number of amateur radio operator examinations given during the past year. A total of 35,389 such examinations were given compared with 11,882 amateur examinations in 1951. (See section of chapter on Safety and Special Radio Services which deals with amateurs.)

Commercial operator licenses and authorizations totaling 179,928 were issued during 1952 as compared to 139,732 in 1951. This represents an increase of about 29 percent. Commercial operator licenses

outstanding of all classes reached a total of approximately 679,000 at the close of the year which was a net increase of about 11 percent above the previous year. Comparative figures according to grades of licenses follow:

Class of license	June 30, 1951	June 30, 1952	Increase or (decrease)
Radiotelegraph:			
First class	4,432	5,244	812
Second class	7,667	9,248	1,581
Third class [1]	1,155	1,694	539
Temporary limited:			
Second class	141	617	476
Radiotelephone:			
First class	39,000	44,537	5,537
Second class	18,400	27,672	9,272
Third class	4,400	8,953	4,553
Restricted Radiotelephone permit	398,960	463,607	64,647
Aircraft Radiotelephone authorization	137,988	117,564	(20,424)
Total	612,143	679,136	66,993

[1] Includes restricted radiotelegraph operator permits.

10. INSPECTIONS

BROADCAST STATION INSPECTIONS

As a part of their duties, Commission field engineers inspect the equipment of stations of all classes in the broadcast services. During these inspections the technical operation of the stations is observed and records of past technical operation are reviewed to determine whether the stations comply with applicable rules, regulations, standards, and the terms of their operating authorizations. These inspections serve to assure that the stations render an adequate service, technically, to the listening and viewing public; that the stations have proper technical supervision, and that they do not create a hazard to aircraft because of improperly marked antenna towers nor cause undue interference as a result of technical misadjustments.

Following is a tabulation of broadcast stations of the three principal classes inspected in 1951 and 1952:

Broadcast Stations Inspected	1951	1952
AM	1,242	444
FM	204	65
TV	44	23
Total	1,490	532

The above decrease in broadcast-station inspections was due to budgetary travel limitations which drastically reduced inspectional trips in 1952.

Discrepancies observed in broadcast-station operation as a result of inspection totaled 232 in 1952, compared with 885 during 1951. Comparable ratios of violations to inspections were observed during both years.

SHIP STATION INSPECTIONS

Constant availability for use in an emergency involving the safety of life or property at sea is of prime importance in the case of ship radio station equipment. Periodic inspections are made by the Commission's engineers to assure that radio equipment required by law for safety purposes is adequately installed, protected, and maintained in a proper state of effectiveness and readiness. Inspection is made to determine also that operators having the prescribed qualifications are in charge of the radio installations. Inspections were made during the past 2 years as follows:

Number of ship inspections	1951	1952
United States ships	7,897	7,901
Foreign ships	2,939	2,706
Total	10,836	10,607

In the course of inspection of ship radio stations formal action was taken looking to correction of defects and irregularities as follows:

Number of deficiency notices served	1951	1952
United States ships	4,393	5,778
Foreign ships	1,431	1,032
Total	5,824	6,810

Numerous deficiencies discovered during inspections were corrected immediately by the station licensee or his representatives and a formal notice therefore was not served. The number of such deficiencies is shown below:

Violations cleared during inspections	1951	1952
United States ships	3,355	3,531
Foreign ships	540	495
Total	3,895	4,026

INSPECTION OF OTHER RADIO STATIONS

Inspections made of stations other than broadcast and ship totaled 8,926 in 1952, and 13,507 in 1951. Discrepancies of a technical nature totaling 3,742 were disclosed in 1951, while 2,393 were revealed in 1952.

During the past year a new procedure was initiated by the bureau designed to provide a degree of self-inspection in the case of certain classes of stations. A special form containing a checklist of requirements frequently overlooked is furnished with the construction per-

mit and the permittee uses this form in notifying the Commission of completion of construction, at the same time certifying thereon that proper attention has been given to the matters listed.

The variety of uses for radio and the extent to which radio is used continues to grow, and public dependence upon radio for both routine communication and safety purposes is becoming more widespread. The enforcement responsibilities and obligations of the bureau increase apace with the rapid expansion, yearly, in these new developments and applications in the electronic sciences.

During the past year, the bureau began a program of inspection of Western Union Telegraph offices to assist the Common Carrier Bureau in its enforcement work. The purpose of the inspection is to determine the speed and quality of service. (See "Common Carrier" chapter.) This work is conducted as an adjunct to the inspection duties performed by the engineers on travel status during the normally scheduled inspection trips.

CHAPTER VII—RESEARCH AND LABORATORY ACTIVITIES

1. TECHNICAL RESEARCH DIVISION
2. LABORATORY DIVISION

1. TECHNICAL RESEARCH DIVISION

GENERAL FUNCTIONS

The Technical Research Division serves as an operational research group for the purpose of resolving problems relating to wave propagation, technical standards and various allied subjects. In this connection it organizes research projects for the collection of technical data by the Field Engineering and Monitoring Bureau, the Laboratory Division, and other organizations including certain groups in the radio industry. Where quantitative field data are not available, the division inaugurates theoretical studies. It also participates in technical studies incident to international conferences and treaties and coordinates the radio research work of the Commission with that of other Government agencies and with commercial organizations. It handles problems related to the Standards of Good Engineering Practice and the technical phases and limitations of the various rules of the Commission.

Due to the recent reorganization of the Office of the Chief Engineer, under which the division serves, several new functions have been added to the division. These include administration of (1) the Experimental Radio Service; (2) type approval and type certification work; and (3) the Cartographic Section activities, which are subsequently mentioned.

During the fiscal year, the Technical Research Division continued its long-term radio wave propagation projects at about the same level as during the previous year, but increased its activities in the VHF and UHF parts of the spectrum. Added emphasis was also given to those projects dealing with technical standards and limits. The Ad Hoc Committee on Television under the chairmanship of the Commission's Chief Engineer concluded its 3½ years of work. The technical reports and expert testimony of this committee have received wide acceptance and are expected to have a profound effect upon the future of the TV industry.

The division continued to carry on special studies and to collect and analyze basic data concerning radio wave propagation, as well as other communication problems, and to make the resulting scientific information available to the Commission for guidance in the promulgation of new rules and the determination of technical limitations and practical engineering standards.

A factual knowledge of equipment capabilities and limitations and of radio wave propagation characteristics is fundamental to an intelligent allocation of frequencies. The whole structure of radio regulation depends on the soundness upon which this framework is built.

A judicious allocation of radio frequencies to the various radio services presupposes a knowledge of many highly technical and complicated things, including ionospheric and tropospheric propagation, terrain effects, useful intensities of signal as related to various sources of interference, geographical and frequency separations necessary to alleviate interference in accordance with various service requirements, equipment capabilities and limitations, new developments and their possibilities, etc.

The Commission requires a detailed knowledge of the propagation characteristics of radio signals throughout the spectrum in order that the most economic and practical allocation of facilities may be achieved. The propagation characteristics of the band of frequencies allocated to a particular service must be consistent with the operating requirements. The allocation of stations within a service; i. e., the determination of cochannel and adjacent channel distance separations, service ranges, and power limitations must be founded on a knowledge of wave propagation. Such knowledge is best obtained from deductions arrived at through the study and analysis of long-term field intensity measurements involving the use of carefully calibrated recording equipment and requiring the attention of experienced engineers. It is one of the primary functions of the Technical Research Division to obtain such data and furnish highly reliable solutions to the technical problems involved.

TELEVISION RULES AND STANDARDS

Considerable work was performed by the division in connection with the final formulation of the recently promulgated television (VHF and UHF) rules and standards. This assignment involved constant reference to the Ad Hoc Committee reports and associated publications.

EFFICIENCY AND SERVICE AREA STUDY OF TELEVISION ALLOCATION

This comprehensive study dealt with the efficiency of television allocation as a function of the transmitting antenna heights, frequency of operation, radiated power, station spacing, and grades of service.

SUNSPOT CYCLE RECORDINGS

This work is a continuation of the previously inaugurated project involving the recording of signals from a number of AM broadcast stations as measured at the several monitoring installations of the Commission. The purpose of this project is to ascertain the relationship between received field strength and solar activity. During the year, field intensity recordings of some 17 stations, representing about 170 accumulated station-years of data, were analyzed by the staff and made ready for the final phase of appropriate statistical treatment which is expected to reveal the dependence of received signals upon the frequency, transmission path latitude, angle of incidence upon the ionosphere, and sunspot numbers. This final phase, however, has been delayed by other assignments of higher priority.

TECHNICAL CONSULTATION AND ADVICE

An all-increasing factor in the activities of the Theoretical Propagation Branch is the technical consultation service rendered to the Commission and its staff on a variety of radio wave propagation phenomena, antenna performance, and other allied problems in the communications field. Much of this work is performed on an informal basis and is not reflected in the normal list of active projects.

