FCC

Federal Communications Commission

20th annual report
Fiscal year ended June 30, 1954

With introductory summary and notations throughout of subsequent important developments.

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COMMISSIONERS

Members of the Federal Communications Commission
(As of June 30, 1954)

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(Term expires June 30, 1959)

EDWARD M. WEBSTER
(Term expires June 30, 1956)

GEORGE E. STERLING[2]
(Term expires June 30, 1957)

FRIEDA B. HENNOCK
(Term expires June 30, 1955)

ROBERT T. BARTLEY
(Term expires June 30, 1958)

JOHN C. DOERFER[3]
(Term expires June 30, 1961)

ROBERT E. LEE[4]
(Term expires June 30, 1960)

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[1] Succeeded as Chairman October 4, 1954, by George C. McConnaughey.
[2] Resigned as of September 30, 1954; succeeded by George C. McConnaughey October 4, 1954.
[3] Reappointed June 4, 1954; confirmed June 29, 1954.
[4] Took office October 6, 1953; succeeded Paul A. Walker.

LETTER OF TRANSMITTAL

FEDERAL COMMUNICATIONS COMMISSION,
Washington 25, D. C., September 29, 1954.

To the Congress of the United States:

In compliance with section 4 (k) of the Communications Act of 1934, as amended in 1952, there is herewith submitted the annual report of the Federal Communications Commission for the fiscal year 1954.

This report is of particular interest because it marks the 20th anniversary of Government regulation of electrical communication services as coordinated in and exercised by this Commission.

Therefore, in addition to reporting on events of the year ending June 30, 1954, this report contains background historical reference and notations of subsequent important developments up to the time of going to press.

Biographical data with respect to persons taken into the employment of the Commission during the year, together with the names of persons who have left its employ during that period, are being transmitted as a nonprinted supplement to this report.

Respectfully,

ROSEL H. HYDE, *Chairman.*

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Introductory Summary

ANNIVERSARY HIGHLIGHTS

The 20th anniversary year of the Federal Communications Commission saw the Nation studded with and served by more than

700,000 radio transmitters,
50 million telephones, and
nearly 3½ million channel miles of telegraph circuitry.

Fifty different nonbroadcast services were serving the general public, business, industry, and individuals on the land, on the sea, and in the air. By major groups they comprised

46,000 marine stations with 44,000 transmitters,
40,000 aviation stations with 42,000 transmitters,
21,000 industrial stations with 146,000 transmitters,
15,000 public safety stations with 165,000 transmitters,
14,000 land transportation stations with 139,000 transmitters,
123,000 amateur stations with 116,000 transmitters; also
over 1,600 common carrier radio stations, and
nearly 600 experimental radio stations.

Eleven categories of broadcast station authorizations were nearing the 6,000 mark. Program service was being rendered by two types of aural stations plus an expanded video service to which compatible color had been added. The close of the fiscal year showed these broadcast authorization totals:

2,697 commercial AM stations
573 commercial TV stations
30 educational TV stations
569 commercial FM stations
123 educational FM stations
1,728 pickup, studio-transmitter links, and other auxiliary stations.

The Bell Telephone System handled a daily average of more than 153 million messages. It operated a national network of coaxial cable and microwave facilities, of which 5 million circuit-miles were radio. Over 80 percent of all Bell telephones were dial operated. More than

500 mobile radiotelephone systems were in operation. Radiotelephone service was provided to 111 overseas points. For the first time, international radiotelephony exceeded 1 million calls.

Western Union handled 162 million land-line messages during the year. Besides operating a regional microwave telegraph system, it had linked nearly 250 large branch offices in nonreperforator cities with its mechanical reperforator relay system, was serving more than 22,000 teleprinter installations and over 13,000 deskfax (facsimile) instruments. Through direct radio connections with 87 countries, and cable systems to Europe, and Central and South America, telegraph carriers were able to reach the world at large. International telegraph traffic amounted to 511 million paid words.

More than 962,000 radio operator authorizations of different classes were outstanding. The two categories numbered

nearly 850,000 commercial radio operators, and
more than 120,000 amateur radio operators.

The net result was that at the close of two decades the Commission had on its books more than 1,200,000 authorizations in the radio field alone.

* * *

Following are group summaries of the Commission's activities and the services it regulates which are detailed elsewhere in this report.

National Defense

Chief among the national defense activities of the Commission is administration of the CONELRAD (control of electromagnetic radiation) program. The purpose is to prevent radio transmissions being used to guide enemy aircraft in event of attack, also to harness radio stations to the defense effort.

CONELRAD has been applied to broadcast, aviation, and public safety stations, and arrangements are being made to extend it to all other radio services, and to radio facilities in our outlying possessions.

The Commission is also active in the coordinated effort of military and civilian Federal bodies and the communications industry to see that wire and radio media are integrated into the defense program, that essential circuits will be available under any eventuality and, further, that our vital communications facilities are adequately safeguarded.

On June 10, 1954, the Commission proposed to deny amateur or commercial radio operator licenses to members of subversive groups. Decision was still pending. Commission licenses have always been limited to citizens.

Frequency Allocation

In the international frequency allocation field, the Commission was concerned chiefly with carrying out domestically the provisions of the Geneva Agreement, in which 65 countries agreed on an orderly use of bands of frequencies for the different radio services on a worldwide basis. It continued to implement a subsequent Atlantic City conference with reference to the division and use of these frequencies in our own country. This involved extensive coordination with and notification to the other nations concerned.

The Commission assisted in the United States preparation for and participation in 13 international radio conferences and meetings during the year, was preparing for 5 additional conferences, and 25 others were scheduled.

Common Carrier Services

Telephone.—The 50-millionth telephone in this country was installed in the White House in November 1953. It was 1 of the 2,000,000 added in 1953. About 82 percent, or 41 million, of these telephones are operated by the Bell System. The number of domestic telephones now exceeds 51 million.

Bell's $1.4 billion construction during calendar 1953 included 234 wire line and 652 microwave radio grants by the Commission. Bell now provides more than 5 million telephone circuit-miles by microwave radio. It also operates more than 54,000 miles of broad-band channels, mostly by radio, in relaying programs to 300 TV stations. In addition, more than 500 mobile radiotelephone systems are in operation.

The public used more telephone service in 1953 than ever before. Bell daily averaged 147 million local and 6.3 million toll calls. It had revenues of $4.4 billion for 1953, up 9 percent over the previous year, and its consolidated net income was $479 million, an increase of 17.7 percent.

The Commission permitted several increases in telephone rates during the fiscal year to offset increasing costs of operation and to provide reasonable earnings. Effective October 1, 1953, Bell companies increased rates for interstate message toll service by $65 million a year, or 8 percent. On November 1, 1953, the Northwestern Bell Telephone Co. increased exchange rates by $900,000 a year in 13 border exchanges in Iowa which furnish interstate service. The Commission also permitted increases of about $200,000 a year to become effective July 1, 1954, on telephone service between the United States and Alaska. This increase accrues to the Alaska Communications System. The Commission prescribed depreciation rates for three Bell companies and revised depreciation rates for three other Bell companies. The effect is to reduce depreciation charges by $3 million a year.

Telegraph.—The Western Union Telegraph Co., the single domestic telegraph carrier, reported 162 million land-line messages in 1953 as compared to 160 million in 1952. Total land-line revenues increased to $208 million as compared to $184 million in 1952, with a large part of this increase resulting from the growth in private line service. Net earnings from all Western Union operations, both land line and cable, amounted to $14.5 million as compared to $1.7 million in 1952, when its earnings were depressed by a 2 months' strike.

Despite improvements in facilities and operations, the speed of handling telegrams was slightly slower in 1953 than in the previous year. As one means of improving service, the company is increasing direct connections with customers, and at the end of fiscal 1954 had 13,534 deskfax and 22, 586 teleprinter tieline installations.

Twelve hundred applications for reductions in hours or closures of telegraph offices were filed with the Commission in fiscal 1954 as compared to 1,953 applications in fiscal 1953.

On June 15, 1954, Western Union filed tariffs proposing general increases in telegraph rates which it estimated would amount to $10 million a year. The company claimed that this was necessary to offset increased wages and to restore declining earnings. After study, the Commission permitted the increase, effective July 15. On April 22, 1954, it authorized Western Union to increase rates for tickers used in leased facilities service.

International.—International telegraph carriers reported 511 million paid words in calendar 1953, which was 1 percent below the 1952 volume. Their total revenues for that year increased by 3.7 percent to $60 million. This reflected higher collection rates on inbound traffic and growth in leased circuits.

International radiotelephony, born in the 1920's, exceeded 1 million calls for the first time, which was an increase of 7.1 percent over the previous year.

At the close of fiscal 1954, telegraph service was provided direct to 87 countries and through them to the rest of the world.

Telephone service was available on 63 direct circuits and via both direct and indirect circuits to 111 foreign countries and overseas points.

The Commission is well along in its program to transfer operations of radio carriers to "in band" frequencies in accordance with frequency allocations in international agreements.

The United States Supreme Court remanded to the Commission the case covering applications of Mackay Radio and Telegraph Co. to establish radiotelegraph circuits to the Netherlands and Portugal in competition with existing service of RCA Communications, Inc. The Court held that the Commission should base its findings upon benefits

that would accrue from such competition rather than upon a view that a national policy favoring competition exists in this field. Further hearings were held and a decision was pending.

In March 1952, the Commission initiated an investigation into the matter of divestment by Western Union of its international telegraph operations as required by law. Hearings were concluded during fiscal 1954 and the matter was awaiting initial decision.

Safety and Special Radio Services

With more than 260,000 authorizations involving the use of over 650,000 transmitters, the Safety and Special Radio Services constitute the largest and most active group of radio-communication facilities in use today.

These services represent the employment of radio by ships afloat and by planes in the air, by police and fire departments, by electric and gas companies, by highway and forestry agencies, by railroad and streetcar systems, by ambulances, taxicabs, trucks, and buses, and by a host of other interests as well as by individuals.

This usage now extends from the cradle to the grave. There are radio facilities for calling doctors and ambulances to the homes of expectant mothers as well as other persons requiring emergency medical assistance, and for speeding milk and other essentials to the newborn—even diaper pickup-and-delivery services. During life's span, radio protects public and personal safety and property, and is used for a myriad of business and individual purposes. At the omega of life, radio is utilized to dispatch vehicles in connection with death and burial, to the inclusion of directing the movement of funeral processions at large cemeteries.

Broadcast Services

In the overall broadcast field, the multiple ownership rules were amended to preclude direct or indirect common interest in more than 7 AM, 7 FM, and 7 TV commercial stations, and Congress was requested to change a 1952 amendment to the Communications Act which enables a "party in interest" not only to protest but also to hold up a new broadcast station grant. The Supreme Court upheld the right of the Commission to adopt rules to enforce the law's ban on the broadcast of lotteries, but invalidated that portion of the Commission's rules defining audience participation as a consideration.

Significant developments in the respective broadcast services were:

TV.—Compatible color standards were adopted on December 17, 1953. They permit color transmissions to be received in color on new sets manufactured for that purpose and in black and white on existing sets.

Both Congress and the Commission were concerned by problems of UHF operation and were studying the situation. Meanwhile, the Commission has increased the previous 5 commercial TV station maximum to 7, providing that at least 2 are UHF; is considering applications for UHF stations to duplicate the programs and so extend the coverage of parent stations; has proposed to bar a station from contracting with a network to keep stations in neighboring communities from receiving network programs; and has invited comments to a proposal that TV stations be permitted to operate their own intercity relay facilities in preference to using more costly common carrier facilities.

At the fiscal year end, of 573 existing commercial TV grants 233 were for UHF, of which latter number 137 had operating authorizations. However, of 87 TV grants canceled since the lifting of the freeze, 69 were for UHF.

The Commission was giving increased attention to problems presented by 300 operating community antenna TV systems and proposals for public subscription TV (pay-as-you-see) service.

Of 30 noncommercial educational TV authorizations, 6 stations were on the air (3 in VHF and 3 in UHF). As of June 30, 1954, no educational TV grant had yet been relinquished. Six educational channels were added during the year, making a total of 251 now reserved for education.

The license period of all TV stations was extended to 3 years, the same as for AM and FM stations.

AM.—Nearly 150 new AM stations were authorized, bringing their total to almost 2,700. Most of the new grants were for local low-powered daytime-only stations.

The North American Regional Broadcasting Agreement (NARBA), signed in 1950, still had not been ratified by the Senate. This delay has had an adverse affect on making new frequency assignments or modifying existing assignments. Negotiations were continuing with Mexico (a nonsignatory nation) looking toward a settlement of border broadcast problems.

The Commission's proceeding affecting "clear channel" AM operation remains dependent upon NARBA ratification. However, on March 11, 1954, the Commission proposed to give increased protection to clear-channel stations from mounting daytime skywave interference.

FM.—Though 22 new commercial FM grants were made, 54 authorizations were deleted, which resulted in a net loss of 32 such stations in the fiscal year. The number of commercial FM authorizations has declined steadily from its peak of 865 in 1949 to 569 at the close of fiscal 1954. Of the latter, however, 553 were in operation.

In an effort to help FM economically, the Commission has proposed that FM stations be permitted to render supplemental services, such

as "functional music," "storecasting" and "transit radio," in order to obtain additional revenue.

Noncommercial educational FM stations, on the other hand, have shown a steady increase over the past 6 years. Their authorizations jumped from 63 in 1949 to 123 in 1954. Of the latter, 117 were operating. Many use low power. Nine new educational FM station grants were made during the year.

Field Engineering and Monitoring

Through 24 district offices, augmented by 18 monitoring stations, the Commission policed traffic in the radio spectrum, gave bearings to ships and planes in distress, inspected all types of radio stations, located and closed unauthorized transmitters, investigated and helped remedy causes of major radio interference, gave radio operator examinations, and performed special technical work for the national defense and for international use as well as for the Commission.

Interference complaints decreased to about 18,000, due largely to the Commission's sponsorship of 370 TV interference committees which function in about 350 communities to handle this problem at the local level.

Fifty-two illegal radio stations were closed. This decrease is responsible in large measure to the growing awareness that illicit operation is speedily detected by FCC monitoring surveillance.

Because of budgetary and personnel limitations, fewer radio-station inspections could be made. However, the field staff did make nearly 10,500 such inspections—over 500 broadcast, 3,300 domestic and foreign ship, and 6,600 miscellaneous.

In studying proposed antennas for their possible obstruction to air navigation, nearly 7,900 such structures were cleared, of which number almost 1,300 were for TV and more than 5,900 were for nonbroadcast (including common carrier) operation.

Research

Control of manmade interference is one of the Commission's chief technical considerations. Rules are being tightened to minimize the disruption of radio communication by noncommunication equipment usng electrical energy for heating purposes, such as industrial, medical, and scientific devices.

These devices collectively now employ power far in excess of that required for all forms of radio communication. Their emissions can affect radio transmissions hundreds and even thousands of miles away. This uncontrolled energy is a particular menace to communication on which the safety of life and property depends, particularly that of the aviation, marine, police, and fire radio services.

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One means employed by the Commission is to pass upon such equipment before it is manufactured and put to use. This is done either by "type approval" of a submitted model which meets Commission laboratory tests, or by "type acceptance" based upon data furnished by the manufacturer. In this way, interference possibilities are minimized at the start.

Particular technical studies by the Commission involved VHF and UHF propagation, station overlap and allocation curves affecting TV; daytime skywave transmission and groundwave intensity curves relating to AM; skip distance and maximum usable frequencies for fixed services; and propagation in connection with aviation frequency shifts. These were in addition to continuing long-range projects, such as the sunspot cycle recording. A much-needed new ground conductivity map was issued as a result of work started last year.

Nearly 600 experimental radio authorizations were held by interests engaged in testing techniques and apparatus intended to better existing services or to develop new services.

Commission

These changes occurred in Commission membership during the year:

Commissioner Rosel H. Hyde, who had served as Chairman since April 18, 1953, under a 1-year Executive appointment, was, on April 19, 1954, designated by the Commission to act as Chairman pending Presidential action. (On September 25, 1954, President Eisenhower appointed George C. McConnaughey to be a member of the Commission, to succeed Commissioner George E. Sterling who resigned as of September 30, and also designated Mr. McConnaughey as Chairman for 1 year. Chairman McConnaughey took office October 4 thereafter.)

On October 6, 1953, Robert E. Lee succeeded Paul A. Walker, whose term expired the previous June 30. Appointed by President Eisenhower, Commissioner Lee's term is to June 30, 1960.

Commissioner John C. Doerfer was, on June 4, 1954, reappointed by President Eisenhower for a regular 7-year term, to June 30, 1961.

There were no major changes in staff organization during the year. The Commission operated with nearly 1,150 employees, about one-third of whom were in the field.

The Commission had an apropriation of $7,400,000 from which, by practicing economies and retrenchments, it was able to effect a saving of nearly $450,000.

The Commission pursued its efforts to streamline administrative procedure and reduce paperwork. These endeavors ranged from legislation to rulemaking, augmented by Commission action in delet-

ing certain reports, simplifying forms, and otherwise cutting administrative corners consistent with legal requirements. Expediting the hearing process continued to receive special attention and action.

Addenda

As of September 30, 1954, TV, AM, and FM broadcast authorizations (not including auxiliary and experimental) totaled 4,044. Of this number, 3,728 were on the air. A breakdown follows:

Service	Authorized	Licensed	On air
TV commercial	578	112	428
TV educational	32	0	7
AM commercial	2,737	2,602	2,616
FM commercial	573	535	559
FM educational	124	117	118
Totals	4,044	3,366	3,728

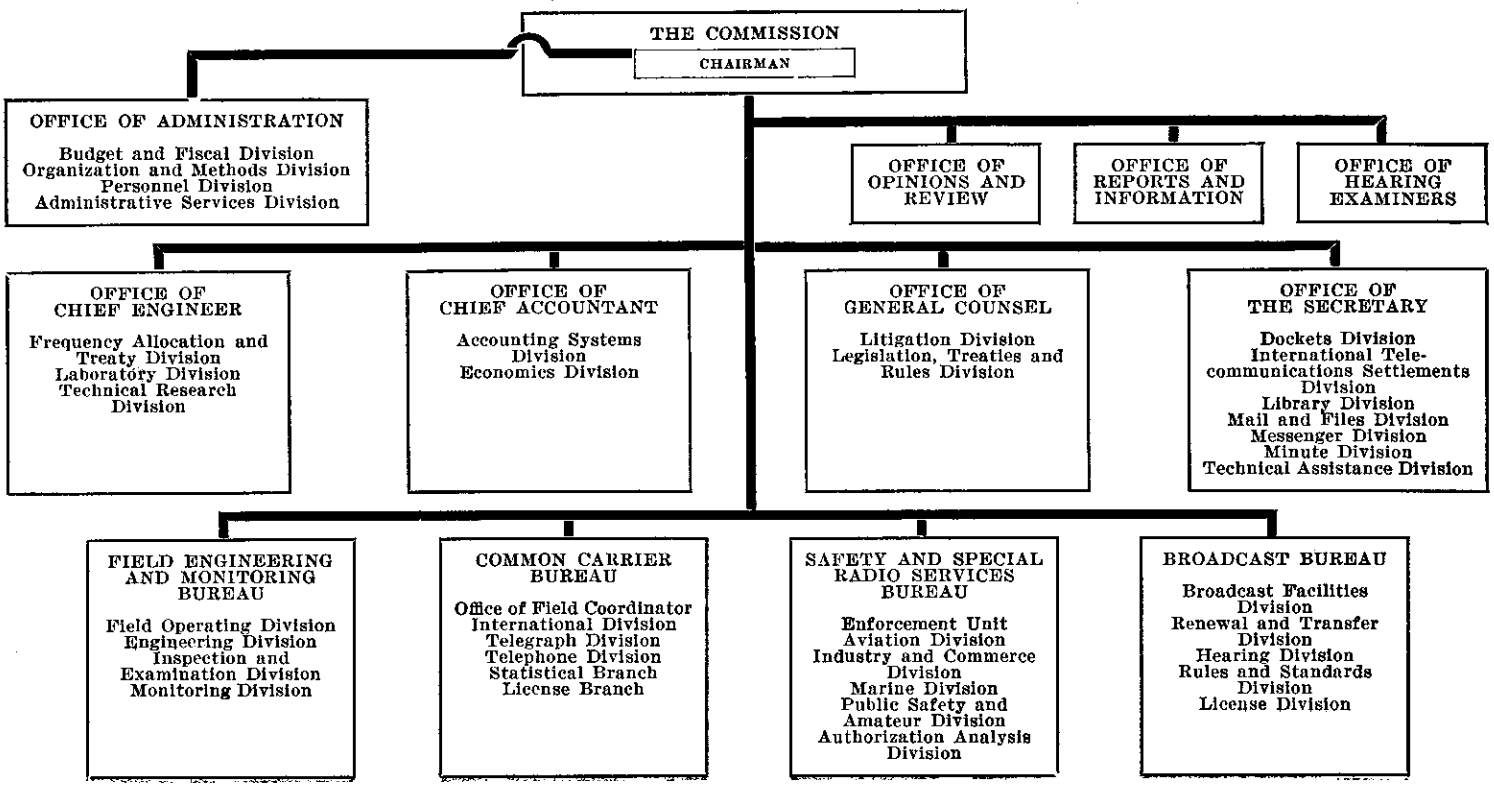
At the same time, the number of authorizations in the nonbroadcast radio services had increased to—

Marine	47,882	Amateur	123,163
Aviation	39,900	Common carrier	1,730
Industrial	22,339	Experimental	607
Public safety	16,308	Miscellaneous	1,273
Land transportation	15,241		

These 268,000 authorizations, collectively, reflect the use of about three times that number of fixed and portable and mobile transmitters.

FEDERAL COMMUNICATIONS COMMISSION

Organization Chart as of June 30, 1954



General

*"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, there is hereby created a commission to be known as the 'Federal Communications Commission' * * *"—(Sec. 1 of the Communications Act).*

20TH ANNIVERSARY

The 1954 fiscal year marked the 20th anniversary of the Federal Communications Commission.

For it was on June 19, 1934 that its creative and authorizing act—the Communications Act of 1934—was signed.

Though a previous law (the Radio Act of 1927) created and gave the predecessor Federal Radio Commission certain regulatory powers over radio, including some radio supervision that had been exercised by the Department of Commerce, it did not give the FRC jurisdiction over telegraph and telephone carriers. Certain powers with respect to such common carriers were vested in a number of different agencies, and regulation was largely ineffective.

Accordingly, in 1933 a Government interdepartmental committee recommended that radio, wire, and submarine cable communication services "should be regulated by a single body". The result was the adoption of the Communications Act of 1934, which established the Federal Communications Commission for that purpose.

That act coordinated in a single agency broadcast regulatory functions previously exercised by the Federal Radio Commission; certain supervision of telephone and telegraph operations formerly vested in the Interstate Commerce Commission; jurisdiction over Government telegraph rates which had been under the Post Office Department; and some powers of the Department of State with respect to submarine-cable landing licenses. It gave the FCC certain additional authority, including broader powers with respect to rates of interstate and international common carriers, and domestic administration of interna-

tional treaties and other agreements concerning electrical communication to which the United States is a party.

When the Commission started to function on July 11, 1934, it had 233 employees, of which number 121 were in Washington. At the the close of its first year, the FCC personnel had increased to 442. During its initial year the Commission operated on an appropriation of $1,888,176.

However, at that time the number of authorized radio stations of all kinds was only about 51,000, and the number of commercial and amateur radio operators collectively was fewer than 67,000.

Today the number of radio authorizations exceeds 1,200,000, including more than 270,000 station authorizations, which cover the use of some 700,000 fixed and mobile transmitters, and more than 960,000 different grades of licenses and permits are held by commercial and amateur radio operators.

The ensuing 20 years have seen the advent of TV and FM as regular broadcast services; entrance of TV into the UHF frequencies and the debut of visual broadcast in color; noncommercial educational FM and TV operation; extension of the usable radio spectrum and the birth of many new nonbroadcast radio services; utilization of radar and other electronic developments; expansion of common-carrier facilities and the use of domestic coaxial cable and microwave adjuncts, and an increasing number of individuals who operate radio transmitters for a livelihood or as a hobby. For radio alone there are now more than 60 categories of users who employ its convenience for a myriad of purposes.

To handle this increased business, the Commission now has about 1,150 employees, one-third of whom are engaged in field engineering work. Its fiscal 1954 appropriation was $7,400,000.

Following is a comparison of radio authorizations of the Commission's 1st year with those of its 20th year:

Class of service	Jan. 30, 1935	June 30, 1954
Marine	2,157	46,299
Aviation	678	40,154
Public safety	298	15,697
Industrial	146	21,598
Land transportation	0	13,945
Broadcast	623	5,881
Experimental	1,012	586
Common carrier	565	1,635
Amateur	45,561	123,287
Other	34	1,037
Subtotal	51,074	270,119
Operators:		
Commercial	[1] 30,000	842,088
Amateur	36,525	120,535
Subtotal	66,525	962,623
Grand total	117,599	1,232,742

[1] Estimated.

Less than 10,000 applications of all kinds were received by the Commission during its first year of operation. In 1953 the number was about 430,000, not including legal and tariff filings.

Many radio operations of two decades ago were on an experimental basis. These included "visual," "high fidelity," and "very high frequency" broadcast, also various embryo nonbroadcast services. Most of today's equipment and techniques developed from such testing, plus developments spurred by World War II requirements.

In 1934 there were two rival domestic wire telegraph companies and various international telegraph carriers operating in the United States. Collectively, they handled nearly 170 million telegraph messages in 1934, of which number about 14 million were international messages. The now single domestic telegraph carrier (Western Union) handled over 162 million landline messages in 1953, while the volume of international telegraph traffic exceeded 511 million words for that year.

Twenty years ago the United States had slightly more than 17 million telephones, over which an average of 74 million calls were made daily. This Nation now has in excess of 50 million telephones from which are made about 185 million calls a day.

The Commission's increased regulatory workload is further reflected in its field engineering activities. For example: in 1934 about 20,200 radio operator applicants were examined in the field and some 12,000 licenses were issued. Last year the field staff conducted more than 115,000 such examinations and issued 179,000 commercial operator authorizations.

Complaints of interference to radio reception in 1934 numbered less than 3,800. Due to the mounting number of radio stations, the extreme sensitiveness of TV reception, and the increased use of electronic equipment and electrical gadgets, the number of interference cases requiring field investigation last year exceeded 18,000.

There is a proportionate increase in other field work, too; such as inspecting radio stations of all types, monitoring the radio spectrum for engineering compliance, furnishing direction finding "fixes" for ships and planes in distress, and obtaining and analyzing technical data for Commission use.

The initial annual report of the Commission for 1935 observed:

"There are no fields of engineering in which new devices and inventions are being disclosed at a more rapid pace than in wire and radio communications. The arts, both in theory and practice, are extremely complex and cover a vast field. New devices and improvements, no matter in what radio or wire services developed, are as a general rule immediately reflected in potentialities for improvement and actual application in all other services."

This is as true today as it was then, but in a greatly magnified degree.

COMMISSION

The Commission is composed of seven Commissioners. Each is appointed by the President subject to Senate confirmation. The normal term of a Commissioner is 7 years. Not more than four Commissioners may be members of the same political party.

The Commissioner who serves as Chairman is normally so designated by the President. In the absence of such an appointment, the Commission is enabled to select one of its members to act in that capacity. The Communications Act designates the Chairman as the chief executive officer of the Commission, to coordinate and organize its work, and to represent the Commission in legislative and other official contacts. Under Commission authorization, the Chairman is responsible for the general administration of its internal affairs.

The Commissioners, who function as a unit, make all policy decisions. In the absence of a quorum of Commissioners, a Board of Commissioners present can function, subject to its actions being later ratified by the Commission en banc.