SPECIAL VHF PROPAGATION STUDIES

One of the current assignments of the Theoretical Propagation Branch is the study of VHF propagation via ionized atmosphere, the possibility of which has been suggested by recent experimentation. The effect of these transmissions would not only account for long-range television and FM reception, but could also complicate interference problems between what are currently considered widely spaced TV and FM stations. Indications are that this problem in UHF propagation will become increasingly important as more experimental data becomes available.

AD HOC COMMITTEE

Several members of the division participated in the Ad Hoc Committee evaluation of radio propagation factors concerning the TV and FM broadcasting services in the frequency range between 50 and 250 megacycles. This committee was formed in October 1948, and functioned through April 1952, in connection with the Commission's hearings on TV and FM allocations. The committee was headed by the Commission's Chief Engineer and consisted of propagation experts from industry and Government. Much time was spent by various division members on the subcommittee responsible for preparing the Ad Hoc Committee reports.

DATA ANALYSIS

The division continued to analyze data accumulated at various monitoring stations, and numerous technical reports were prepared concerning these measurements. They included information concerning UHF propagation as applied to broadcasting purposes resulting from measurements made on frequencies ranging from 540 kilocycles to 500 megacycles.

OTHER STUDIES

In preparation for the television allocation hearing, numerous studies were made of the effect upon TV broadcast service areas of the different parameters, such as transmitting antenna height, acceptance radio; i. e., ratio of desired to undesired signals required to give satisfactory service, multiple interference, etc. These service studies were made for both the VHF and UHF bands and under propagation conditions typical of different parts of the country.

Extensive studies were made of available data to evaluate the variation of field intensity for the UHF band. They included both long-distance tropospheric propagation and line-of-sight propagation over irregular terrain. These studies enabled intelligent estimates to be made of the service available in the UHF band.

FIELD MEASUREMENTS OF VHF AND UHF PROPAGATION

Activity on VHF and UHF propagation research was centered on the project in which field strengths of more than 20 TV and FM stations were measured continuously during the year. Information derived from such measurements is of vital importance in determining engineering standards for the allocation of frequency channels for TV and FM broadcasting and other radio services, as well as in the verification of theoretical studies of radio wave propagation.

At the beginning of the year, the VHF and UHF propagation project, supported by the Central Radio Propagation Laboratory of the National Bureau of Standards, was in full operation and was continued throughout the year. The data accumulated was processed and the resulting tabulations were delivered to CRPL. This same data is being analyzed by the Technical Research Division in order to extend the general knowledge concerning VHF and UHF propagation and to supply the Commission's special needs for answers to highly technical questions relative to wave propagation and technical standards in this part of the frequency spectrum.

EXPERIMENTAL RADIO SERVICE

Pursuant to the requirement of the Communications Act that the Commission "study new uses for radio, provide for the experimental uses of frequencies, and generally encourage the larger and more effective use of radio in the public interest," the Commission has provided

for the operation of experimental radio stations. Part 5 of its Rules and Regulations Governing Experimental Radio Services became effective October 1, 1939, and has been modified from time to time as the demands of the experimental service required.

These rules are designed to encourage and promote all types of experimentation relating to the radio art. They provide for three classes of experimental stations, namely, class 1, class 2, and class 3. Class 1 stations are for the use of persons engaged in fundamental or general research, experimentation and development of the radio art, or for the development, testing, or calibration of radio equipment. Class 2 stations are for the development of a new radio service or the expansion of an established service. Class 3 authorizations are available to individuals interested in conducting experimental programs on their own behalf for a limited period of time.

There are two subclasses of class 1 experimental stations. These subclasses are contract developmental and export developmental stations. The former classification includes experimental stations licensed for the purpose of developing equipment or techniques to be used by stations operated by the United States Government. The latter classification is for the development of equipment intended for export purposes and for eventual ownership and operation by stations under the jurisdiction of foreign governments.

The majority of class 1 stations are operated by manufacturers of equipment and by research and development organizations. These stations are engaged in development of new equipment and the improvement of existing equipment, the development of new techniques in the electronic art and in connection with fundamental studies involving radio propagation. Development work is being continued on narrow-band communication equipment which will effect a more efficient use of the radio spectrum. New and improved radio aids to navigation are being developed while other development work includes radiolocation equipment, and microwave communication equipment.

Continued experimental work is being done in ionospheric investigations and propagation studies on various frequency bands throughout the spectrum, particularly in the upper range of the spectrum where the presently available information is meager.

The table of frequency allocations contained in part 2 of the rules provides for the experimental use of frequencies throughout the spectrum subject to the condition that harmful interference is not caused to the service or stations to which the frequencies are regularly assigned.

Class 1 stations are used extensively by manufacturers and sales engineers for the purpose of making field-intensity or coverage surveys in areas where it is proposed to establish radio communication

systems. The results of these surveys provide useful information for choosing the operating frequency, power, emission, and antenna location for optimum performance.

Applications for class 2 experimental stations include proposals for types of operation which are not recognized in the present rules. Since the establishment of the land mobile services on a regular basis, the number of class 2 stations has decreased.

Because of the limited scope of experimentation permitted under a class 3 authorization, the Commission receives few requests for that class of station license. The types of experimentation permitted under a class 3 authorization may also be conducted under a class 1 authorization or, for qualified persons, under the Rules Governing Amateur Radio Service.

Statistics covering the experimental radio services for fiscal 1952 follow:

Number of experimental radio stations

Class of station	June 30, 1951	June 30, 1952	Decrease
Class 1	348	322	26
Class 2	56	47	9
Total	404	369	35

Mobile and nonmobile transmitters

Class of station	Nonmobile units	Mobile units	Total transmitters
Class 1	237	1,154	1,391
Class 2	15	131	146
Total	252	1,285	1,537

Experimental applications

Class of station	Received 1951	Received 1952	Increase or (decrease)
Class 1	839	835	(4)
Class 2	51	80	29
Total	890	915	25

RESTRICTED AND INCIDENTAL RADIATION DEVICES

In 1938 the Commission recognized the need for establishing standards of radiation which would obviate the licensing of equipment the radiations from which did not exceed a specified field intensity. Studies were undertaken and the rules are now codified as Part 15, Rules Governing Restricted Radiation Devices. These rules do not place a limitation on the permissible power, but do specify the maximum permissible field intensity at definite distances from the radiating devices.

Considerable use has been made of equipment designed to operate within the provisions of part 15. Typical of these uses are "college campus" broacast stations, which employ carrier current techniques for the distribution of programs essentially broadcast in nature; industrial signaling and communications systems using carrier current techniques; and space radiation devices such as phono-oscillators, garage door openers, remote control devices, etc.

Since the operation of transmitting devices under part 15 does not involve licensing for either equipment or operators, this mode of operation has been adopted by many persons. It has been found, however, that much of the equipment intended to operate under part 15 is not capable of compliance with the field-intensity limitations.

Campus carrier broadcasting and other types of carrier current operation have grown to such proportions that a study of the problems attendant to the operation of carrier current systems has been undertaken. Field-intensity measurements have been made and Government-industry committees are continuing studies of the data obtained.

The problem of receiver radiation continues to command attention, and the Commission is endeavoring to obtain better receiver design both in the matter of more effective radiation suppression methods and, particularly in the case of TV receivers, in the choice of IF amplifier frequency. It is believed that these efforts will effectively help to reduce interference created as the result of incidental radiation from receiver oscillators.

Incidental radiations from electric razors, heating pads, fluorescent lights, automobile ignition systems, and other electrical devices are the source of interference to radio reception. Considerable time has been devoted to the study of such radiations with a view of determining the most troublesome sources and to find effective remedies.

Rule making has been proposed for amending part 15 in this respect. However, it is expected that considerable additional information will be necessary before a satisfactory solution to all the problems concerning restricted and incidental radiation devices can be found.

COORDINATION OF TECHNICAL RULES

The desirability of maintaining uniformity of the technical phases of the rules throughout all parts and services has never been questioned. But the processes for the accomplishment of such uniformity have not been easy to inaugurate. However, progress is being made, and it is hoped that within a reasonable period practically all parts of the rules will embody the desired uniformity.

INDUSTRIAL, SCIENTIFIC, AND MEDICAL EQUIPMENT

One of the limiting factors in the use of radio transmitting and receiving equipment is the existence of electrical interference which

tends to prevent the satisfactory reception of radio signals. Such interference may be in the form of atmospheric background noise, or it may be the result of spurious and harmonic emissions from various types of electrical- and radio-frequency generating equipment. Equipment generating radio frequency energy, but not designed for communication purposes, is known to contribute a substantial portion of the interference to authorized radio services, and the operation of such equipment has often resulted in destructive interference to radio communication systems. Such interference occurs not only to broadcast services, but frequently interrupts those services concerned with the safety of life and property.

To minimize the probability of interference from particular kinds of noncommunication equipment generating radio-frequency energy, the Commission adopted, effective June 30, 1947, part 18 of its rules, which relates to the Industrial, Scientific, and Medical Service. The operation of medical diathermy, industrial heating, and miscellaneous equipment is governed by part 18.

Medical diathermy equipment includes any apparatus (other than surgical diathermy apparatus designed for intermittent operation with low power) which generates radio frequency energy for therapeutic purposes. Industrial heating equipment includes apparatus using radio frequency energy for heating operations in manufacturing or production processes. Miscellaneous equipment includes apparatus, other than medical diathermy or industrial equipment, in which the action of the radio-frequency energy generated is applied directly to the workload and does not involve the use of associated receiving apparatus.

Specific frequency bands have been allocated for the operation of industrial, scientific, and medical equipment, and part 18 of the rules sets forth the conditions under which such equipment may be operated without a license. The suppression of spurious and harmonic radiations on frequencies outside the allocated bands is required by the rules.

Interference problems arising from the operation of equipment governed by part 18 of the rules have been administered, first, on a request-for-cooperation basis, and, in those cases where cooperation has not been satisfactorily accomplished, by the use of the enforcement provisions available to the Commission. In the administration of part 18, the Commission has been guided by a desire to provide interference-free communication and, at the same time, permit the necessary use of medical diathermy, industrial heating, and miscellaneous equipment. The Commission's efforts to eliminate interference by the cooperative efforts of the complainant and the equipment user have, in general, been well received.

The imminent expansion of television facilities, and the further congestion of the frequency spectrum by other services, is expected to result in an increase in the number of interference cases reported. Thus far, the procedure set up for processing complaints of interference to radio reception has been satisfactory; however, the expected growth of broadcasting, communication, and safety services may lead to an increase in the number of difficult situations which may be resolved only by the use of stronger measures available under the Communications Act.

In addition to its regulatory duties, the Commission has held conferences with representatives of industry engaged in the manufacture and sale of equipment regulated by part 18. These conferences have been helpful to both industry and the Commission in the solution of problems relative to equipment included in part 18. Type approval certificates have been issued covering 73 diathermy machines and 11 types of miscellaneous equipment.

Through rule-making procedure the Commission has issued orders successively postponing the effective date of part 18 as it concerns arc welding equipment which uses radio-frequency energy, until January 31, 1954. Part 18 has also been amended to extend the effective date applied to medical diathermy and industrial heating equipment manufactured prior to July 1, 1947, until June 30, 1953. The shielding requirements for medical diathermy and miscellaneous equipment operated on fundamental frequencies outside the allocated bands have also been modified through rule-making procedure. The sections of the rules relating to certification of industrial heating equipment have been amended to permit the certification of groups of industrial heaters as a single unit.

The Commission and interested representatives of industry are continuing studies toward the formulation of suitable technical standards to be applied to arc welding equipment using radio-frequency energy. Continued studies of new industrial and medical applications of radio-frequency energy are being made in an effort to keep the rules governing such devices abreast of the development of equipment and the needs of the users of such devices.

TYPE APPROVAL AND TYPE ACCEPTANCE WORK

Among the equipments which have for a long time been "type approved" by the Commission are marine radio equipment, diathermy equipment, and industrial heating equipment. Most of the transmitting and frequency monitoring equipment used by broadcast stations are also "approved." In addition certain equipments are "certified" as acceptable for licensing.

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In the past, the responsibility for such approval work was divided largely among the various Commission divisions which administered the services concerned. Now, however, the major responsibility has been placed in the Technical Research Division, and attendant functions are being absorbed as rapidly as possible. However, during the transition period some of the work is still being performed by other divisions and bureaus.

The work is separated into three main divisions: (1) applications for type acceptance; (2) applications for type approval; and (3) the filing of detailed technical specifications of equipment. An unusually heavy burden is associated with the filing of technical specifications for a wide variety of transmitters, frequency monitors, etc. It is expected that the centralization of the equipment files in the Technical Research Division will expedite the handling of applications.

The following tabulation indicates the approximate number of applications handled and the number of equipment specifications filed during the last half of the fiscal year:

	Type acceptance	Type approval (including ISM)	Specifications filed
Received	37	96	149
Issued	32	90	88
Pending	5	6	61

In order that the type approval and type acceptance work may be established on a sound basis, it is anticipated that a certain amount of rule-making procedures will be necessary. The basic work for such rule making has already been started. After the rules have been made complete, it is presumed that column 3 in the tabulation above will be reduced to a minimum, while columns 1 and 2 will be proportionately larger.

CARTOGRAPHIC AND DRAFTING SERVICE

The facilities and personnel of the Cartographic and Drafting Section were transferred to the Technical Research Division in order to provide a more efficient means of presenting the division's technical studies in graphic form, and of preparing the generally involved and complex drawings required for exhibits and for publication in technical reports and standards. These include graphs and curves resulting from practically all phases of the division's research and scientific investigations, and various engineering drawings prepared expressly for use in graphical computations.

In addition, this service was made available to other offices of the Commission requiring a higher order of engineering drafting in con-

nection with their respective fields of work, which included special purpose maps and charts of communications engineering, and certain administrative and informative charts related to the functions of the Commission.

Some 350 drawings of all classes were produced by the Cartographic and Drafting Section during the year, with approximately 65 percent of the total prepared in connection with technical activities.

GOVERNMENT-INDUSTRY COMMITTEES

The Commission is represented by its Technical Research Division on a number of important standing committees of Government and industry. Among those are executive groups of the Central Radio Propagation Laboratory, the URSI (International Radio Scientific Union) and CCIR (International Radio Consultative Committee), committees of the Institute of Radio Engineers and the Radio-Television Manufacturers Association, and panels of the Committee on Electronics of the Research and Development Board. The chief of the division continued to serve on many of these committees.

TECHNICAL CONSULTING SERVICE

In addition to furnishing technical advice to the Commission, the division is called upon to answer technical questions of other Government agencies, industry, and private engineers. During the past year demands of this nature increased far beyond those of any previous period, and as a result, backlogs in routine work developed.

2. LABORATORY DIVISION

GENERAL FUNCTIONS

The Commission maintains a Laboratory Division near Laurel, Md. This division makes technical measurements and engineering investigations to aid the Commission in allocating frequency bands, establishing and revising engineering standards and regulations for new as well as existing services, and drafting regulations covering noncommunications type of equipment employing radio-frequency energy which may interfere with the radio-communication services.

The Laboratory Division's activities include:

1. Investigation of various methods of transmission and reception to determine which method permits the most efficient utilization of the spectrum and to ascertain the interference factors which limit the various methods.

2. Tests of transmitters to determine whether interference signals are emitted on frequencies other than the assigned channel.

3. Tests of receivers to determine how close together the Commission might place stations without the listeners receiving several stations at the same time.

4. Tests of receivers to determine what interference they may produce in other nearby receivers either in the same service or in other services.

5. Tests for reliability of operation of equipment such as apparatus involving safety at sea. This type of equipment is required by the Communications Act or treaty.

6. Tests of the accuracy and reliability of monitoring equipment required to be used by stations, such as frequency and modulation monitors.

7. Investigation of interference produced by noncommunication uses of radio-frequency energy.

8. Development of special monitoring equipment for use of Commission engineers in the field, and maintenance of the accuracy of measuring installations and equipments.

The work of the laboratory generally is directed toward the testing of a type of equipment rather than the testing of individual units. Attempt is made to anticipate interference problems and to have remedial measures taken prior to the manufacture and distribution of a large number of units instead of waiting until the interference occurs in the field and requires numerous individual investigations.

In some instances type tests are required by the rules and regulations, and formal approval is given. In other cases the laboratory makes type tests not specifically required, in order that the Commission may be aware of the existing service and interference problems encountered in practical operation, so that either the allocation structure may be designed to fit the units available or the Commission may take other action leading to improved equipments which will permit more efficient use of the available radio frequencies.

Type testing also is required of certain noncommunications equipment, such as diathermy machines which employ radio frequencies and may cause serious interference unless the frequencies are properly maintained and the harmonic and spurious emissions sufficiently restricted.

Following is a summary of particular laboratory activities engaged in during the year.

BROADCASTING

Most of the Laboratory Division work in the broadcast field concerned tests as to receiver oscillator radiation and the various spurious responses of receivers, with especial emphasis as to impact of these problems on the implementation of the UHF television band. Studies were made of a number of proposed UHF tuners submitted by manufacturers. With regard to receiver oscillator radiation, the laboratory participated in the formation of standards for the measurement of receiver oscillator radiation by the Institute of Radio Engineers. A

permanent new field-intensity range was installed at the laboratory to replace a tentative one used during the establishment of proposed measurement methods.

In order to obtain propagation data for the UHF television band, the laboratory continued the recording of the UHF-TV station at Bridgeport, Conn. Changes have been made in the laboratory's television signal generator equipment to facilitate operations on both color and monochrome. Permanent facilities are being installed to permit examination of interference between several color television signals on the adopted standards, and to permit the examination of new systems or methods for television transmission. Tests are being conducted on several proposed types of color receivers.

SERVICES OTHER THAN BROADCASTING

Measurements were made of the selectivity, intermodulation, and other spurious responses of receivers used in other than broadcast services. Tests also were made of the oscillator radiation of nonbroadcast receivers. Examination was made of the performance of deviation limiting devices now required in many transmitters to reduce interference on channels near the one in use. The foregoing tests have indicated that the state of the art has progressed to the point where, with good equipment, consideration can be given to the implementation of closer channel spacings to provide more communication facilities.