The Commission assigns specific tasks to committees of Commissioners or individual Commissioners. There are 2 standing committees of Commissioners—the Telegraph Committee and the Telephone Committee—each composed of 3 Commissioners. The Commission also prescribes staff functions.

During the year, these changes occurred in Commission membership:

Commissioner Rosel H. Hyde was, on April 19, 1954, designated by the Commission to act as Chairman pending Presidential action. He had served as Chairman since April 18, 1953, under a 1-year Executive appointment. (George C. McConnaughey was, on September 25, 1954, appointed by President Eisenhower to be a member and also Chairman of the Commission. He took office the following October 4. He succeeded Commissioner George E. Sterling, who resigned as of September 30, for the latter's unexpired term which extends to June 30, 1957. His appointment as Chairman is for one year.)

On October 6, 1953, Robert E. Lee succeeded Paul A. Walker, whose term expired the previous June 30. Appointed by President Eisenhower, Commissioner Lee was confirmed by the Senate on January 25, 1954. His term is to June 30, 1960.

Commissioner John C. Doerfer was, on June 4, 1954, reappointed by President Eisenhower—this time for a regular 7-year term—for which he was confirmed on June 29. Since April 15, 1953, Commissioner Doerfer had filled out the remainder of the term of Robert F. Jones, resigned, which expired June 30, 1954.

A list of Commissioners as of June 30, 1954, with their terms of office appears on the back of the title page to this report. Present and former Commissioners, also their tenure of service, are listed in the appendix.

STAFF ORGANIZATION

As a result of a reorganization initiated in 1949 and completed in 1952, the Commission staff operates on functional rather than professional lines. In other words, the staff is integrated into bureaus and offices on the basis of the Commission's operating requirements. Thus, each of the chief operating bureaus is a self-contained unit with legal, engineering, accounting, administrative, clerical, and other personnel needed to perform its particular functions.

The Commission's 4 bureaus and 8 offices and their respective major units are shown on the organization chart which constitutes a separate page of this chapter.

PERSONNEL

When the fiscal year ended, the Commission had 1,146 employees, which was 76 more than for the same time the year previous. Of this total, about one-third were engaged in field work—largely engineering. Personnel distribution was as follows:

	Washington	Field	Total
Commissioners	46	0	46
Office of Opinions and Review	21	0	21
Office of Hearing Examiners	34	0	34
Office of Reports and Information	4	0	4
Office of Administration	87	0	87
Office of Secretary	64	0	64
Office of General Counsel	16	0	16
Office of Chief Accountant	17	0	17
Office of Chief Engineer	66	21	87
Common Carrier Bureau	76	31	107
Safety and Special Radio Services Bureau	130	0	130
Broadcast Bureau	172	0	172
Field Engineering and Monitoring Bureau	59	302	361
Total	792	354	1,146

Biographies of Commission personnel added during the year, as well as a list of those employees leaving the Commission during that period, are being submitted to Congress as a mimeographed supplement to this printed report. This information is required by Section 4 (k) (3) of the Communications Act, as amended in 1952.

APPROPRIATION AND EXPENDITURES

Through stringent economy measures, the Commission was able to effect a saving of $449,020 in its operations during the fiscal year 1954. It did this on an appropriation of $7,400,000, which was $991,540 more than the year previous.

Obligations against the 1954 appropriation were as follows:

Appropriation		*Obligations*	
Regular appropriation (salaries and expenses)	$7,400,000	Personal services	$6,131,453
		Travel	71,210
		Transportation of things	22,373
		Communication services	165,706
		Rents and utilities	51,471
		Printing and reproduction	58,162
		Other contractual services	167,666
		Supplies and materials	118,186
		Equipment	151,543
		Land and structures	13,000
		Awards and indemnities	210
		Total obligtions	6,950,980
		Savings, unobligated balance	449,020
		Total	7,400,000

The source of these funds and the authority for expenditures thereunder was Public Law 176, 83d Congress.

FEES

Pursuant to provisions of the Independent Offices Appropriation Act of 1952, as augmented by a Bureau of the Budget circular of November 5, 1953, the Commission on January 27, 1954, proposed rulemaking looking toward the establishment, for the first time, of fees to cover the cost of its licensing and related activities. However, on March 3 thereafter the Senate Interstate and Foreign Commerce Committee resolved that the Commission should suspend this proceeding until July 1, 1955. In the light of this resolution and further discussions with the Bureau of the Budget, the Commission has suspended action in this proceeding.

SEEK LESS PAPER, MORE SPEED

In order to keep abreast of its growing workload, the Commission continued its efforts to reduce procedures and paperwork, both for itself and the industries which it regulates.

In some cases it has been necessary to request legislation to modify requirements of the Communications Act; in others the Commission has amended its own rules to cut nonessential administrative corners. The latter includes streamlining of forms, simplification and clarification of rules, elimination of reports no longer needed, and various steps to speed up the hearing process.

Also, the Commission has delegated authority to the heads of its operating bureaus to act for it in routine matters where policy has long been established. This has resulted in more expeditious handling of run-of-the-mill cases and gives the Commission more time to devote to substantive problems.

Specific illustrations will be found in sections of this report dealing with hearings, legislation, and the different communication services.

The purpose of these changes is to help simplify and speed the administrative process. The Commission is desirous of relieving applicants and licensees of paperwork and formalities which are not essential to the requirements of law and orderly regulation.

HEARINGS

One of the current major objectives of the Commission is to reduce the hearing procedure to bare essentials. One step has been to open hearings with a conference in which the parties can agree on fundamental facts which need not be gone into in the subsequent argument. This antedates but reflects the Government's interest in simplifying the hearing process through the President's Conference on Administrative Procedure. FCC Commissioner John C. Doerfer is a member of that conference as well as a member of its Pre-Hearing Committee.

In addition, the Commission, where possible to do so, makes findings on basic qualifications of competing applicants (legal, financial, and technical) before designating them for hearing. This has helped to eliminate testimony upon which no controversy exists.

The Commission and bar are working together to reduce the amount of oral testimony at hearings, and to make the hearing record a written one insofar as possible. Consideration is also being given to means for further reducing the number and volume of filings and counterfilings in connection with cases in hearing. As of February 17, 1954, the Commission limited the number of pleadings that may be filed in these proceedings. This was done because numerous and repetitious pleadings have delayed and complicated consideration of cases, and indications were that many such pleadings were unnecessary to their disposition. The Commission also believes that briefer "briefs" would help to expedite the hearing procedure.

These objectives, however, must be consistent with the requirements of law, and their achievement will depend largely upon the cooperation of lawyers practicing before the Commission.

Television cases accounted for most of the Commission's hearing load during fiscal 1954. Docket statistics for that period were:

Class	Pending June 30, 1953	Designated for hearing	Disposed of without hearing	Disposed of following hearing	Pending June 30, 1954
AM broadcast	140	84	77	33	114
FM broadcast	2	0	0	2	0
TV broadcast	119	255	92	93	189
Other broadcast	6	2	3	0	5
Petitions and rulemaking	16	55	40	2	29
Total broadcast	283	396	212	130	337
Safety and special	19	59	47	2	29
Common carrier	40	52	20	21	51
Joint and general	30	50	32	3	45
Total nonbroadcast	89	161	99	26	125
Grand total	372	557	311	156	462

LEGISLATION

During the fiscal year, four bills were enacted by the 83d Congress which amended the Communications Act. Three of them had been recommended to Congress by the Commission as part of its legislative program.

On March 23, 1954, Public Law 314 was approved. This law amended section 501 so as to provide that any violation of the act, except a second or subsequent violation, would be punishable as a misdemeanor rather than a felony. It was introduced as H. R. 4559 at the request of the Commission.

On March 26, 1954, Public Law 320 was approved. It amended section 309 (c) to give the Commission 30 days instead of 15 days to take action on protests filed against applications granted without hearing. It was introduced as H. R. 4558 at the Commission's request.

Public Law 321, also approved March 26, 1954, amended section 319 to enable the Commission to, in certain instances, waive the requirement that a construction permit be secured for certain types of radio stations. It was introduced as H. R. 4557 at the Commission's request.

Public Law 345, approved April 27, 1954, amended sections 2 (b), 3 (e) and (u), and 221 (b) and served to clarify the Commission's jurisdiction over certain types of communications common carriers. It was introduced as H. R. 6436 as a result of joint efforts of the Commission, the United States Independent Telephone Association, and the National Association of Railroad and Utilities Commissioners.

In addition to the three proposals enacted at the request of the Commission, the following additional proposals by the Commission to amend the Communications Act were submitted to Congress:

Extensive amendments to part II of title III, which concern radio equipment and radio operators on board ships, to reflect the requirements of the Safety of Life at Sea Convention (London, 1948), which went into effect on November 19, 1952. The convention was ratified by the Senate on April 30, 1949. These proposed amendments were

introduced as S. 2453. This bill was passed by the Senate and, at the close of the fiscal year, was pending before the House. (It was adopted August 3, 1954.)

Amendments to reflect the provisions of the agreement concluded by the United States and Canada for promoting safety on the Great Lakes by means of radio, and to repeal certain provisions of the Ship Act of 1910 which are no longer necessary as a result of this agreement. The agreement has been ratified by both countries, and comes into force on November 13, 1954. S. 3464, which incorporated both of these proposals (the repeal of the Ship Act had previously been the subject of a separate bill, S. 1947), was passed by the Senate and was pending before the House at the close of the fiscal year. (It, too, was adopted August 3, 1954.)

Amendments to sections 503 and 504 (b), to provide for monetary forfeitures in the case of violations of the Commission's rules and regulations relating to radio stations other than broadcast stations. This proposal was introduced as S. 1979 and H. R. 5673.

An amendment to section 309 (c), designed to prevent protests filed to grants of applications without hearing from being used as a delaying tactic. Specifically, this proposal would eliminate the existing requirements that a hearing be held on each application against which a protest has been filed and that the effectiveness of the grant made by the Commission be stayed until the protest has been disposed of by the Commission after hearing. It was introduced as H. R. 7795.

In addition to these Commission proposals, Congress also considered various other legislative proposals affecting the Commission. Some of the more important of these are here listed:

S. 2926, S. 3203, and H. R. 7842 concern the Commission's authority to charge fees for licenses issued or services provided. The Commission presented testimony before the Senate Committee on Interstate and Foreign Commerce in connection with S. 2926 and commented on the others.

Bills relating to the multiple ownership of radio broadcast stations were introduced in the Senate as S. 3095 and S. 3350. Testimony was presented by the Commission on S. 3095 before the Senate Committee on Interstate and Foreign Commerce.

Several bills dealing with the use of interstate communications facilities for the transmission of gambling information were considered by Congress, and the Commission presented testimony before the Senate Committee on Interstate and Foreign Commerce with respect to one of these bills (S. 3542).

S. 3546 and H. R. 9700, on which the Commission commented, concerned the Commission's authority over radio and television networks.

H. R. 6431, concerning the regulation of subscription radio and television, was also commented on by the Commission.

It also commented on H. R. 6819, to establish a Telecommunications Policy Committee.

The Senate Committee on Interstate and Foreign Commerce held lengthy hearings concerning problems involved in the use of ultra high frequencies for television broadcasting. The Commission presented extensive testimony at those hearings.

During fiscal 1954 the Commission submitted comments to Congress and the Bureau of the Budget with respect to more than 45 different legislative proposals which had been referred to the Commission for comment.

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 55 cases in which the Commission was a party in the Federal courts. Thirty-eight of these were instituted during that period—34 in the Court of Appeals for the District of Columbia Circuit, 1 in the Court of Appeals for the Second Circuit, and 3 in the District Courts for the Southern District of Illinois, for the Southern District of New York, and for the District of Columbia. The other 17 cases were pending at the beginning of the year.

Due to some confusion as to whether certain orders are appealable under sections 402 (a) or 402 (b) of the Communications Act, in 5 cases instituted in the Court of Appeals for the District of Columbia Circuit review of the same Commission order was sought in separate actions brought under each subsection. Since these were separate actions, they are reported separately here and in the following table.

In addition to cases in which the Commission was a party, there were 7 cases pending in the Federal courts which involved criminal violations pertaining to the Communications Act which were instituted at the request of the Commission. Of these cases, 1 resulted in conviction and sentencing of the defendant. The rest were pending at the close of the year.

The Supreme Court, in three companion actions on appeal from the United States District Court for the Southern District of New York,

sustained in part and invalidated in part the Commission's rules pertaining to the broadcast of lotteries. This was an affirmance of the district court's judgment.

In the courts of appeals, the Commission was affirmed in 3 cases, reversed in 1 case, 6 cases were dismissed on jurisdictional grounds, and 13 cases were dismissed by agreement of the parties or as being moot. In the District Court for the Southern District of New York one injunction was issued to enforce an order of the Commission. In the District Court for the Southern District of Illinois 1 case was dismissed on jurisdictional grounds. In the District Court for the District of Columbia 1 case was dismissed on jurisdictional grounds and 2 cases were dismissed by agreement of the parties or as being moot.

As of June 30, 1954, there were 24 cases pending in the courts of appeals, and 1 case in the District Court for the Southern District of New York. (After the close of the fiscal year the Court of Appeals for the District of Columbia Circuit affirmed the order of the Commission in 2 cases and reversed the order of the Commission in one matter where appeals were brought under both sections 402 (a) and 402 (b) of the Communications Act. During the same period 6 new cases were filed in that court.)

A tabulation of the status of litigation for the fiscal year follows:

	Supreme Court	Court of Appeals under sec. 402 (b)	Court of Appeals under sec. 402 (a)	District courts	Total
Total	3	28	19	5	55
Decisions affirming Commission			3		3
Decisions reversing case	[1] 3	1			4
Dismissed on jurisdictional grounds		4	2	2	8
Dismissed by agreement of parties or as being moot		6	7	2	15
Cases pending June 30, 1954		17	7	1	25

[1] Companion cases, sustained in part, reversed in part.

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

In *Federal Communications Commission* v. *American Broadcasting Company, Inc., Federal Communications Commission* v. *National Broadcasting Company, Inc.*, and *Federal Communications Commission* v. *Columbia Broadcasting System, Inc.* (347 U. S. 284), the Supreme Court of the United States affrmed the decision of a three-judge District Court, reported in the 1953 annual report, ruling upon the Commission's rules pertaining to the broadcast of lottery information. The rules interpret 18 U. S. Code, Section 1304, which prohibits the broadcast of lotteries. They also provide that a license will not be issued to a broadcast station which makes a practice of broadcasting lotteries. In these three companion actions brought to enjoin enforcement of the rules, the Supreme Court held that adoption of the rules was fully within the Commission's statutory authority and that there was little dispute over the element of prize or the

Commission's interpretation of the element of chance. With respect to the third element of a lottery—consideration—the Court sustained that portion of the rules finding consideration in a requirement that a thing of value be furnished or that there be possession of a sponsor's product. The Court held invalid that portion of the rules defining consideration in terms of a requirement that the audience listen to a program as a condition of winning. The Commission's rules have been amended to conform to the Court's decision and, as amended, made effective.

In *Zenith Radio Corporation* v. *Federal Communications Commission* (211 F. 2d 629), the United States Court of Appeals for the District of Columbia Circuit reversed a Commission decision denying appellant's application for a construction permit for a new television station on channel 2 in Chicago, Ill. The court held that Zenith's application entitled it to a hearing under the statute, and that this right had not been waived either by Zenith's failure to intervene as a party in rule making proceedings in which channel 4 in Chicago was deleted and the licensee on that channel, Balaban and Katz Corp., was proposed to be moved to channel 2, or by its failure to intervene in adjudicatory proceedings in which Balaban and Katz' license was renewed and transferred to Columbia Broadcasting System, Inc. Zenith was therefore entitled to a comparative hearing with other applicants or proposed licensees on channel 2.

The court also held, however, that the renewal of Balaban and Katz' license and its transfer to Columbia had become final since they were not appealed from, and that all of the rights in Balaban and Katz' former license now adhered in Columbia, whose interest could not be ignored. The court thus said, "The comparative hearing, therefore, between Zenith and Balaban and Katz must actually be a comparison between operation by Zenith and operation by the Columbia Broadcasting System". The Commission, upon the court's remand, designated Zenith and Columbia for comparative hearing for Channel 2. A request by Zenith for leave to file a petition for mandamus to require a hearing between it and Balaban and Katz was subsequently denied by the court.

In *People's Broadcasting Company* v. *United States and Federal Communications Commission* (209 F. 2d 286), the United States Court of Appeals for the District of Columbia Circuit sustained the Commission's authority to adopt by rule making a nationwide television allocation plan. It also sustained the Commission's authority under section 316 (a) of the Communications Act to modify a license without application therefor by the licensee. The Commission had deleted television channel 4 in Lancaster, Pa., and substituted channel 8, and had ordered a comparative hearing for Channel 8 between WGAL, Inc., the licensee of a station on channel 4, and appellant, an applicant for channel 8. In addition, the court upheld the Commission's determination to give WGAL, Inc., a temporary authorization at minimum power to operate on channel 8 pending the comparative hearing, as a practical solution of a problem involving the public interest in the continuity of television service. This did not impair appellant's right to a fair comparative hearing.

In *Logansport Broadcasting Corp.* v. *United States* (210 F. 2d 24), the Court of Appeals for the District of Columbia Circuit upheld the validity of the Commission's rules prescribing a nationwide system for allocating television frequencies by assigning particular channels to over 1,000 communities throughout the country. Under these rules only applications which are in conformity with the plan receive Commission consideration. The principal attack on the rules was that section 307 (b) of the Communications Act precludes the assignment of frequencies in any way but by action on applications filed with the Commission.

The court held in this respect that the act authorized the Commission to allocate channels among communities either by passing upon specific applications or by rule making proceedings, and that in this case the Commission had not abused its discretion by deciding that a more equitable distribution of facilities might be accomplished by rule making processes. The court also held that the procedures utilized by the Commission in adopting the allocation plan conformed with the requirements of the Administrative Procedure Act, and that the Commission's determination to allocate VHF television channel 10 to Terre Haute, Ind., rather than to Logansport, Ind., and Owensboro, Ky., was within the Commission's statutory authority and supported by substantial evidence in the record.

In *Columbia Broadcasting System, Inc., of California* v. *Federal Communications Commission* (211 F. 2d 644), the Court of Appeals for the District of Columbia Circuit affirmed an order of the Commission denying a request by the appellant, licensee of a standard broadcast station, to have the program test authority of another standard broadcast station revoked or modified. Only after the issuance of a construction permit and program test authority—an interim authorization preceding the grant of regular station license—to the other station, did appellant discover that the authorized operation would cause interference within its normally protected contour. Upon a prima facie showing of such interference the Commission determined to hold a hearing on the application for regular station license of the other station, but it refused, during the pendency of that hearing, to revoke or modify the program test authority under which the station was in fact operating. The court held that this decision did not constitute a modification of appellant's license in violation of Section 316 of the Communications Act, because after the grant of construction permit to the offending station the issuance of a license was governed by section 319 (c) rather than section 316. The court held that the Commission had properly exercised its discretion in refusing to halt, during the pendency of the hearing, operations already in progress pursuant to authorizations previously made in the licensing process.

In *United States* v. *National Plastikwear Fashions, Inc.*, the Commission was successful in its first attempt to obtain court enforcement of a cease and desist order issued by the Commission pursuant to the recently given authority of Section 312 of the Communications Act, as amended in 1952. The United States District Court for the Southern District of New York issued a preliminary injunction enjoining defendant, the manufacturer of plastic wearing apparel, from violating the Commission's order directing defendant to cease and desist from operating certain industrial heating equipment which was not certified or licensed in accordance with the requirements of part 18 of the Commission's rules, and which was causing harmful interference to important radio communications of the United States Army in the New York City metropolitan area. In its opinion, the court found that the Commission's cease and desist order had been duly issued, after a full administrative hearing, in accordance with section 312 of the Communications Act; that defendant had failed to exercise its statutory right of appeal to the United States Court of Appeals for the District of Columbia Circuit from the Commission's order; that defendant had continued its operations in violation of the Commission's order; and that such operations continued to cause harmful interference to important Army radio communications. (On September 27, 1954, the president of the corporation was sentenced to 30 days in jail and the corporation was fined $2,500.)

APPLICATIONS AND OTHER FILINGS

Approximately 430,000 applications of all kinds were received by the Commission during the year. Of these, 8,200 dealt with broadcast, nearly 142,000 involved nonbroadcast, nearly 4,200 had to do with common carriers, and about 275,000 related to radio operators—commercial and amateur.

These figures do not include thousands of petitions and other legal filings in connection with hearing proceedings, or some 17,200 tariffs and 1,800 annual and monthly reports of common carriers and holding companies which also required Commission attention.

CORRESPONDENCE

Nearly 1,279,000 pieces of correspondence in the form of letters, telegrams, etc., were received or dispatched through the Commission's Mail and Files Division during the year. Of this number, about 875,000 were incoming and 404,000 were outgoing. These figures do not include mail handled in the field offices, or outgoing correspondence from the Washington office of the Field Engineering and Monitoring Bureau.

RELEASES AND PUBLICATIONS

Regulatory and administrative procedure required the issuance, during fiscal 1954, of mimeographed public notices and official documents (orders, decisions, opinions, etc.) which represented the use of 45,700 stencils, nearly 9,300,000 sheets of paper, and about 13,400,000 impressions.

The Commission issues no press releases as such, and maintains no mailing lists for its mimeographed or printed issue. Its printed publications are processed by the Government Printing Office and are sold by the Superintendent of Documents. These printed publications, which are not distributed by the Commission, include rules and regulations, engineering standards, annual reports, bound volumes of decisions and reports, common carrier statistics, the Communications Act of 1934 as amended, and miscellaneous publications. A complete list appears in the appendix to this report.

TECHNICAL ASSISTANCE ACTIVITY

Assistance in planning technical study programs for foreign nationals interested in telecommunication increased during fiscal 1954. Although the main activity was in arranging for such study in private industry under the Government's point 4 program, much time was also devoted to planning training programs for recipients of

grants under the United Nations, Mutual Security, and International Educational Exchange Service.

Some 18 individual programs were arranged for point 4 trainees from 7 countries. A total of 42 individuals representing 14 countries were received, 7 of which had programs arranged for them by the Commission.

Of the 4 representatives who received certificates of award during the year for completing the point 4 program, 3 were from Israel and 1 from Egypt. This brings to 17 the total number of foriegn nationals who have completed this program to date.

In the future, point 4 and Mutual Security trainees will be sponsored by the Foreign Operation Administration, while United Nations and IEES trainees will continue under Department of State sponsorship.

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National Defense

" * * for the purpose of the national defense * * * "—(Section 1 of the Communications Act).*

" * * 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 * * * "—(Sec. 606 (c) of the Communications Act).*

GENERAL

The Communications Act recognizes the importance of wire and radio communication in time of national emergency. It empowers the Federal Communications Commission to regulate such non-Government operations in the interest of the national defense as well as for the promotion of safety of life and property in general.

The act also gives the President special emergency powers over electrical communication and radiation to further protect the country during war or threat of war. This is reflected in the Commission's current program to guard against the possibility of radiations being used as "beams" to guide enemy aircraft and missiles in event of attack, as well as to curb emissions of miscellaneous electrical devices interfering with regular radio communication services.

CONELRAD PROGRAM

In addition to plans for regulating wire and radio communication facilities during an emergency, the Commission must control the radiations of a great variety of electronic equipment and gadgets which have developed since World War II.

In 1951 Congress gave the President special authority to deal with electrical radiations as a defense measure. This authority was subsequently incorporated in the Communications Act. Later that same year the President authorized the Commission to enforce regulations in this connection. The text of the related amendments and Executive Order appeared in the Commission's 1952 annual report.

One of the results is the CONELRAD plan (so called because this combination of letters is coined from the words *CON*trol of *EL*ectromagnetic *RAD*iation). This plan, or system, is being applied to the various radio services.

Its first application—affecting the broadcast services—was announced by the White House in late 1952. This White House statement was printed in the 1953 annual report. The covering broadcast rules became effective May 15, 1953.

During an alert, FM and TV broadcast stations would be silenced, but designated AM stations would use 640 or 1240 kilocycles to broadcast essential news, information, and civil defense instructions. This operation would be juggled in such a way as to confuse the enemy regarding the location of the participating stations. The alert would be sounded by the Air Defense Command of the Air Force.

One nationwide test and many small area tests of the CONELRAD broadcast system were held during the year. The results indicated that it is performing as contemplated. Air Defense Command observations indicate that broadcast operations under CONELRAD are virtually of no value to a possible air enemy. Broadcasting of civil defense information to the public has been adequate in approximately 80 percent of the cities having CONELRAD stations. The CONELRAD staff and the broadcast industry are working to improve coverage in areas not now being adequately served.

On February 25, 1954, the Commission proposed to extend the CONELRAD plan to the Aviation Radio Services. It became effective June 14 of that year. In event of an alert, aeronautical radio stations would operate under instructions of the Civil Aeronautics Authority Air Route Traffic Control Centers. Only aviation radio stations required for air-traffic control and other essential purposes would remain on the air; the others would be silent.

The Commission announced on March 11, 1954, that it had approved a CONELRAD plan for the Public Safety Radio Services. In case of attack, police, fire, forestry conservation, special emergency, and State Guard radio stations would continue necessary operations under controlled conditions. They would be subject to direction of the Air Defense Control Centers of the Air Force.

A CONELRAD plan for the Amateur Radio Service was approved by the Commission on June 2, 1954. After receiving an alert from broadcast stations, all amateur stations would cease operation unless specifically authorized by the Commission to continue on the air.

Plans for the International Broadcast Service, noncommercial educational FM stations, and the Citizens Radio Service have been approved by the Commission and await concurrence by the Secretary of Defense and the Director, Office of Defense Mobilization.

Plans for Alaska, Puerto Rico, the Virgin Islands, the Hawaiian Islands, and Guam are nearing completion.

It is expected that during the next fiscal year essentially all radio stations licensed by the Commission will operate under CONELRAD

requirements. (On September 24, 1954, the Commission approved a temporary CONELRAD plan for voluntary compliance by all stations—except AM, FM, TV, amateur, and aviation—operating on frequencies up to 890 megacycles, until mandatory plans are put into effect.)

Meetings have been held with representatives of Canada and Cuba. Methods of exchanging air-defense warnings between the United States and Cuba were completed during April 1954.

At the present time the Commission has representatives at each Air Division (Defense) Headquarters and at each Air Defense Force Headquarters for implementation and liaison purposes.

The radio industry has cooperated fully with this Commission in developing and implementing CONELRAD plans.

CITIZENSHIP REQUIREMENTS

The Communications Act limits radio station licenses to citizens of the United States. This privilege is denied to aliens and foreign governments, and to their representatives; also to any corporation of which any officer or director is an alien or of which more than one-fifth of the capital stock is owned or controlled by foreign interests. The latter provision also applies to consolidations or mergers of telegraph carriers.

Under its statutory authority to prescribe the qualifications of radio operators, the Commission on June 10, 1954, proposed to make ineligible for licensing any amateur or commercial operator who is a member of the Communist Party or any organization which has been required to register as a Communist-action or Communist-front organization under the provisions of the Internal Security Act of 1950, or any organization which advocates or teaches the overthrow of the United States Government or the government of any of its political subdivisions by force and violence. The operator application forms would include questions with respect to membership in organizations and be accompanied by the fingerprints of applicants.

OTHER DEFENSE ACTIVITIES

The Commission is engaged in other defense activities which cannot be chronicled here because of the security classification given these projects by higher authority. In brief, however, they may be said to be the coordinated effort of various Federal bodies and the communication industry to cope with potential emergencies, to see that wire and radio media are harnessed to the defense program and that essential circuits are available under any eventuality, and, further, that our vital communication facilities are adequately safeguarded.