At the present time automatic equipment which responds to distress signals is required only on certain ships which are radiotelegraph equipped. Through international conferences it now has been agreed to extend this general type of protection to radiotelephone-equipped vessels. A number of units operating on the latest proposed type of signal have been designed and constructed at the laboratory, and tests on the new type signal are under way.

CALIBRATION OF INSTALLATIONS AND APPARATUS

In its enforcement and investigation activities, the Field Engineering and Monitoring Bureau uses a large amount of testing and recording equipment. During the year calibrations of the recording equipment were checked at eight of the field-intensity recording installations operated by that division including Laurel, Md., Baltimore, Md., Powder Springs, Ga., Grand Island, Nebr., Houston, Tex., Santa Ana and Livermore, Calif., and Portland, Oreg. Eight field-intensity meters and 13 signal generators were calibrated during the year.

NONCOMMUNICATIONS EQUIPMENT

Industrial heating, medical diathermy, and other miscellaneous uses of radio-frequency energy for purposes other than communication

have expanded to such an extent that the power used by this group exceeds the total transmitter power required for radio communication. Since such noncommunications equipment employs frequencies of the same order as used by the communications industry, severe interference may be expected unless these units are designed and operated properly. Some of these units use power far in excess of the 50-kilowatt maximum permitted AM broadcast stations. Devices in this category are covered by part 18 of the rules and regulations of the Commission.

Medical diathermy apparatus which falls within this classification is type-approved by the laboratory to insure that the frequency is maintained within one of the specified bands and that the harmonic and spurious radiations are within the prescribed limits. During the year 18 submissions of diathermy machines were received for test.

In addition, the Laboratory Division made tests on other devices employing radio-frequency energy and capable of causing interference. During the year seven devices of this type were submitted for test.

The Laboratory Division is represented on the following committees which are working toward reduction of interference from receivers, industrial radio-frequency heating equipment, power lines, etc.: I. R. E. Industrial Electronics Committee, A. I. E. E. Subcommittee on Induction and Dielectric Heating, A. I. E. E. Subcommittee on Radiation Measurements above 300 Megacycles, I. R. E. Oscillator Radiation Subcommittee, A. S. A. Technical Subcommittee No. 1 of Committee C63, and CCIR Committee.

CHAPTER VIII—FREQUENCY ALLOCATION AND TREATY ACTIVITIES

1. GENERAL
2. INTERNATIONAL FREQUENCY ALLOCATION
3. NATIONAL FREQUENCY ALLOCATION
4. FREQUENCY REGISTRATION AND NOTIFICATION
5. INTERNATIONAL TREATY ACTIVITIES
6. INTERDEPARTMENT RADIO ADVISORY COMMITTEE

1. GENERAL

Frequency allocation may be defined as the study of the spectrum so that channels can be reserved, widened, and modified to keep pace with developments in radio and to provide a maximum of usefulness consistent with the public need.

Although they range from 10,000 cycles per second to about 30 billion cycles per second, the frequencies in the various portions of the spectrum exhibit different qualities. For example, 1000 kilocycles (1,000,000 cycles or 1 megacycle) is excellent for aural broadcasting but would be practically useless for television broadcasting. Similarly, 415 kilocycles is good for ship navigation by direction finding but would be useless for ship navigation by means of radar.

Because of the differing characteristics of frequencies, certain bands throughout the spectrum have been reserved (allocated) to specific kinds of uses (services). These bands have in many instances been further subdivided to serve more specific purposes. For example, frequencies in the range of 30 to 40 megacycles have been allocated in the United States to the mobile service (use between stations on vehicles or between stations on vehicles and stationary stations). This band has been further subdivided so as to reserve certain portions for particular categories of mobile use such as police, industrial, etc.

Since the energy transmitted by a radio station cannot necessarily be confined to the borders of the transmitting country, the use of the spectrum must be coordinated by all nations so as to minimize interference. The universal use of radio has thus led to the adoption of international treaties governing the allocation and conditions of use of frequencies throughout the spectrum.

Although frequency allocation (reservation) is not the same as frequency assignment (authority to use) one cannot be accomplished without reference to the other. Because of this, an integral part of frequency allocation work is the maintenance of frequency assignment records of the United States and of the world.

2. INTERNATIONAL FREQUENCY ALLOCATION

The most significant accomplishment in the international radio field was the successful culmination of the Extraordinary Administrative Radio Conference of the International Telecommunication Union, held at Geneva, Switzerland, October 16 to December 3, 1951. The purpose of this conference was to find a method by which the allocations of spectrum space to the several radio services agreed to at the Atlantic City Radio Conference of 1947 might be put into force throughout the world.

The task facing this conference was a most difficult one, because a station assignment plan for the fixed service with international acceptance had not been developed by the Provisional Frequency Board even though it had struggled for 2 years with this problem, and a complete high-frequency-broadcasting plan which would provide for time and frequency sharing on an international basis was not available.

Despite these obstacles, the EARC conference did devise a method whereby the fixed and broadcasting stations of the world could gradually adjust their frequency assignments so that they would, in the future, use only those frequencies which are within the bands allocated to those services in the Atlantic City table of frequency allocations.

Moreover, the Geneva agreement provided a method whereby the aeronautical- and maritime-mobile services of the United States can bring their frequency assignments to specific stations into conformity with the frequency lists contained in the Geneva agreement. These lists had been drafted at conferences held for this purpose between 1947 and 1951.

The Geneva agreement further provided that the so-called "regional" frequency-band allocations below 2000 kilocycles would be brought into force on a world-wide basis on specified dates.

Thus, a practical basis is now available for the stabilization of international uses of radio in the bands of frequencies below 27,500 kilocycles. The Atlantic City table of frequency allocations above 27,500 kilocycles came into force internationally on January 1, 1949.

In order that the United States could carry out the terms of the Geneva agreement, much Commission staff time has been devoted to this project. Literally dozens of related rule-making and other regulatory projects are being proposed by the Commission, and many more will be forthcoming.

Substantial progress in frequency allocation was made by the United States and by other countries in the period between December 1951 and July 1952. For example, in March 1952, the United States proposed that the radio spectrum range between 20,000 and 27,500 kilocycles contain frequency assignments to stations in conformity with the Atlantic City allocations of bands of frequencies, and to the station assignments stipulated in the Geneva agreement. This project has been completed and many friendly countries have taken similar action so that this portion of the spectrum is now fairly well stabilized throughout large parts of the world.

Included in the Geneva agreement are provisions relating to the protection of stations in the maritime mobile and aeronautical mobile services from harmful interference which might be caused by other stations during the difficult period of transition from the existing assignment situation to the assignment plans contained in the agreement. In an effort to insure the maximum usefulness of the world-wide high-frequency ship communication bands established by the Cairo Radio Regulations (1938), the Commission has initiated numerous requests that the many broadcasting, fixed, and land stations in these bands cease operations which are contrary to treaty provisions. This has taken intensive effort by the staffs of the Frequency Allocation and Treaty Division and the Field Engineering and Monitoring Bureau. Early reports indicate that this effort is bringing results because, in a number of cases, steps have been taken to close down out-of-band stations or move them into the proper bands. Monitoring work confirms that many countries have taken remedial action. Preventive measures of this type appear vital to early and successful entry into force of the plans formulated at the Geneva conference.

Other projects are under active investigation in cooperation with the Telecommunications Adviser to the President and with Government users of radio. One of these is the introduction of new families of frequencies for the use of United States flag aircraft flying the North Atlantic air routes. The target date for use of these new aeronautical frequencies in March 15, 1953.

Another typical project is the introduction of the new calling bands for ship telegraph stations to become effective June 3, 1953, as provided in the Geneva agreement. Here again, the problem of relocating the stations of other services now occupying these calling bands requires an enormous amount of rule-making and licensing action by the Commission. These, and all other projects related to the Geneva agreement, are being studied cooperatively by the Commission and representatives of the telecommunications industry in an effort to find practical answers to the many difficult operational problems which confront the Commission's licensees.

During June 1952, representatives of the Commission held informal discussions with representatives of the United Kingdom in London concerning the use of frequencies in the VHF spectrum by stations in the maritime-mobile service. One of the principal points in these discussions centered around the use or standardization of frequency modulation on the maritime mobile frequencies in the VHF range. Plans were also made for future discussions between representatives of the two countries on broad problems related to the Geneva agreement.

3. NATIONAL FREQUENCY ALLOCATION

Many of the national frequency allocation projects of the Commission are, of course, related directly to the work being done by the Commission and the United States Government in the international field. For example, the Geneva agreement looks toward a system of priority for the use of a frequency which would be based on the actual use being made of that frequency. In the United States, the Commission, the Telecommunications Adviser to the President, and each Government user of radio have been investigating the problems in connection with the establishment of a record of frequency usage. This has involved the collection and analysis of several thousand reports submitted by both non-Government and Government radio stations over a 1-month period and that study is not yet completed.

In addition, the following frequency allocation changes were made, or were proposed:

1. The allocation of the band 21,000–21,450 kilocycles to the Amateur Service was made final.

2. The band 14,350–14,400 kilocycles was allocated to the Fixed Service and assignments were made to stations in the International Fixed Service.

3. The entire band 20,000–25,000 kilocycles was reallocated so as to conform to the Atlantic City table of frequency allocations and United States station assignments were adjusted so as to bring them into agreement with the international allocation.

4. A study of the requirements of the Radiolocation Service was made, and spectrum space was allocated at 1750–1800 kilocycles to permit the use of radiolocation stations in connection with oil exploration activities in the Gulf of Mexico.

5. Some expanded use of the band 1800–2000 kilocycles by the Amateur Service was proposed.

6. The temporary arrangements concerning the allocation of the bands 220–225 megacycles and 235–240 megacycles to the Amateur Service were deleted, thus making the band 220–225 megacycles available for use in all areas.

7. A complete table of frequency allocations for the band 10–25,000 kilocycles was adopted and incorporated in Part 2 of the rules.

8. Seven additional proposals involving changes in frequency allocations between 2000 and 25,000 kilocycles, all relating to bringing into force the Atlantic City table of frequency allocations, were made the subject of separate proceedings.

9. Theater television was under further study. A proposal was made to expand the subjects to be considered so that non-Government interests in several services would be aware of the possible impact from any allocation to theater television, and so that information concerning allocation problems above 1,000 megacycles could be obtained.

10. The Commission proposed the reallocation of television channels 5 and 6 and the upper half of the FM broadcasting band (98–108 megacycles) to the Common Carrier Fixed Service in the Territory of Hawaii only.

11. Other minor modifications of the Commission's table of frequency allocations were proposed or adopted in order to permit greater utilization of the radio spectrum by the various services.

4. FREQUENCY REGISTRATION AND NOTIFICATION

The Geneva agreement provided that all notifications to the International Telecommunication Union which were to be included in the final edition of the List of Frequencies had to be submitted to the Union no later than February 29, 1952. Consequently, some 4,550 new notifications for non-Government and Government stations were submitted by that date.

Furthermore, the Geneva agreement required each administration to submit data concerning the actual use being made of frequencies between 2,850 and 27,500 kilocycles for which protection from harmful interference was being sought. This data was prepared by the Commission's staff and by individual licensees, and by Government agencies using radio, and the entire usage list was submitted to the ITU prior to the April 1, 1952, deadline.

After supplying the usage data, the Commission resumed notifications to the ITU on a daily basis. Instead of being notified in accordance with the Cairo (1938) General Radio Regulations, new assignments are now reported to the ITU under the terms of the Atlantic City (1947) Radio Regulations, using a special fanfold in the Atlantic City Appendix 6 format.

As of June 30, 1952, the Commission's radio frequency record (consisting of more than 70,000 cards which reflect the historical development of the use of each frequency, and over 90,000 machine punch

cards showing the particulars of the present Commission authorizations) was completely current. In addition, a start had been made in converting the records developed under the Cairo General Radio Regulations to the format set forth in the Atlantic City Radio Regulations.

The Commission's staff also coordinated 10,725 new and modified authorizations to Government stations made by the Interdepartment Radio Advisory Committee, after having examined each to determine if it might cause interference to existing non-Government authorizations.

5. INTERNATIONAL TREATY ACTIVITIES

A major portion of the year's activities in the field of international treaties has been directed toward the accomplishment of the Commission's part in bringing into force the Atlantic City table of frequency allocations in accordance with the decisions of the Extraordinary Administrative Radio Conference.

The number of international interference cases which the Commission has received for resolution is increasing because of the adjustments which are being made to bring out-of-band stations into the proper bands. A total of 670 cases of international interference received the attention of the Commission's staff during the year, of which 445 were resolved. Of the remaining 225 cases, 85 cases are more than 60 days old.

Infractions by foreign stations of the International Telecommunication Convention and Radio Regulations, and of the radio provisions of the International Convention for the Safety of Life at Sea detected by the Commission's monitoring stations and inspection offices were screened and forwarded to the appropriate foreign administrations in accordance with international procedures. During the year a total of 375 cases of treaty infractions were so reported. Most of these involved spurious emissions, harmonic radiations, off-frequency operation, or some other technically improper operation, all of which constituted sources of actual or potential interference to radio communications, or involved the safety of life and property in the air and on the sea.

Coordination between the Commission and the Canadian Department of Transport of proposed VHF and UHF frequency assignments is of continuing importance. The informal procedure announced in 1950 permits an effective and efficient exchange of engineering comments on proposed assignments of both countries in certain portions of the spectrum in border areas, and for the exchange of current frequency-assignment data. Approximately 440 letters of comment were exchanged by the two countries during the year.

The Commission assisted in the United States preparation for, and participated in, a total of 20 international conferences and meetings. These were world-wide, regional, or bilateral in nature, and most of the major conferences were convened under the auspices of the International Telecommunication Union or the International Civil Aviation Organization. Approximately 90 nations of the world participate in the activities of the ITU, and approximately 60 in the activities of the ICAO. The Commission furnished 2 delegation chairmen, 17 delegates or representatives, 4 advisers, and a small number of staff assistants to the following conferences and meetings:

US-Mexico Informal Conference To Discuss Border Assignments for TV.	Mexico City	Feb. 23, 1951.
CCIT International Telegraph Consultative Committee.	Geneva	March 1951.
CCIR—Sixth Meeting	Geneva	June 5, 1951. July 6, 1951.
US-Mexico Informal Conference To Discuss Border Assignments for TV.	Mexico City	June 18, 1951.
US-UK Informal Conference To Discuss Extraordinary Administrative Radio Conference.	London	July 1951.
Discussion with Mexican Telecommunications Authorities re: Application to Export-Import Bank of Washington for Credit for Expansion and Modernization of Mexican Telecommunications Systems.	Mexico City	Oct. 11, 1951.
Extraordinary Administrative Radio Conference of ITU.	Geneva	Aug. 16, 1951. Nov. 16, 1951.
ICAO South American-Atlantic Regional Air Navigation Meeting.	Buenos Aires	Oct. 30, 1951. Nov. 17, 1951.
US-Canada Agreement for Promotion of Safety on Great Lakes by Radio.	Ottawa	Feb. 21, 1952.
Meeting of the Executive Committee of the Technical Policy Steering Committee for US-Canada Implementation of the Extraordinary Administrative Radio Conference.	Ottawa	Feb. 27, 1952.
CCIR Study Group XI	Stockholm	May 20, 1952. May 27, 1952.
European Regional Conference on VHF Broadcast 41 Mc to 216 Mc.	Stockholm	May 28, 1952.
Discussions with British Post Telegraph and Telephone on use of FM vs. AM on VHF Range by Maritime Mobile Service.	Paris and Geneva	June 20, 1952.

In addition, the Commission was involved in preparatory or follow-up work directly connected with the following conferences and meetings:

ICAO Search and Rescue Meeting	Montreal	Sept. 4, 1951.
CCIF Study Groups	Florence	Oct. 1, 1951. Oct. 13, 1951.
CCIT Subcommittee on Maintenance	Florence	Oct. 4, 1951. Oct. 9, 1951.
CCIF Plenary—Sixth Meeting	Florence	Oct. 22, 1951. Oct. 27, 1951.
CCIT Working Group on Signal Correctors.	Paris	Oct. 29, 1951. Nov. 3, 1951.
CCIT Study Group VI on Definitions and Vocabulary.	Paris	Nov. 5, 1951. Nov. 12, 1951.
CCIF Committee for the Revision of the Principles of Protective Interference.	Geneva	March 1952.

The following conferences and meetings are projected for the future and the preparatory work by the Commission's staff has started:

ITU Conference for Revision of Bermuda Telecommunication Agreement of 1945.	London	July 9, 1952.
Inter-American Telecommunication Conference.	Undetermined	Fall 1952.
International Telecommunication Conference.	Buenos Aires	Oct. 1, 1952.
ICAO—Special Meeting	Undetermined	1952.
ICAO—Second Southeast Asia Regional Air Navigation Meeting.	In Region	Oct. 25, 1952.
CCIT Study Group I (General Telegraphy).	Geneva	October 1952.
CCIT Study Group VI (Vocabulary and Definitions).	Geneva	October 1952.
ICAO Search and Rescue Division	Undetermined	1953.
CCIT Plenary Meeting	Holland	1953.
ICAO African-Indian Ocean Second Regional Air Navigation Meeting.	Undetermined	1953.
ICAO—Special Meeting	Undetermined	1953.
ICAO Communications Division	Undetermined	1953.
Tenth International Conference of American States O. A. S.	Caracas	1953.
CCIF—Study Group for Trials Semi-Auto Phone Operations.	Geneva	1953.
CCIF—Study Group on Operating and Tariff.	Geneva	1953.
CCIF—Substudy Group	Stockholm	6-53.
CCIF—Technical Committee	Geneva	10-53.
CCIR—Seventh Plenary	London	1953.
ICAO Third Caribbean Regional Air Navigation Meeting.	Undetermined	1954.