Common carrier telephone and telegraph services, for example, not only play a leading role in meeting current defense communication requirements, but they are a major consideration in planning for any possible contingency.

Practically all of the existing nonbroadcast services help in protecting life and public property on the land, on the water, and in the air; or in speeding business and other communication. Also, there are special radio services dedicated to disaster and emergency relief, civilian defense, State Guard, Civil Air Patrol, and kindred purposes. These services are described in the chapter dealing with the Safety and Special Radio Services.

Further, the Commission patrols the radio spectrum around the clock with the Government's only monitoring network covering the continental United States and its possessions. Besides keeping an engineering eye on the transmissions and equipment of existing radio stations, it is on the constant watch for illicit radio operation, interference to authorized radio services from radio and other electrical equipment, and furnishes radio bearings for lost or disabled sea and air craft.

Information about the control of noncommunication radiation devices will be found in chapters of this report dealing with Field Engineering and Monitoring and Research and Laboratory activities.

The Telecommunications Planning Committee, representative of various Government agencies concerned with the national defense, was re-established by the President on September 23, 1953. FCC Commissioner Edward M. Webster serves as its Vice Chairman.

On November 4, 1954, the President established a Cabinet Committee on Telecommunications Policy and Organization to study existing governmental policies and programs affecting all forms of electrical communication (except domestic broadcasting) in the light of present world conditions.

In fiscal 1954, the Federal Communications Commission had its own Defense Steering Committee, of which Commissioner George E. Sterling was Defense Commissioner and Commissioner Robert T. Bartley was Alternate Defense Commissioner. (Commissioner Robert E. Lee was subsequently designated Defense Commissioner.)

Common Carrier Services

*"'Common carrier' * * * means any person engaged as a common carrier for hire, in interstate or foreign communication by wire or radio * * * "—(Sec. 3 (h) of the Communications Act).*

*"All charges, practices, classifications, and regulations for and in connection with such communication service, shall be just and reasonable * * * "—(Sec. 201 (b) of the Communications Act).*

DOMESTIC TELEPHONE

General

During calendar 1953, the telephone industry maintained its accelerated construction program to supply additional services for millions of new customers. The Bell System spent an estimated $1.4 billion for additional plant facilities which brought its total plant book cost to more than $13 billion. The total Bell System construction during the past 4 years almost equaled its total gross plant book cost at the end of 1940. The independent telephone companies also made substantial plant additions to boost the telephone industry total to more than $14.5 billion by the end of 1953.

Telephone developments during fiscal 1954 included the completion of new radio relay "backbone" routes between Chicago and St. Louis; between Chicago, Milwaukee, and Minneapolis; between Louisville, Nashville, Chattanooga, Atlanta, and Jacksonville; and between Yakima and Spokane. Also completed were numerous branch radio relay systems emanating from these and other major relay routes. Construction was started on new major radio relay systems between Amarillo and Los Angeles; between Minneapolis and Fargo; between Atlanta and Dallas; and between New Orleans and Baton Rouge. Almost 5 million long-distance telephone circuit miles were being derived from microwave relay systems. New techniques were applied to expand the capacity of the Philadelphia-Chicago coaxial cable system.

These microwave and coaxial cable facilities were being used to bring live TV programs to about 300 television broadcasting stations in more than 190 cities throughout the Nation, and the first coast-to-coast public transmission of color TV occurred on January 1, 1954. (By November of 1954 the Bell System was serving 244 TV stations in 225 cities.)

By the end of calendar 1953, there were more than 50 million telephones in service throughout the Nation, over 41 million of which were operated by the Bell System and over 9 million by independent telephone companies. The Bell System added more than 1.9 million telephones during 1953. It reported 307,000 held orders for main service and 762,000 requests for regrades in existing service as of June 30, 1954. Comparable figures 12 months earlier were 605,000 and 1,300,000, respectively. By June 30, 1954, the total number of domestic telephones exceeded 51 million.

There were about 179 million (147 million in the Bell System) average daily local telephone conversations during calendar 1953 while the daily long-distance calls averaged 6.6 million. Many calls were reclassified from toll to local during the year as a result of expansion of local exchange areas. After adjusting for these reclassifications, the local and toll calls increased 2.9 and 4.9 percent, respectively, over 1952. Toll calls were only slightly above the same months of the preceding year in the first 6 months of calendar 1954. Teletypewriter exchange service (TWX) calls increased about 9.7 percent during calendar 1953 to reach a total of over 20 million.

The use of dial telephone equipment was expanded both for local and long-distance service. Eighty-one percent of all Bell telephones and 59 percent of the independent telephones are now dial operated. Bell operators were dialing 44 percent of toll calls directly to destination by the end of 1953 with 2,450 cities and towns connected to the toll dialing network, a gain of 750 during the year. The number of large traffic centers equipped for toll dialing rose to 23, and plans were to provide similar facilities at 9 additional cities during the current year. Customer toll dialing, already in operation at Englewood, N. J., was inaugurated in suburban exchanges near Detroit and Pittsburgh to permit subscribers to dial their long-distance calls directly to about 13 million subscribers located in 14 metropolitan areas throughout the Nation. Subscribers in the Detroit and Washington metropolitan areas were able to dial calls to selected nearby cities. These dialing services required new centrally located accounting machinery which automatically records each call, for subsequent billing purposes.

Bell System operating revenues reached a new high of $4,416,729,614 in 1953, an increase of about 9 percent over 1952. Consolidated net income applicable to American Telephone & Telegraph Co. capital stock amounted to $478,512,265, an increase of 17.7 percent over 1952. Earnings per share increased from $11.45 in 1952 to $11.71 in 1953, despite an increase in number of shares outstanding.

Expansion of the Bell System is illustrated by the following table:

Year	Number of telephones	Plant book cost	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	10,101,521,562	3,261,528,032	523,251
1952	39,413,889	11,971,435,727	4,039,664,218	579,500
1953	41,353,483	13,059,232,000	4,416,729,614	587,839

Services and Facilities

Construction of facilities.—The Bell System spent about $1.4 billion for expansion and improvement of existing facilities during 1953, the largest portion of which went for exchange plant additions, such as central office buildings, exchange switching equipment, exchange distribution plant, and subscriber station equipment. During the same period, the A. T. & T. Long Lines Department spent a record $133 million for new plant construction, part of which went to provide a 27-percent increase in long-distance circuits.

During fiscal 1954, the Commission granted 234 applications involving estimated expenditures of $62,985,906 for authority to construct, lease, acquire, and operate wire and cable facilities in connection with interstate and foreign telephone service. Included were 12 authorizations for acquisition or lease by telephone companies of facilities owned by other companies. The following table shows the estimated costs and amounts of wire and cable construction authorized by the Commission since 1948:

Fiscal year	Number of projects	Cost	Sheath miles of cable	Tube miles of coaxial units	Conductor miles of open wire
1948	348	$127,162,499	2,637.5	46,080	16,373
1949	313	38,638,919	1,370.5	1,323	7,278
1950	141	13,230,678	399.3		3,491
1951	218	45,795,686	957.1	2,704	5,461
1952	323	107,533,688	1,388.7	2,972	5,998
1953	358	89,228,416	1,494.0	5,678	2,006
1954	234	62,985,906	730.0	564	1,837

The Bell System also continued its vast microwave radio construction program during fiscal 1954. The Commission granted a total of 652 Bell applications for microwave construction, including 13 held over from 1953. These projects involved an estimated expenditure of $51.5 million to provide an estimated 30,492 broadband channel miles for toll telephone and video program services. By the end of fiscal 1954, the Bell System operated nearly 5 million toll telephone circuit-miles over microwave paths, which was more than double the number at the end of the previous year. The microwave systems, in conjunction with coaxial cable systems, were also being used to provide about 54,000 channel miles of TV program circuits.

Independent telephone companies also expanded the use of microwave systems during fiscal 1954. The Commission authorized 13 new projects involving estimated expenditures of $617,000 which would be used to provide about 5,000 toll telephone circuit-miles and about 62 TV program channel-miles.

The Commission revised its rules relating to the granting of authority for the supplementation of interstate communication facilities. These revisions permit carriers to secure continuing authority under which small projects may be initiated without securing prior specific authority, provided that a brief report is submitted to the Commission semiannually showing the projects undertaken.

Discontinuance, reduction or impairment of service.—During fiscal 1954, the Commission granted seven applications to discontinue, reduce, or impair telephone service. Three of these involved the substitution of one carrier for another in providing exchange service. One involved the substitution of toll-station service in lieu of exchange service, 1 involved a temporary discontinuance of toll interconnections, 1 involved closure of a coastal harbor station after the only vessel it served was decommissioned, and 1 involved the elimination of toll-station service at a community.

Speed of service.—The Bell System reported that the average time required for completing toll calls dropped from 1.8 minutes in calendar 1952 to 1.6 minutes in 1953, and that 95 percent of all toll calls went through while the calling party held the line.

Acquisitions and consolidations.—The Commission received 19 applications from domestic telephone carriers for authority under section 221 (a) of the Communications Act to acquire the property of another telephone company. After due notice of public hearing, 10 of these applications were granted, along with 1 held over from fiscal 1953. Of those pending at the close of the year, an initial decision had been issued on one, a hearing had been held on another and awaited initial decision, while hearings had been scheduled but not held on the remaining seven.

Interlocking directorates.—The Commission received 20 applications filed by individuals pursuant to section 212 of the act for authority to hold positions of officer or director of more than one domestic carrier subject to the act. All but one of these applications had been granted by the end of the fiscal year.

Reclassification of companies.—The Commission granted petitions by 3 telephone companies to be classified as "connecting carriers" under section 2(b)2 of the act which would render them subject only to sections 201 through 205, inclusive.

New techniques.—A tiny revolutionary electronic device called the transistor continued to find new and wider uses in the telephone indus-

try, particularly as a substitute for thermionic tubes. In one installation in the trial stage near Americus, Ga., transistors are being used to derive several voice paths from one pair of telephone wires to expand service to rural telephone subscribers.

Foreign attachment cases.—The Commission, on May 7, 1954, issued its final decision in the cases of *Jordaphone Corporation of America et al.* v. *American Telephone and Telegraph Co. 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 involved the lawfulness of the foreign attachment provisions of the Bell System companies' tariffs as applied to automatic telephone answering devices in connection with interstate and foreign telephone service. The Commission found that such devices would be primarily used in connection with intrastate and local telephone service and only incidentally in interstate and foreign communication. It concluded, therefore, that the determination as to the use of such devices in any particular locality should be made by the appropriate State or local regulatory authority.

Final decision was still pending in the case of *Hush-A-Phone Corp. et al.* v. *American Telephone and Telegraph Company et al.* (docket 9189), which involved the lawfulness of the foreign attachment provisions of the defendants' tariffs insofar as they might be construed to prohibit the use of the Hush-A-Phone device.

Bell lease and maintenance of radio equipment.—The Commission started inquiry into the growing practice of Bell System companies leasing radio equipment to various licensees and performing the maintenance therefor on a monthly charge basis. Among other things, the Commission is seeking to determine whether the licensees involved have complete control over the operation of the radio equipment, whether the lease and maintenance charges of the telephone companies may be so low that their common-carrier services are subsidizing the lease-maintenance activities, whether the telephone companies may use arguments regarding the availability to prospective lessees of regular communication services to help sell the lease-maintenance service, and whether lease-maintenance activities may lead to demands that portions of the radio spectrum not now allocated to common carriers be reallocated to common carrier uses.

Domestic public land mobile radio service.—Activity in this service continues to be noteworthy for the interest shown in one-way signaling (radio paging) operations. This operation typically involves communication from a base station to pocket-type receivers carried on the subscriber's person. As of June 30, 1954, there were 34 such systems licensed, 24 others authorized, and 9 had been terminated.

Due to the lack of sufficient frequencies to accommodate all applicants for new one-way signaling systems in certain areas, it was necessary to hold comparative hearings for the Philadelphia area, the Fort Worth-Dallas area, the St. Louis area, the Los Angeles-Long Beach area, and the Seattle area. Final decisions had been issued in the St. Louis and Seattle cases, and an initial decision given in the Philadelphia case. In addition, a final decision was issued in a previously heard Los Angeles case.

The two-way land mobile radiotelephone service furnished by miscellaneous (nontelephone company) common carriers continued to expand and was being provided by 258 licensed systems, and 29 others had been authorized. In addition, there are 2 such systems in operation in Alaska, 1 in Hawaii and 1 in Puerto Rico.

The two-way land mobile radiotelephone service furnished within the United States by general communications carriers (telephone companies) was being provided on 207 systems licensed to Bell companies and 20 to non-Bell companies. Bell companies were authorized to establish 13 additional systems within the United States. The Hawaiian Telephone Co. is the only general communications common carrier providing such service (at Honolulu) outside the continental United States.

Rules governing domestic public radio services.—Only the land mobile radio operations of common carriers are currently being conducted under rules and regulations specifically applicable to a regularized service. The domestic common carrier operations of microwave radio relay systems, television STL (studio-to-transmitter link) stations, TV pickup stations, rural subscriber radio stations, short-haul toll radio stations, stations for control of remotely located transmitters, and repeater stations for automatic relay of land mobile station transmissions are all being licensed as developmental stations in the experimental radio service.

During the year, a rulemaking proceeding (docket 10821) was initiated to revise the rules and regulations governing the common carrier land mobile radio service and to establish rules and regulations for authorizing the aforementioned types of common carrier radio operations on a regular service basis. The proposed rules are designed to be of material assistance in the preparation and filing of common-carrier applications for radio authorizations and in the regulation of these services.

Rural subscriber and short-haul toll radiotelephone services.—Expansion continued in these experimental services which provide short-distance radio communication, on VHF frequencies, to points where it is impracticable to provide wire line communication. As of

June 30, 1954, telephone companies held licenses for 26 rural subscriber radio stations and construction permits for 6 others. In addition, 12 stations were licensed and 4 were authorized to miscellaneous common carriers. Fifty experimental short-haul toll radio stations were licensed to Bell companies and 5 to non-Bell companies. Four construction permits were outstanding.