ICAO Middle East Regional Air Navigation Meeting.	Undetermined	1954.
International HF Broadcasting Conference.	Buenos Aires	1954.
International Telegraph and Telephone Conference.	Undetermined	1954.
URSI, Eleventh General Assembly	Undetermined	1954.
ICAO South Atlantic Regional Air Navigation Meeting.	Undetermined	1955.
ICAO South American Regional Air Navigation Meeting.	Undetermined	1955.
ICAO Fourth European Mediterranean Regional Air Navigation Meeting.	Undetermined	1956.

6. INTERDEPARTMENT RADIO ADVISORY COMMITTEE

The Commission does not license United States Government radio stations or assign their frequencies. Such frequency assignments are made by the President upon recommendation of the Interdepartment Radio Advisory Committee (IRAC), composed of 11 Federal agencies. The Commission provides the secretariat of the IRAC.

During the year the IRAC approved 6,727 new and deleted 3,065 regular assignments. In addition, it approved 1,091 changes in assignments, 2,907 temporary assignments, and 574 deletions of temporary assignments.

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APPENDIX

1. FIELD OFFICES
2. PUBLICATIONS
3. TREATIES AND OTHER INTERNATIONAL AGREEMENTS

1. FIELD OFFICES

The Commission maintains 64 field installations geographically distributed throughout the United States and its possessions. Fifty-nine of these are engaged in engineering work, comprising 9 regional offices, 24 district offices, 6 suboffices, 3 ship offices, and 18 monitoring stations. There are also four Common Carrier Bureau field offices. The complete list follows:

FIELD ENGINEERING AND MONITORING BUREAU

Regional offices	*Headquarters*
North Atlantic	954 Federal Bldg., New York 14, N. Y.
South Atlantic	411 Federal Annex Atlanta 3 Ga.
Gulf States	332 U. S. Appraisers Bldg., Houston 11, Tex.
South Pacific	323–A Customhouse, San Francisco 26, Calif.
North Pacific	801 Federal Office Bldg., Seattle 4, Wash.
Central States	1300 U. S. Courthouse Bldg., Chicago 4, Ill.
Great Lakes	1029 New Federal Bldg., Detroit 26, Mich.
Hawaiian	P. O. Box 1142, Lanikai, Oahu, T. H.
Alaskan	52 Post Office and Courthouse, Anchorage, Alaska.

District offices	*Address*
1	1600 Customhouse, Boston 9, Mass.
2	748 Federal Bldg., New York 14, N. Y.
3	1005 U. S. Customhouse, Philadelphia 6, Pa.
4	508 Old Town Bank Bldg., Baltimore 2, Md.
5	402 New Post Office Bldg., Norfolk 10, Va.; (ship office) 106 Post Office Bldg., Newport News, Va.
6	411 Federal Annex, Atlanta 3, Ga.; (suboffice) 214 Post Office Bldg., Savannah, Ga.
7	312 Federal Bldg., Miami 1, Fla.; (suboffice) 409–410 Post Office Bldg., Tampa 2, Fla.
8	400 Audubon Bldg., New Orleans 16, La.; (suboffice) 419 U. S. Courthouse and Customhouse, Mobile 10, Ala.
9	324 U. S. Appraisers Bldg., Houston 11, Tex.; (suboffice) 329 Post Office Bldg., Beaumont, Tex.; (ship office) 406 Post Office Bldg., Galveston, Tex.

District offices	*Address*
10	500 U. S. Terminal Annex Bldg., Dallas 2, Tex.
11	539 U. S. Post Office and Courthouse Bldg., Los Angeles 12, Calif.; (suboffice) 15–C U. S. Customhouse, San Diego 1, Calif.; (ship office) 326 U. S. Post Office and Courthouse, San Pedro, Calif.
12	323–A Customhouse, San Francisco 26, Calif.
13	307 Fitzpatrick Bldg., Portland 5, Oreg.
14	801 Federal Office Bldg., Seattle 4, Wash.
15	521 Customhouse, Denver 2, Colo.
16	208 Uptown Post Office and Federal Courts Bldg., St. Paul 2, Minn.
17	3200 Fidelity Bldg., Kansas City 6E, Mo.
18	1300 U. S. Courthouse, Chicago 4, Ill.
19	1029 New Federal Bldg., Detroit 26, Mich.
20	328 Federal Bldg., Buffalo 3, N. Y.
21	502 Federal Bldg., Honolulu 1, T. H.
22	322–323 Federal Bldg., San Juan 13, P. R.
23	7–8 Shattuck Bldg., Juneau, Alaska; (suboffice) 53 U. S. Post Office and Courthouse Bldg., Anchorage, Alaska.
24	22nd & E Streets, N. W., Washington 25, D. C.

PRIMARY MONITORING STATIONS	SECONDARY MONITORING STATIONS
Allegan, Mich.	Searsport, Maine
Grand Island, Nebr.	Spokane, Wash.
Kingsville, Tex.	Twin Falls, Idaho
Millis, Mass.	Fort Lauderdale, Fla.
Santa Ana, Calif.	Lexington, Ky.
Laurel, Md.	Muskogee, Okla.
Livermore, Calif.	Fairbanks, Alaska
Portland, Oreg.	
Powder Springs, Ga.	
Lanikai, Oahu, T. H.	
Anchorage, Alaska.	

COMMON CARRIER BUREAU FIELD OFFICES

Atlanta, Ga., 733 Hurt Bldg.
New York, N. Y., 90 Church Street.
St. Louis, Mo., 815 Olive Street.
San Francisco, Calif., 180 New Montgomery Street.

2. PUBLICATIONS

The Commission is unable to make public distribution of its printed publications but makes them available by purchase from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at the prices indicated in the following list:

Title	*Price*
Communications Act of 1934, with amendments and index, revised to Jan. 1952	$0.25
Public Law 554, Communications Act Amendments, 1952	.05
Federal Communications Commission reports (bound volumes of decisions and orders exclusive of annual reports):	
Volume 3, July 1936 to February 1937	2.00
Volume 4, March 1937 to Nov. 15, 1937	1.50
Volume 5, Nov. 16, 1937, to June 30, 1938	1.50
Volume 6, July 1, 1938, to Feb. 28, 1939	1.50
Volume 7, March 1, 1939, to Feb. 29, 1940	1.50
Volume 8, March 1, 1940, to Aug. 1, 1941	1.50
Volume 10, April 1, 1943, to June 30, 1945	2.00
Volume 11, July 1, 1945, to June 30, 1947	3.75
Volume 12, July 1, 1947, to June 30, 1948	3.50
Annual reports of the Commission:	
Thirteenth Annual Report—Fiscal year 1947	.25
Fourteenth Annual Report—Fiscal year 1948	.30
Fifteenth Annual Report—Fiscal year 1949	.35
Sixteenth Annual Report—Fiscal year 1950	.40
Seventeenth Annual Report—Fiscal year 1951	.40
Eighteenth Annual Report—Fiscal year 1952	(1)
Statistics of the Communications Industry:	
For the year 1939	.25
For the year 1940	.20
For the year 1942	.35
For the year 1943	.30
For the year 1945	.50
For the year 1946	.55
For the year 1947	.75
For the year 1948:	
Secs. A and B	1.00
Sec. B (Broadcast only)	.35
For the year 1949:	
Secs. A and B	1.00
Sec. B (Broadcast only)	.25
For the year 1950:	
Sec. A (Common Carrier only)	.50
Report on Public Service Responsibility of Broadcast Licensees (Blue Book), 1946	.35
The Safety and Special Radio Services—a Public Primer, 1950	.15
Telephone and Telegraph—a Public Primer, 1949	.10
An Economic Study of Standard Broadcasting, 1947	.40
Study Guide and Reference Material for Commercial Radio Operator Examinations, revised to Feb. 1, 1951	.35
Standards of Good Engineering Practice:	
Concerning Standard Broadcast Stations, revised to Oct. 30, 1947	1.25
Sec. 26, Sunrise and Sunset Table	.10
Concerning FM Broadcast Stations, revised to Jan. 18, 1950	.10

[1] In the process of printing—available at Government Printing Office at a later date.