Community TV antenna servicing.—The rapid increase in the number of community antenna TV systems has led to requests for common carrier microwave authorizations to relay the TV signals from the point of pickup to the cable distribution point. During the fiscal year, authorizations for such relay systems were made to the Mountain States Telephone and Telegraph Co. and to J. E. Belknap and Associates, a specialized common carrier in this field.

State radio operation.—On petition of the State of California, the Commission proposed rulemaking (docket 10777) to afford interested parties an opportunity to present views concerning contemplated amendments of parts 10 and 11 of the rules. These amendments would provide that operational fixed stations licensed to various agencies of a State could be used to provide coordinated service to other eligible agencies such as the Federal State Market News Service of California; also that any facilities so licensed could be used during off-peak periods for the general administrative communications of the State government. Common carriers commented adversely on the grounds that they have adequate facilities to meet State communications needs, and that provision of such facilities by States would result in unnecessary and uneconomical duplication of facilities.

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.

Rates and Tariffs

Tariff schedules.—At the close of the year, 365 telephone carriers had tariffs or concurrences on file with the Commission, or 29 more than at the close of the previous year. The increase was due to new carriers in the Domestic Public Land Mobile Radio Service. The carriers filed 15,210 tariff publications, establishing new or modifying existing rates and regulations. Sixteen of these were rejected for failure to comply with notice requirements; none were suspended.

Special permissions.—Fifteen applications for special permission to make changes in tariffs on less than statutory notice, or for the waiver of some other rule requirements, were received. All were granted.

Increased message toll telephone rates.—Increased rates for interstate message toll telephone service became effective October 1, 1953, as provided for in revised tariff schedules filed with the Commission on August 28 by the Bell System telephone companies. The revised tariffs provided for increases of 5 cents in the rates for each 1-minute overtime period on station-to-station and person-to-person calls involving most distances above 24 miles; and for increases of 5 and 10 cents in the initial period (3-minute) rates for night and Sunday calls involving most distances between 41 miles and 2,300 miles. The increases in the initial-period rates for night and Sunday calls resulted in more uniformity in the percentage differentials between those rates and the initial-period day rates at the various mileages.

The new rates were estimated to produce about $65 million in additional annual telephone revenues, an increase of about 8 percent. Of this $65 million, about $30 million accrued to the Bell System companies as increased earnings, $2 million went to their independent connecting companies, with the balance representing principally Federal income tax payments.

The Commission, after due consideration and study of attendant filings, decided to take no action to prevent the new rates from becoming effective since it appeared that, under existing rates, interstate earnings of the Bell System companies were deficient and that the level of earnings which would result from the revised rates was sufficiently within the area of reasonableness as not to present any substantial question as to their lawfulness. In this connection, it appeared to the Commission that the additional revenues would bring the Bell System's return on its interstate services from less than 5 percent to within a range of 6 to 6½ percent.

Investigation of Bell System rates.—The Commission, on March 31, 1954, terminated the investigation which it instituted on January 19, 1951, of the Bell System's rates and charges for interstate and foreign communications services (docket 9889). This action followed a review of the Bell interstate and foreign operating results which indicated that further action in the proceeding was not required.

Teletypewriter exchange (TWX) service rates.—Increases and revisions in the rates for interstate TWX service became effective July 1, 1953. Contractual arrangements between the Long Lines Department of A. T. & T. and the regional telephone operating companies of the Bell System, covering compensation of the latter for their participation in furnishing interstate TWX service, were modified at the same time. There was substituted for the former commission and prorate basis of compensation a plan designed to reimburse the regional companies for their expenses incurred in connection with the

service plus a return on their investment devoted to it, in part a fixed rate of return and in part a rate of return equal to that being earned by the Bell System on all interstate services.

Bell System video program transmission rates.—In order to provide tariff rates and regulations covering the transmission of network TV color programs, the A. T. & T. successively extended its "Experimental Color Systems" tariff schedules.

Under the "experimental color" tariff, which was originally to expire on December 31, 1953, the Bell System's rates for the transmission of color broadcasts are the same as for the transmission of regular black-and-white (monochrome) broadcasts except for a higher station connection charge in the case of color. In its first letter dated December 28, 1953, requesting special permission to extend its color tariffs, A. T. & T. stated "the present rates for experimental color systems are substantially less than the full costs of furnishing interexchange and local facilities suitable for the NTSC system and that the extension of these rates is proposed without prejudice to compensatory rate schedules which will be filed shortly".

As of the close of fiscal 1954, the Bell System had not filed revised tariff schedules to cover the new color standards. However, in anticipation of such a filing, A. T. & T. submitted to the Commission a study made by the Bell System companies with respect to their current and future costs of furnishing video services. The methods used in making the study as well as the validity of the results were being reviewed and analyzed by the Commission.

Interstate telephone exchange service rates.—The Northwestern Bell Telephone Co. increased its rates, effective November 1, 1953, for interstate telephone exchange service furnished in 13 exchanges on the borders of Iowa, which exchange service is subject to the Commission's jurisdiction since it is not subject to regulation by any State or local authority. Upon consideration of data relating to the Iowa operations, the Commission decided to take no action to prevent the rates becoming effective as filed. The increase of about $900,000 in annual revenues will bring exchange rates in these border communities into line with rates for exchanges serving interior localities in Iowa.

Telephone rates between United States and Alaska.—Charges for most telephone calls between the United States and Alaska were to be increased 75 cents for the 3-minute initial period and 25 cents for each minute of overtime, effective July 1, 1954. The increased revenues, estimated to amount to about $200,000 annually, will all accrue to the Alaska Communications System, administered by the Chief Signal Officer of the Army, which operates the communication links between the United States and Alaska.

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Telephone excise taxes reduced.—Federal excise taxes, which had been 25 percent on long distance calls of 25 cents or more and on leased wire services, and 15 percent on long-distance calls of less than 25 cents and on local service, were all reduced by congressional action to 10 percent, effective April 1, 1954.

Other Regulatory Matters

Depreciation.—The work of developing information in connection with the Commission's continuing program of fixing depreciation rates for telephone companies was carried out during the year with respect to several Bell companies. On the basis of such information and through joint reviews of relevant facts with State commissions and the companies concerned, depreciation rates were prescribed for the first time for Wisconsin Telephone Co., Bell Telephone Co. of Nevada, and for each operating area served by The Pacific Telephone and Telegraph Co. (5 operating areas in 4 States). The new rates resulted in annual depreciation charges aggregating $60,925,000 and represented a reduction of $2,196,000 annually, or 3.5 percent.

In addition, the Commission modified most of the depreciation rates previously prescribed for the following Bell companies: Illinois Bell, Bell of Pennsylvania, and New England Telephone & Telegraph. The new rates in the case of the first 2 mentioned companies produced annual charges aggregating $49,482,000 and represented a total reduction of $797,000 annually, or 1.6 percent, whereas in the case of the New England company, the resulting depreciation charges of $24,028,000 annually represented an increase of 0.5 percent.

In prescribing depreciation rates for the Pacific and Nevada companies, the Commission considered the views expressed by certain State commissions that prescription should be postponed pending further study to determine whether the straight-line, total-life method used by the FCC for computing depreciation should be abandoned in favor of the remaining-life method. The Commission concluded that no sufficient showing had been made for a change in method and, accordingly, made its prescription on the total-life basis without prejudice to further review of depreciation methods.

By the end of the fiscal year, the program of prescribing depreciation rates for telephone companies had been carried out with respect to all 23 Bell companies, including the Long Lines Department of A. T. & T. In the case of 12 of these companies, the depreciation rates were revised at least once during the past 4 years in order to reflect changes arising from developments in the art and other factors. While the established rates reflect both upward and downward adjustments in depreciation charges, their overall net effect to date represents a reduction aggregating approximately $29,000,000 annually, or more than 6 percent.

In spite of the downward adjustments in depreciation rates, depreciation expense charges of telephone companies continued to rise due to a substantial increase in plant facilities. For the calendar year 1953 these charges in the case of the 23 Bell companies amounted to almost $441,000,000, an increase of $31,986,000, or 7.8 percent over the previous year. The increase in depreciable plant facilities, however (expressed in terms of the recorded book cost), amounted to 9.1 percent during the same period.

Separation procedures.—The procedures used by Bell companies to separate and apportion their investment and expenses between intrastate and interstate services were the subject of further studies by the Commission in cooperation with State regulatory authorities, through the National Association of Railroad and Utilities Commissioners (NARUC). Since the major portion of telephone plant is used in common to render intrastate and interstate services, a uniform and equitable method of separation, acceptable to both State and Federal jurisdictions, is essential to the determination of reasonable rates for services subject to each of the several jurisdictions.

The current studies, which were pending at the close of the fiscal year, were undertaken as a means of mitigating the regulatory problems which are presented by the fact that intrastate long-distance rates are generally higher than interstate long-distance rates for equivalent distances of service. It has been contended by various regulatory authorities that the disparity between intrastate and interstate rates results, at least in part, from inequities in the methods of allocation and that larger amounts of investment and expenses of the Bell System should be apportioned to interstate operations.

Interstate telephone service within large metropolitan areas.—One new interstate exchange embracing a large metropolitan area was established during the year at Louisville, Ky. Other interstate exchanges in this category are Cincinnati, Ohio; Kansas City, Mo.; Providence, R. I., and Washington, D. C. Some of them present problems of regulatory jurisdiction not yet fully resolved.

Bell System Federal income taxes.—The Internal Revenue Code of 1954 will present new income-tax allocation as well as other problems. One may result from the inclusion of Western Electric Co., Inc., the manufacturing and supply unit of the Bell System, in the latter's consolidated income-tax returns. Western has not been included in the Bell consolidated returns filed each year since 1950. There is doubt that it could have been included in these returns without the Bell companies sacrificing their favorable tax status of "regulated public utility" as defined in the Excess Profits Tax Act of 1950.

If Western is included in the Bell consolidated returns on a basis of eliminating from consolidated taxable income Western's profits on

intercompany transactions, such inclusion will result in deferrals of the impact of income taxes which in turn will lead to substantial reductions in the revenue requirements of the telephone companies. A representative of A. T. & T. has argued against the elimination of these intercompany profits in consolidated returns on the grounds that such elimination "is both exceedingly costly and impracticable and merely shifts the tax effect from one period to another".

Western Electric earnings and prices.—The Commission, in cooperation with the NARUC, continued its review of the prices, earnings, and costs of Western Electric Co., Inc. Data developed by these reviews are reported quarterly and annually to the various telephone regulatory commissions in order to assist them in their consideration of Western's prices to its affiliated telephone operating companies in the Bell System insofar as such prices affect the revenue requirements of the companies.

Pensions and relief.—The pension plans of the Bell companies were unchanged during fiscal 1954. For the calendar year 1953, pension and other benefit costs (including Federal taxes for social security benefits) for the Bell System, including manufacturing and research activities, amounted to approximately $272 million. This is an increase of about $27 million over 1952. The combined pension trust funds of these companies totaled approximately $1,762 million as of December 31, 1953. At that time 32,728 retired employees were receiving service pensions and approximately 21,000 active employees were eligible to retire at their own request.

During fiscal 1954, a review was started of the revised actuarial data underlying certain of the basic actuarial factors used in developing the Bell System pension accrual rates.

Uniform system of accounts.—The system of accounts was amended to permit all pension costs, including provisions for pensions based on service prior to the period for which accruals are made, to be charged to operating expense when certain conditions are met.

In response to inquiries from certain companies, a number of informal interpretations of the system of accounts were made, including such subjects as capitalization of standby mobile telephone units and the allocation of the pay of employees performing multiple duties.

Accounting research.—Research was continued on accounting regulations of other regulatory agencies and accounting principles enunciated by professional accounting organizations for the purpose of determining their applicability to the communications industry. Studies were also continued with respect to the "all-inclusive" income statement, certain aspects of depreciation accounting, accounting for tax savings resulting from filing consolidated tax returns, and accounting for acquisitions of private communication systems from pub-

lic utilities not engaged in furnishing communication services to the public.

Plant accounting practices.—During fiscal 1954, followup examinations were made of the plant accounting practices of certain Bell companies. These examinations revealed a decided improvement, particularly with respect to the classification of plant as between plant in service and plant under construction. The companies are making further improvements in these accounting procedures.

Restatement of plant accounts on basis of original cost.—The accounting for a number of current acquisitions of plant, including mergers of small companies, was handled during the year in accordance with the Commission's accounting regulations. In some instances this involved the disposition of amounts in excess of original cost. Final accounting for certain acquisitions of plant from nontelephone companies is being held in suspense pending determination as to whether original cost accounting shall be applied to such transactions. These transactions include acquisitions of private radiotelephone communications systems which the former owners continue to operate as the licensees under lease arrangements at specified monthly charges and the telephone companies maintain the facilities.

Continuing property records.—Further studies and reviews were made of the continuing property records of several Bell companies during fiscal 1954.

As indicated in the 1953 report, one of the principal features of a continuing property-records plan is the provision for determining the cost of plant to be retired from the accounts. The Bell System had proposed a revised method for the development of average retirement unit costs which would give recognition to the trends in the level of costs and to the age distribution of plant retirements in addition to those factors now recognized under the present method. Further study of the proposed Bell method was made during fiscal 1954 by the Commission in conjunction with A. T. & T. and the NARUC Committee on Accounts and Statistics. The Bell companies have been authorized to adopt the revised method pending the possible development of an economically feasible "cost-by-years" method. It is anticipated that the revised method will be placed into effect by these companies during fiscal 1955. This should result in more accurate accounting for plant retirements.

NARUC committees on depreciation and accounts and statistics.—The Commission cooperated with these committees in a number of projects of mutual interest to State and Federal regulatory commissions. Commission representatives participated in further consideration of proposed revisions in the systems of accounts for electric, water and gas utilities, with respect to general accounting principles involved

which are also applicable to communication utilities. In addition to the revision of the method of developing retirement unit costs discussed under the continuing property records section of this chapter, considerable time and effort were devoted to a study, in cooperation with the Bell System, of possible methods of simplifying the present practices of accounting for telephones installed and removed. This study was still in progress at the end of the year.

Annual and other reports.—The Commission's rules relating to reports from communication common carriers were completely revised, giving considerable relief to all carriers as to data required to be reported and relieving the smaller carriers from filing any annual reports.

DOMESTIC TELEGRAPH

General

Almost all of the domestic message telegraph service in the United States is provided by The Western Union Telegraph Company. Private line and other special telegraph services also are furnished by Western Union, but the great bulk of these, including teletypewriter exchange service, is furnished by the telephone companies.

Western Union's land-line operating results in fiscal 1954 were somewhat lower than in fiscal 1953. Although gross operating revenues continued at high levels, the volume of message telegraph traffic decreased in the fall of 1953. Operating expenses were affected by wage increases which became effective in June 1954.

For the calendar year 1953, Western Union reported gross land-line revenues of $208,578,000 and 162,188,00 messages handled, as compared to 1952 revenues of $184,336,000 and 159,735,000 messages. Results of the company's systemwide operations, including the ocean-cable system, provided $14,469,000 net income after Federal income taxes of $9,417,000 for 1953, as compared to 1952 reported earnings of $1,661,000 with $200,000 for Federal taxes. The 1953 earnings were augmented to the extent of $6,364,000, after providing $2,217,000 for Federal taxes, by a net gain on the sale of the company's investment in its subsidiaries, American District Telegraph Co., and the Teleregister Corp. Earnings in 1952 were depressed as a result of the nationwide strike in April and May of that year.

Western Union used the revenue from the sale of its investments in subsidiary companies to complete the retirement of a $12 million bank loan, negotiated in 1950, and to provide additional capital to be used for financing expansion of its growing private wire and facsimile services.

For the last half of fiscal 1954, Western Union reported land-line gross operating revenues of $100,162,000 as compared with $103,-274,000 for the first half of fiscal 1954. Message volume for the last

half of fiscal 1954 is estimated at about 4 percent below the level of the message volume for the previous 6 months. Systemwide earnings for the last half of fiscal 1954 amounted to $3,300,000 after providing $3,564,000 for Federal income taxes.

At the close of fiscal 1954 the telegraph company increased rates for the purpose of offsetting the cost of increased wages, expected to increase operating expenses by about $7 million a year over the next 2 years and restore earnings to about 5 percent, the level that prevailed during the last half of fiscal 1953.

Services and Facilities

Speed of service.—Western Union is required to conduct daily studies of speed of service at its 25 largest message centers and to report monthly summaries to the Commission. These reports show the average origin to destination speed (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 for a message to pass through a large message center). Fifteen of the message centers are operated by reperforator-switching equipment while the remaining 10 are manually operated. The following table compares the speed of service in minutes reported by Western Union for the past 2 fiscal years:

	Average speed in minutes	
	Fiscal 1953	Fiscal 1954
Origin to destination: Delivered by:		
Telephone	43.0	43.7
Messenger	46.2	47.2
Private tieline	37.8	37.9
Office relay drag	8.4	8.4

The above summary shows that origin to destination service for fiscal 1954 was somewhat slower than in the previous year and office relay drag remained the same. However, as a result of Western Union's recent efforts to improve speed of service in its 15 reperforator centers, where large volumes of messages are relayed, the company attained the fastest monthly average speed of service at such centers during May and June 1954 (5.8 minutes) yet reported. If this continues, the overall origin to destination speed of service should improve also.

Due to limited personnel and funds, Commission studies of service conditions are necessarily restricted to the most pressing situations. However, during the year the Field Engineering and Monitoring Bureau personnel in 17 district offices assisted the Common Carrier Bureau by making routine speed-of-service inspections of 81 Western Union offices and agencies, and the Common Carrier Bureau field

offices made 478 inspections of Western Union offices located in or adjacent to those cities. In addition, the bureau headquarters staff made on-the-spot inspections of telegraph service conditions at certain of the larger offices.

Western Union modernization program.—Western Union's modernization program was instituted in 1946. Its principal component was completed in 1950 and consisted of the construction of 15 strategically located reperforator-switching centers for the automatic and semiautomatic relay of telegrams between cities. Each reperforator office serves from 1 to 6 States and each is provided with direct channels to other centers.

To extend the service benefits of the high-speed transmission facilities provided through these reperforator message centers, Western Union, as of June 30, 1954, had provided 245 large branch offices, all except 2 of which are located in nonreperforator cities, with direct-circuit connections to distant reperforator centers. Of this number, 206 are equipped for sending originating messages into the reperforator system and the remainder are equipped for both sending and receiving messages. These direct-circuit connections provide faster and more efficient service by eliminating the manual relay of messages.

The principal development affecting the modernization program during fiscal 1954 was the installation at Richmond, Va., of additional switching equipment of the latest type. As a result, the larger tributary offices in Virginia and North Carolina are interconnected directly with automatic switching equipment in the Richmond traffic center and messages from these offices can be handled more rapidly than before.

Total channel-miles in telegraph service, including carrier, physical, and other facilities, approximated 3,372,000 miles as of June 30, 1954, an increase of 182,000 miles during the fiscal year. Total carrier channel miles on leased facilities and Western Union-owned circuits increased from 2,148,122 miles to 2,351,708 miles. Total telegraph channel-miles in service on June 30, 1954, were more than double the 1946 capacity. The increased channel mileage was derived largely from the application of carrier equipment to voice frequency channels.

Western Union continued to provide increasing numbers of telegraph users with deskfax tielines and other direct wire connections with telegraph central offices. The deskfax, a compact facsimile telegraph machine installed on the desk of the business user, speeds the delivery and pickup of telegrams. During fiscal 1954, deskfax installations were completed to 4,860 additional customers' offices, bringing to 13,534 the total number in use. Company plans call for approximately 20,000 deskfax installations by the end of calendar 1954. In fiscal 1954, teleprinter-operated direct-wire connections to customers were increased from 21,388 to 22,586.

The large and continuing increase in direct customer connections lessens the need for messenger and telegraph office handling, and correspondingly reduces public service requirements at certain telegraph offices. There has been a substantial trend away from messenger pickup and delivery of telegrams. The increasing number of deskfax tielines and greater use of the telephone to accept and deliver telegrams is accelerating this trend. The following table shows the percentage of messages delivered and picked up by messenger, by tieline, by telephone and over the counter for 1934, 1944 and 1954:

	Percent of total messages					
	Delivered			Picked up		
	1934	1944	1954	1934	1944	1954
Terminal handling method:						
Messenger	74	51	45	50	25	18
Tieline	14	24	35	14	25	40
Telephone	9	22	18	19	24	32
Counter	3	3	2	17	26	10

Western Union undertook a program of connecting its large volume tieline customers directly to the company's public message reperforator switching system. Such arrangements eliminate the usual interception and manual relay of tieline messages at the originating telegraph message center, thereby effecting substantial economies and speeding up service.

At the close of fiscal 1953, Western Union announced plans for further expansion in the facsimile and private wire service field. A number of custom-built private wire systems were installed and major additions were made to certain existing systems in fiscal 1954. Some of these systems employ equipment and methods similar to those used in the telegraph company's own mechanized switching centers. A new and extensive private wire system was being completed for the General Services Administration. This system will link governmental centers throughout the Nation in a 15,000-mile network employing the latest telegraph techniques.

Gross expenditures on the modernization program through calendar year 1953 amounted to some $56 million, with an estimated $26 million to be spent in future years. Estimated savings in operating expenses resulting from this program currently aggregate about $31 million a year.

Construction of wire facilities.—The Commission granted five requests of Western Union for authority to construct or operate new or extended wire telegraph lines. The applications covered the leasing of 102,031 telegraph channel miles at an annual rental of $208,338, and the construction of 69,369 telegraph channel miles of line and associated equipment at a cost of $1,571,720.

Facilities leased to subscribers for private-line telegraph service supplied by Western Union rose from 1,248,000 miles to 1,493,572 miles during the fiscal year, an increase of almost 20 percent.

Discontinuance, reduction, or impairment of service.—A total of 1,202 applications for reduction in hours of service or closure of public telegraph offices were filed by Western Union as compared to 1,953 such applications during the previous fiscal year. In addition, 224 applications were pending at the beginning of the year. Of the total, 1,259 applications were granted, 30 were withdrawn, and 137 were pending at the close of fiscal 1954. Generally, where hours were reduced or offices closed, substitute service was made available.

On December 21, 1953, the Commission proposed rulemaking (docket 10816) *In the Matter of the Amendment of Part 63 of the Commission's Rules and Regulations Governing Extension of Lines and Discontinuance of Service by Carriers*, to enable interested parties to present their views regarding a petition filed by American Communications Association requesting certain changes in the requirements for posting and publishing of notice of applications by carriers for authority to discontinue, reduce or impair telegraph service, and to require that hearings be held on all formal applications where objections are filed. (On October 25, 1954 the Commission amended its rules to require carriers to post adequate public notices in affected offices, but denied the ACA petition in other respects.)

Messenger delivery limits.—Western Union filed tariff amendments to clarify its practices relating to limits within which messages are delivered by messenger without additional charge. The changed regulations provide that delivery of messages will be made without additional charges to any address within the established city or community limits of any point listed in the company's tariff. The tariffs had previously fixed such delivery limits at specified distances from open telegraph offices.

Rates and Tariffs

Tariff schedules.—At the end of the fiscal year, 32 domestic telegraph carriers had tariffs and concurrences on file with the Commission. During the year, they filed 924 tariff publications establishing or changing rates, regulations, practices, and classifications of service.

Domestic telegraph rates.—As reported in the 1953 annual report, Western Union filed new and revised rates and regulations for interstate leased facilities (private-line telegraph services). After due examination, they were permitted to become effective July 1, 1953, resulting in both increases and decreases, the overall effect of which amounted to an estimated reduction of $357,000 annually in the company's revenues.

On June 15, 1954, Western Union filed new and increased rates, effective July 15 and August 1, 1954, for interstate message telegraph and money-order services, foreign money-order service, and certain other interstate services. The company estimated that the revised rates, if made effective systemwide (interstate and intrastate), will produce about $10 million additional revenue a year. Western Union stated that the increased rates were necessary to offset the cost of wage increases and restore the company's earnings position to the approximate level which obtained during the first half of 1953. The overall average effect is an increase in the cost of these telegraph services to the public approximating 12 percent. The schedules also provide for a flat discount or reduction of 20 cents a message in the charges for all sent paid messages in excess of 100 messages in a month filed by tieline to points in the United States or Alaska. Western Union initiated this volume discount rate in recognition of lower terminal costs experienced from traffic handled over tielines.

Ticker rental charges.—As a result of hearings held in early 1953 regarding the lawfulness of Western Union's revised tariff schedules establishing new and increased charges and new regulations applicable to "tickers" used in leased facilities service, effective August 1, 1952 (docket 10274), the Commission, by decision released April 22, 1954, held that the increased rates had not been shown to be unreasonable or otherwise unlawful. On June 19, 1954, the Chicago Board of Trade, one of the intervenors, appealed to the Court of Appeals for the District of Columbia Circuit, where the matter was pending at the end of the fiscal year.

Other Regulatory Matters

Original cost of plant and continuing property records.—Field verification and analysis has been completed with respect to the methods and procedures applied and the accounting performed in connection with Western Union's reclassification of its plant and equipment on the basis of original cost, and with regard to the establishment and maintenance by Western Union of a continuing property record system.

Depreciation.—No changes in Western Union's depreciation rates were made during the fiscal year. The carrier is concluding studies of the factors underlying the development of depreciation rates, looking toward a comprehensive revision of the rates by the end of 1954 that will reflect, more accurately, obsolescence and retirement of a substantial amount of its older equipment and installation of newer types of equipment having different service-life and salvage characteristics.

Miscellaneous accounting matters. The Commission devotes continuing attention to the telegraph carrier's accounting methods and

procedures for the purpose of assuring proper treatment in and reporting of accounts as an aid to effective rate regulation. In this connection, attention was directed during the fiscal year to such matters as (*a*) local office bookkeeping and flow of accounting and other data to headquarters offices; (*b*) changes in subaccounts and temporary or experimental accounts, and other internal controls; (*c*) accounting for temporary investments in Federal securities; (*d*) accounting for sales of investments in subsidiary companies; and (*e*) accounting for plant under construction.

Uniform system of accounts.—The system of accounts was amended to prescribe total-life depreciation except in instances where the Commission authorizes the use of the remaining-life method which was formerly prescribed. Provisions relating to accounting for cost of pensions were also amended to permit charging such costs to operating expense when certain conditions are met, which is consistent with a similar amendment applicable to telephone carriers. Work was also continued on preparation of a combined system of accounts for domestic and international telegraph carriers.

INTERNATIONAL TELEGRAPH AND TELEPHONE

General

Fixed point-to-point telegraph message service between the continental United States and the rest of the world was provided by 4 cable and 6 radiotelegraph carriers. Four of these carriers also provided direct customer-to-customer international telegraph service, primarily to European countries. In addition, 9 carriers rendered marine radiotelegraph service between ships and shore. Of these, 4 were international point-to-point carriers, whereas the other 5 provided only communication between land stations and ships at sea. Radiotelephone service was furnished between the continental United States and over 100 foreign points by the American Telephone & Telegraph Co. International telegraph and telephone service was also provided to and from the United States possessions and Territories on a basis generally comparable to service to and from the continental United States.

The downward trend in the total volume of international telegraph traffic reported by the 10 cable and radiotelegraph carriers for the calendar year 1952 leveled off during the first half of 1953, and was actually reversed during the last half of that year. However, the increase in message traffic volume which obtained during the second half of 1953 was not sufficient to offset the decrease for the preceding half year. Thus, the word volume of United States international telegraph traffic handled by the carriers during calendar 1953 totaled 511,256,493 paid words, which was about 1 percent or 5,005,080 paid words under the 1952 level.