Title	Price
Rules and Regulations:	
Part 0, Organization, Delegation of Authority, etc	[2]
Part 1, Practice and Procedure, revised to Dec. 29, 1949	[2]
Part 2, Frequency Allocations and Radio Treaty Matters; General Rules and Regulations, revised to Dec. 20, 1950	$0.20
Part 3, Radio Broadcast Services, revised to Dec. 13, 1950	.20
Part 4, Experimental and Auxiliary Broadcast Services, revised to Oct. 30, 1950	.15
Part 5, Experimental Radio Services, revised to Jan. 16, 1948	[2]
Part 6, Public Radiocommunication Services, revised to Apr. 27, 1949	.10
Part 7, Stations on Land in the Maritime Services, effective July 23, 1951	.20
Part 8, Stations on Shipboard in the Maritime Services, effective July 23, 1951	.25
Part 9, Aeronautical Services, revised to July 1, 1947	.15
Part 10, Public Safety Radio Services, revised to Apr. 27, 1949	.15
Part 11, Industrial Radio Services, revised to Apr. 27, 1949	.10
Part 12, Amateur Radio Service, revised to June 6, 1951	.10
Part 13, Commercial Radio Operators, revised to June 27, 1950	.05
Part 14, Radio Stations in Alaska (Other than Amateur and Broadcast), revised to Apr. 28, 1948	[3]
Part 15, Restricted Radiation Devices, recodified July 21, 1948	[3]
Part 16, Land Transportation Radio Services, revised to Apr. 27, 1949	.10
Part 17, Construction, Marking and Lighting of Antenna Structures, effective Feb. 15, 1951	.05
Part 18, Industrial, Scientific and Medical Service, revised to Jan. 25, 1950	.05
Part 19, Citizens Radio Service, effective June 1, 1949	.10
Part 20, Disaster Communications Service, effective Mar. 21, 1951	.05
Part 31, Uniform System of Accounts for Class A and Class B Telephone Companies, revised to May 12, 1948	.40
Part 33, Uniform System of Accounts for Class C Telephone Companies, revised to May 12, 1948	.30
Part 34, Uniform System of Accounts for Radiotelegraph Carriers, revised to Oct. 14, 1949	.20
Part 35, Uniform System of Accounts for Wire-telegraph and Ocean-cable Carriers, revised to Oct. 14, 1949	.25
Part 41, Telegraph and Telephone Franks, revised to Dec. 4, 1947	.05
Part 43, Reports of Communication Common Carriers and Their Affiliates, revised to July 21, 1948	.10
Part 45, Preservation of Records of Telephone Carriers, effective Oct. 1, 1950	.10
Part 46, Preservation of Records of Wire-telegraph, Ocean-cable and Radiotelegraph Carriers, effective Oct. 1, 1950	.10
Part 51, Occupational Classification & Compensation of Employees of Class A and Class B Telephone Companies, effective Oct. 10, 1951	.05
Part 52, Classification of Wire-telegraph Employees, effective July 11, 1944	.05

[2] Being revised—not available at present.

[3] Obtainable temporarily from the Federal Communications Commission without charge.

Title	Price
Rules and Regulations—Continued	
Part 61, Tariffs, Rules Governing the Construction, Filing and Posting of Schedules of Charges for Interstate and Foreign Communications Service, revised to Aug. 1, 1946	$0.10
Part 62, Applications under Sec. 212 of the Act to Hold Interlocking Directorates, revised to May 23, 1944	.05
Part 63, Extension of Lines and Discontinuance of Service by Carriers, revised to Dec. 30, 1946	[3]
Part 64, Miscellaneous Rules Relating to Common Carriers, revised to July 16, 1948	.10

[3] Obtainable temporarily from the Federal Communications Commission without charge.

Purchasers of the Commission's Rules and Regulations are furnished a form by the Superintendent of Documents which, when filled out and forwarded to the Commission, entitles the purchaser to receive any future amendments to the part or parts purchased until a complete revision thereof is reprinted. In the event any exception is made in this procedure, rule purchasers will be advised by letter where the amendments may be obtained. AM and FM Standards of Good Engineering Practice and most of the rule parts are printed on 8- by 10½-inch pages and punched to fit standard three-ring binders.

The Commission is not able to supply lists of radio stations but, on request, will furnish a fact sheet about commercial sources of such lists, also one on commercial radio publications and services.

3. TREATIES AND OTHER INTERNATIONAL AGREEMENTS

International treaties, agreements, and arrangements relating to radio and telecommunications which were in force and to which the United States was a party as of September 17, 1952, are listed below. Unless otherwise indicated, copies of these documents may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Date	Series [1]	Subject
1910		Ship Act of 1910 as amended July 23, 1912. (Those provisions relating to required radio communication for ships navigating the Great Lakes.)
1925	T. S. 724–A	Arrangements between the United States of America, Great Britain, Canada, and Newfoundland effected by exchange of notes September and October 1925, providing for the prevention of interference by ships off the coast of these countries with radio broadcasting. (Not available at the Government Printing Office.)
1928 and 1929	T. S. 767–A	Arrangement effected by exchange of notes between the United States of America and Dominion of Canada governing radio communications between Private Experimental Stations. Signed Oct. 2, 1928, Dec. 29, 1928, and Jan. 12, 1929.
1929	T. S. 777–A	Arrangement between the United States of America, Canada, Cuba, and Newfoundland relating to assignment of high frequencies on the North American continent effected by exchange of notes signed at Ottawa Feb. 26 and 28, 1929. (Cuba ceased to be party by virtue of notice to Canadian Government of Oct. 5, 1932, effective Oct. 5, 1933. Arrangement still in force with respect to United States of America, Canada, and Newfoundland.) (Not available at the Government Printing Office.)

[1] T. S.—Treaty Series. E. A. S.—Executive Agreement Series. TIAS.—Treaties and other International Act Series.

Date	Series [1]	Subject
1929	T. S. 910	Safety of Life at Sea Convention with Regulations between the United States of America and Other Powers, signed at London May 31, 1929.
1930	T. S. 921	Amendment to Regulation XIX of Annex 1 to the Safety of Life at Sea *Convention, Dec. 31, 1930.*
1934		Communications Act of 1934, as amended.
1934	E. A. S. 62	Radio communications between private experimental stations and between amateur stations. Arrangement between the United States of America and the Dominion of Canada (continuing arrangement effected by exchange of notes signed Oct. 2, 1928, Dec. 29, 1928, and Jan. 12, 1929) effected by exchange of notes signed Apr. 23 and May 2 and 4, 1934. Effective May 4, 1934. (Not available at the Government Printing Office.)
1934	E. A. S. 66	Radio communications between amateur stations on behalf of third parties. Arrangement between the United States of America and Peru. Effective May 23, 1934.
1934	E. A. S. 72	Radio communications between amateur stations on behalf of third parties. Arrangement between the United States of America and Chile. Effected by exchange of notes signed Aug. 2 and 17, 1934.
1937	E. A. S. 109	Exchange of information concerning issuance of radio licenses. Agreement between the United States of America and Canada. Effected by exchange of notes signed Mar. 2 and 10, Aug. 17, Sept. 8, and 20, Oct. 9, 1937. This agreement was largely superseded by the notification procedure established in the NARBA (T. S. 777-A, T. S. 962, E. A. S. 227 and TIAS 1553) and under the Inter-American Radio Communications Convention (T. S. 938). (Not available at the Government Printing Office.)
1937	T. S. 962	North American Regional Broadcasting Agreement between the United *States of America, Cuba, Dominican Republic, Haiti, and Mexico.* Signed at Habana, Dec. 13, 1937. NOTE: See E. A. S. 227 and TIAS 1553 which supplement this agreement. (Not available at the Government Printing Office.)
1937	T. S. 938	Inter-American Radio Communications Convention between the United States of America and other Powers. Signed at Habana, Dec. 13, 1937. (First Inter-American Conference.)
1938	E. A. S. 142	Radio Communications between Alaska and British Columbia. Agreement between the United States of America and Canada effected by exchange of notes June, July, August, September, October, November, December 1938.
1938	T. S. 949	Regional Radio Convention between the United States of America (in behalf of the Canal Zone) and Other Powers. Signed at Guatemala City, Dec. 8, 1938. (Not available at the Government Printing Office.)
1938	E. A. S. 136	Radio Broadcasting Arrangement between the United States of America and Canada. Effected by the exchange of notes signed Oct. 28 and Dec. 10, 1938. (Not available at the Government Printing Office.)
1939	E. A. S. 143	Use of Radio for Civil Aeronautical Services. Arrangement between the United States of America and Canada. Effective Feb. 20, 1939. (Not available at the Government Printing Office.)
1940	E. A. S. 196	Agreement between United States of America and Mexico with regard to broadcasting effected by an exchange of notes signed Aug. 24 and 28, 1940. Effective Mar. 29, 1941. (Not available at the Government Printing *Office.)*
1941	E. A. S. 227	Supplementary North American Regional Broadcasting Agreement signed at Washington, Jan. 30, 1941. (See T. S 962 and TIAS 1553.)
1944	E. A. S. 400	Agreement with Canada Regarding Construction and Operation of Radio Broadcasting Stations in North Western Canada, effected by exchange of notes signed at Ottawa, Nov. 5 and 25, 1943 and Jan. 17, 1944. This Agreement is to "cease with termination of the war." (Not available at the Government Printing Office.)
1946	TIAS 1553	North American Regional Broadcasting Interim Agreement between the United States of America and Other Governments (Modus Vivendi). Signed at Washington, Feb. 25. 1946. NOTE: See T. S. 962 and E. A. S. 227. Amended by TIAS 1802.
1946	TIAS 1527	Agreement between the United States of America and Union of Soviet Socialist Republics on Organization of Commercial Radio Teletype Communication Channels. Signed at Moscow, May 24, 1946.
1947	TIAS 1726	*Agreement* between United States of America and Canada providing for frequency modulation broadcasting in channels in the r. f. band 88–108 Mc. Effected by exchange of notes signed at Washington, Jan. 8 and Oct. 15, 1947. (Not available at the Government Printing Office.)
1947	TIAS 1670	Interim Arrangement between the United States of America and Canada with respect to Mobile Radio Transmitting Stations. Effected by Exchange of Notes, signed at Washington June 25 and Aug. 20, 1947.
1947	TIAS 1901	International Telecommunication Convention, Final Protocol and Radio Regulations. *Signed at Atlantic City, N. J., Oct. 2, 1947, superseding* the International Telecommunication Convention, Madrid, 1932. Radio Regulations effective Jan. 1, 1949, except for Regulations enumerated in Article 47. However, the effective date provisions of Article 47 have been superseded by the provisions of the Agreement signed at the Extraordinary Administrative Radio Conference Geneva, 1951 (see below). (This printing does not contain the Additional Radio Regulations, since the United States is not a party thereto. Copies of the final acts of the Atlantic City conferences which include the Additional Radio Regulations are available only from the International Telecommunication Union, Geneva, Switzerland.)

Date	Series [1]	Subject
1947	TIAS 1652	Telecommunication Standardization of Distance Measuring Equipment Agreement between the United States of America and the United Kingdom of Great Britain and Northern Ireland. Signed at Washington Oct. 13, 1947.
1947	TIAS 1676	Agreement between the United States of America and the United Nations relative to headquarters of the U. N. Signed at Lake Success June 26, 1947; brought into force Nov. 21, 1947, by an exchange of notes between the United States Representative to the United Nations and the Secretary-General of the U. N. (The provisions of this agreement were also made Public Law 357 of the 80th Cong. approved Aug. 4, 1947.)
1948	TIAS 1802	Radio Broadcasting. Engineering Standards Applicable to the Allocation of Standard Broadcasting Stations (540–1600 kc.). Arrangement between the United States of America and Canada. Effective Apr. 1, 1948. (Not available at the Government Printing Office.)
1949		Telecommunications Agreement between the United States of America and certain British Commonwealth Governments. Signed at London, August 12, 1949. Effective February 24, 1950. (Not available as of July 21, 1950, but to be published shortly by Government Printing Office).
1949		Inter-American Radio Agreement between the United States and Canada and other American Republics.[2] (Fourth Inter-American Radio Conference). Signed at Washington, July 9, 1949. Entered into force April 13, 1952, subject to provisions of Article 13. (Not available from Government Printing Office. Available from International Telecommunication Union, Geneva, Switzerland.)
1949		Telegraph Regulations (Paris Revision, 1949) annexed to the International *Telecommunication Convention (Atlantic City, 1947) and Final Protocol* to the Telegraph Regulations. Signed at Paris, August 5, 1949. Effective July 1, 1950. Instrument of ratification of the United States deposited with the International Telecommunication Union September 26, 1950.
1950	TIAS 2223	Radio communications between amateur stations on behalf of third parties. Arrangement between U. S. A. and Ecuador. Effective March 17, 1950. (Not available as of July 21, 1950, but to be published shortly by Government Printing Office.)
1951		Radio communications between amateur stations on behalf of third parties. Agreement between U. S. A. and Liberia effective January 11, 1951.
1951	TIAS 2366	Agreement between the United States of America and Mexico which assigns television frequency channels to cities within 250 miles of the United States-Mexican border. Effected by exchange of notes dated Aug. 10, 1951, and Sept. 26, 1951.
1951		Agreement signed at the Extraordinary Administrative Radio Conference to bring into force the Table of Frequency Allocations and other provisions of the Radio Regulations (Atlantic City, 1947) not yet in force. Signed at Geneva, Dec. 3, 1951. Entered into force Mar. 1, 1952. (Not available at Government Printing Office. Available from International Telecommunication Union, Geneva, Switzerland.)
1952		Radio communications between amateur stations on behalf of third parties. Agreement between U. S. A. and Cuba effective Apr. 14, 1952. (Not yet available but to be published by Government Printing Office as a TIAS document.)
1952		Treaty with Canada effective May 15, 1952 relating to mutual recognition by the United States and Canada of certain radio station and operator licenses issued by either country. Not available from the Government Printing Office.
1952		Agreement between the United States of America and Canada which assigns television frequency channels to cities within 250 miles of the United States-Canadian border. Effected by exchange of notes dated April 23, 1952 and June 23, 1952. Entered into force June 23, 1952. (Not available at Government Printing Office.)

[2] In addition, certain Resolutions and Recommendations were adopted by a number of countries, member of the International Telecommunication Union Region 2 at Washington, July 9, 1949. (Not available Switzer-Government Printing Office. Available from International Telecommunication Union, Geneva, *from land.)*

In addition, the United States is bound by certain other treaties and agreements which are generally considered as superseded because certain of the contracting countries other than the United States did not become a party to subsequent treaties and agreements. The United States is, in such instances, bound to the original document with respect to our relations with those particular countries. These include the following:

Date	Series [1]	Subject
1912	T. S. 581	International Radiotelegraph Convention, Final Protocol and Service Regulations. Signed at London, July 5, 1912. (Not available at the Government Printing Office.)
1927	T. S. 767	International Radiotelegraph Convention and General Regulations. Signed at Washington Nov. 25, 1927.
1932	T. S. 867	International Telecommunications Convention; General Radio Regulations annexed to the International Telecommunications Convention, signed at Madrid Dec. 9, 1932. (Not available at the Government Printing Office.)
1937	E. A. S. 200	Inter-American Arrangement concerning Radiocommunications and Annex. Signed at Habana, Dec. 13, 1937. This arrangement was replaced by Inter-American Agreement concerning Radiocommunications, signed at Santiago, Jan. 26, 1940, E. A. S. 231. Countries which approved the 1937 arrangement but which have not yet approved the 1940 arrangement are Dominican Republic, Haiti, Mexico, Panama, and Peru. (Not available at the Government Printing Office.)
1938	T. S. 948	General Radio Regulations (Cairo Revision, 1938) and Final Radio Protocol (Cairo Revision, 1938) annexed to the International Telecommunication Convention of Madrid, 1932. Superseded by Radio Regulations annexed to the International Telecommunication Convention, Atlantic City, 1947.
1940	E. A. S. 231	Inter-American Radio Communications Agreement between the United States, Canada and other American Republics (Second Inter-American Radio Conference), signed at Santiago, Chile, Jan. 26, 1940.

[1] T. S.—Treaty Series. E. A. S.—Executive Agreement Series. TIAS.—Treaties on other International Act Series.

The following treaties, agreements, and arrangements have been signed by the United States and are included for informational purposes because of their importance or the imminence of their effective dates:

Date	Subject
1948	International Convention for the Safety of Life at Sea and annexed Regulations. Signed at London, June 10, 1948. Enters into force Nov. 19, 1952, subject to the provisions of Article 11 of the Convention.
1950	North American Regional Broadcasting Agreement between the United States of America, Canada, Cuba, Dominican Republic, United Kingdon of Great Britian and Northern Ireland for the Territories in the North American Region (Bahama Islands and Jamaica). Signed at Washington D. C., November 15, 1950. Agreement will enter into force subsequent to ratification of at least three of these four countries, in accordance with part III, paragraph I, of the agreement: Canada, Cuba, Mexico and the United States of America, subject to ratification procedure in the United States. (Not available from Government Printing Office. Available through the International Telecommunication Union, Geneva, Switzerland.)
1952	Agreement between the United States of America and Canada for the purpose of promoting Safety on the Great Lakes by means of Radio. The Agreement applies to vessels of all countries as provided for in Article 3. Enters into force 2 years from the date of exchange of instruments of ratification. Ratified by the United States July 17, 1952. Instruments of ratification not yet exchanged. (Not available at the Government Printing Office.

There are in addition to the foregoing, certain treaties, agreements, or arrangements primarily concerned with matters other than the use of radio but which affect the work of the Federal Communications Commission insofar as they involve communications. Among the most important of these are the following:

Date	Series [1]	Subject
1944	TIAS 1591	International Civil Aviation Convention. Signed at Chicago, Dec. 7, 1944. Effective April 4, 1947.
1946		Special Radio Technical Meeting (COT), Montreal.[3]
1946 to present.		ICAO Regional Air Navigation Meetings, Communications Committee Final Reports.[3]
1946		ICAO Communication Division, Second Session, Montreal.[3]
1949		ICAO Communication Division, Third Session, Montreal.[3]
1951		ICAO Communication Division, Fourth Session, Montreal.[3]

[1] T. S.—Treaty Series. E. A. S.—Executive Agreement Series. TIAS.—Treaties and Other International Act Series.

[3] Not available from Government Printing Office. Available from Secretary General of ICAO, International Aviation Building, 1080 University Street, Montreal, Canada.

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