Industrywide message revenues, on the other hand, increased slightly to $46,094,179, as compared to $44,916,384 for 1952, mainly because of the benefits accruing to the carriers from increased collection rates on traffic inbound from the United Kingdom later in calendar 1952 and certain Latin American countries in calendar 1953. At the same time, revenues from nonmessage services also increased $943,449, to a total of $13,632,442, reflecting the continued growth of such customer-to-customer services as leased channel and international teleprinted exchange services.

As a result, total gross operating revenues for 1953 amounted to $59,726,621, an increase of about 3.7 percent or $2,121,244 over the previous year. Net operating revenues of the industry before provision for Federal income taxes amounted to $6,509,448 in 1953. This was $461,509 or 7.6 percent more than the previous year, and the highest for any year since the end of World War II.

The growth in international radiotelephone service continued, and the number of calls handled during calendar 1953 passed the million mark for the first time in the history of this service. The chargeable calls in 1953 totaled 1,052,812, representing an increase of about 7.1 percent over a year ago. The revenues (including associated land-line charges) amounted to $10,918,450, or about 5.5 percent above those in 1952.

International Services

Telegraph facilities.—In general, international telegraph service by cables is provided to Europe and to many countries in the West Indies, Central and South America. In addition, cable carriers provide service to most other points through connection with foreign facilities.

At the close of fiscal 1954, the radiotelegraph companies were serving 87 foreign countries and overseas points either by direct circuits or via relay stations at Tangier, North Africa. Some points in northern Europe, the Near East, and Asia were served primarily via Tangier in order to provide more reliable service. Relaying technique is used at other points not only to overcome propagation difficulties but also to provide service to additional countries by connections with foreign carriers.

In addition to public message traffic, certain telegraph carriers provide radiotelephone transmission and reception service for broadcast programs. Program service includes such material as on the spot foreign news commentaries which are broadcast on "news roundups" in this country. Transmission of sponsored sporting events, such as boxing matches and baseball games, to Latin American broadcast stations increased during the year. Similarly, the Department of State and the United Nations utilize this service to send information

to be retransmitted locally from foreign points. Radiophoto transmission and reception service provided by some carriers is used primarily by news agencies.

Requirements of the United States and foreign governments, commercial enterprises, and airlines which operate internationally, for leased channel teleprinter service, provided by both the cable and radiotelegraph carriers, have continued to increase. Customer-to-customer international teleprinter exchange service—similar to domestic TWX (teletypewriter exchange service)—is an arrangement whereby the cable or radio carrier provides circuit facilities and equipment to the customer for personal communication with his associates overseas. This service is used principally by financial and other commercial interests on a time and metered basis. These facilities are used by subscribers in the United States, particularly in the vicinity of New York City and Washington, for communication with several European countries, the Belgian Congo, and Venezuela. Service of this type is also available between San Francisco and Hawaii.

Radiotelegraph service is likewise available between the United States and ships at sea. Under international agreement, each country is required to provide for the settlement of accounts for vessels under its registry of tolls for radiotelegraph traffic exchanged with coastal stations of other administrations. This function is carried out by the International Telecommunications Settlements Division in the Commission. In fiscal 1954 this division accounted for the following messages and made the following disbursements:

Messages on hand beginning of period	41,055
Messages received during period	131,556
	172,611
Messages processed during period	147,133
Messages on hand June 30, 1954	25,478
Cash on hand at beginning of period	$67,919.33
Cash received from United States companies	208,618.02
	276,537.35
Cash disbursed to foreign governments	209,948.52
Cash on hand for disbursement June 30, 1954	66,588.83

Telephone circuits.—A new radiotelephone circuit was established to Singapore so that message toll service is now in effect with 111 foreign countries and overseas points. There is direct communication on 63 of these circuits. Of these, 59 are served by radiotelephone from either New York, San Francisco, or Miami. Canada and Mexico are served by interconnecting wire lines at their respective borders. Cuba is served by submarine cables and Alaska is served via the

facilities of the Alaska Communications System. Program and private line service is available between the continental United States and many foreign countries and overseas points.

Plans are underway to install two coaxial cables with submerged repeaters between Nova Scotia and Scotland, to be owned one-half by American Telephone & Telegraph Co. and one-half by United Kingdom and Canadian communications interests. These cables will be connected to land-line and microwave radio relay systems to provide control terminals at New York, Montreal, and London. They will be capable of handling 36 two-way telephone conversations simultaneously. What effect this development will have on easing the transatlantic radiofrequency shortage is not known at this time since it is quite possible that the spectrum space thus saved may be absorbed by normal increase in requirements for communication channels.

Radiotelephone service is also being made available to the passengers of an increasing number of oceangoing vessels. In the past year this service was established with three additional transoceanic vessels.

Applications.—Licensees in the International Fixed Public Services filed 405 applications for additional frequencies, points of communication, and transmitters as well as for short-term authorizations for program and other special services. The Commission acted on 432 such applications during the same period. The number handled was approximately 27 percent less than during the preceding year. This is brought about principally by a reduction in the number of applications filed for additional frequencies in implementing the Atlantic City allocation table. The number of "out-of-band" frequency assignments in these services has been reduced from 35 to 15. Progress has been aided materially by the rearrangement of operating patterns and the development of multichannel transmission techniques which result in more efficient use of the frequency spectrum.

Radiotelephone and radiotelegraph service has been instituted on an experimental basis in the very high frequency range between stations in Puerto Rico and the Virgin Islands. Heretofore such service had been on high frequencies. It is expected that the change will improve service and help to conserve the relatively scarce high frequencies.

Merger.—Studies are continuing under the auspicies of the Senate Committee on Interstate and Foreign Commerce regarding the feasibility and desirability of a merger of the major companies providing international telegraph service. Although it appears that some progress has been made in this matter, no definite results had been reached at the end of the fiscal year.

Licensing of submarine cables.—On May 10, 1954, the President issued Executive Order 10530 which, in section 5, designates the Com-

mission to receive, grant, or revoke licenses to land or operate submarine cables in the United States without the approval, ratification, or other action of the President, provided the approval of the Secretary of State is obtained and such advice from any executive department of the Government the Commission may deem necessary. Formerly, under Executive Order 6779 of June 30, 1934, the Commission was directed to receive such applications and, after obtaining the approval of the Secretary of State, to advise the President with respect to their grant, denial, or revocation.

(The first license issued under this authority was on October 20, 1954, to the American Telephone and Telegraph Co., for twin submarine telephone cables between Port Angeles, Wash., and Ketchikan, Alaska.)

Docket Cases

Western Union-Globe and Tropical contracts.—The 1953 annual report referred to the final decision issued May 18, 1953, in this matter (docket 9292), in which the Commission concluded that certain contracts entered into by Western Union with Globe Wireless, Ltd., and Tropical Radio Telegraph Co., respectively, for the exchange of specified international telegraph traffic, were violative of section 222 of the Communications Act and the formula prescribed thereto. On February 24, 1954, the Commission denied the petitions of these companies for a rehearing, and again ordered them to cease and desist from transferring traffic pursuant to such contracts and to enter negotiations for an agreement on damages due the complainants (Commercial Pacific Cable Co.; Mackay Radio and Telegraph Co., Inc.; The Commercial Cable Co., All American Cables and Radio, Inc.; and RCA Communications, Inc.), as well as a plan of reparations.

On March 4, 1954, the Commission set April 1, 1954, as the date by which the cease-and-desist orders in this proceeding were to be complied with. Western Union, Globe, and Tropical on March 29 sought review of the Commission action in the Federal courts and also requested that the Commission's order be stayed pending the appeal. The request for a stay was denied, but the appeal is still pending before the Court. After notice that no agreement on damages had been reached by May 24, 1954, the Commission, on June 30, 1954, granted an extension to September 30, 1954 of the time within which to come to such agreement.

Western Union divestment.—Investigation and hearing was instituted by the Commission on March 5, 1952, into the matter of the divestment of Western Union's international telegraph operations in accordance with section 222 of the Communications Act. This section, which authorized the merger or consolidation of domestic telegraph carriers, required that any merger plan should provide for

the divestment of the international telegraph operations theretofore carried on by any party to the proposed merger within a reasonable time, and after the Commission found the compensation for the property to be divested commensurate with its value. In approving the merger of Western Union and Postal Telegraph, Inc., in 1943, the Commission required the former to exercise due diligence in effecting divestment of its cables (docket 6517). Since Western Union had not effected divestment, the instant proceeding (docket 10151) was instituted. Hearings in the matter were concluded on March 25, 1954, and the matter is now awaiting an initial decision.

Buccaneer application.—This proceeding involved an application filed on June 9, 1952, by Buccaneer Line, Inc., for a new fixed public radiotelephone station at Jacksonville, Fla., to furnish radiotelephone service between Jacksonville and certain points in the Yucatan peninsula in Mexico (docket 10376). Hearings in the matter, scheduled for April 14, 1953, were postponed pending negotiations between the American Telephone & Telegraph Co. and Mexican communications companies for the establishment of communication between the points desired through interconnection with their existing facilities. The carriers were able to establish satisfactory service and the Commission on April 29, 1954, granted a motion by Buccaneer to dismiss its application without prejudice.

Mackay circuits to Netherlands and Portugal.—In a previous annual report it was noted that RCA Communications, Inc., had appealed to the United States Court of Appeals for the District of Columbia Circuit from the Commission decision of February 21, 1951, granting Mackay Radio & Telegraph Co., Inc., authority to establish radiotelegraph circuits to the Netherlands and Portugal which would compete with existing RCAC circuits (docket 8777).

After a reversal of the Commission decision by the Court of Appeals, both the Commission and Mackay were granted certiorari by the Supreme Court of the United States for review. On June 8, 1953, the Supreme Court reversed the lower court and ordered the case remanded to the Commission for such action as may be open under the court's opinion. The Supreme Court, although agreeing that the grant of the Mackay applications would not result in a violation of section 314 of the Communications Act, stated that the Commission could not base such a grant on a finding that there exists a national policy favoring competition in this field, but rather must find ground for "reasonable expectation that competition may have some beneficial effect", although specific findings of immediate tangible benefit are not required.

Following oral argument on February 8, 1954, the Commission held further hearings to bring the record up to date. Meanwhile,

pending a new Commission decision, Mackay is being permitted to operate the circuits. This case is particularly significant in that it presents a basic policy problem as to the extent to which the Commission may find additional competitive circuits in the public interest on the basis of the benefits expected to be derived by the public as a result of competition.

RCAC complaint on Canadian traffic.—Section 222 of the act, which authorized the merger of Western Union and Postal, provided that the merged company shall divide among the international telegraph carriers such traffic as is destined to points outside the continental United States and also to distribute telegraph traffic destined to Canada among that country's carriers in accordance with formulas established pursuant to that section. On March 24, 1954, RCA Communications, Inc., filed a petition alleging that Western Union was in violation in that it was failing to turn over to RCAC certain traffic destined for trans-Pacific points which Western Union had received from the Canadian National Telegraph in Canada. The petition requested a ruling by the Commission. The matter is under consideration.

Rates and Tariffs

Rate levels.—During calendar 1953 the level of rates for telegraph traffic outbound from the continental United States remained unchanged, while for telegraph traffic inbound some changes in rates were reported. Although these revisions were in the nature of surcharges added to the normal rates by certain Latin American countries to increase the revenues of their telegraph operating administrations, they were of financial benefit to those United States carriers which carry on international telegraph operations in those countries. United States carriers which provide service to Latin American countries by communicating with foreign correspondents did not share in the increases in inbound rates.

Tariff schedules.—During fiscal 1954, communications carriers furnishing international and marine telegraph service filed 1,123 tariff schedules affecting charges and regulations applicable to such services.

Contracts and divisions of tolls.—International and marine telegraph carriers filed 254 contracts, 815 amendments to existing contracts, 108 reports of negotiations with foreign correspondents, and 511 statements showing revisions in the division of tolls arrangements for telegraph messages between the United States and foreign countries.

Other Regulatory Matters

Depreciation.—Substantial progress was made in implementing the continuing program of prescribing depreciation rates for international

telegraph carriers. On the basis of cooperative studies with the carriers, the Commission, for the first time, prescribed annual depreciation rates, effective January 1, 1954, for All America Cables and Radio, Inc., and The Commercial Cable Co. The annual net effect of these new rates, based on the gross book cost of depreciable plant on December 31, 1953, represents reductions in annual depreciation charges of approximately $77,000 (or 15 percent) for All America, and $60,000 (or 21 percent) for Commercial Cable. Depreciation rates are expected to be prescribed for some of the other carriers during fiscal 1955.

Studies were also continued to determine the reasonableness and propriety of the annual depreciation rates and charges, book depreciation reserves, and the depreciation accounting practices of these carriers. In order to effect more flexibility in the Commission's rules, the systems of accounts for the international telegraph carriers were amended to make the application of the remaining-life method of depreciation accounting permissive rather than mandatory.

Continuing property records.—Two of the three international telegraph carriers fulfilled the requirements to install and maintain satisfactory property records during the year. The third carrier made substantial progress and, with the advice and assistance of the Commission, is expected to restate its records in a satisfactory manner during fiscal 1955. Studies were continued to verify and to evaluate the regulatory effectiveness of the forms, records, and procedures employed by these carriers in installing and maintaining their property records.

Relief and pensions.—The Commission pursued its general studies of the international telegraph carriers' pension arrangements, particularly with the view of determining the effect of pension costs upon operating expenses. Six of the carriers introduced changes in their pension plans, primarily to expand coverage and to increase employees' benefits. The Commission revised its systems of accounts for international telegraph carriers to provide that when certain provisions in the accounts are met, the entire cost of pensions, whether relating to past or to current service of employees, may be charged to operating expenses.

Reclassification of plant.—Although the reclassification of plant of the international telegraph carriers has been substantially completed, additional adjustments may be required with regard to three carriers. In order to be assured of the propriety and reasonableness of the final results, comprehensive studies were in progress at the end of fiscal 1954 to analyze the methods and procedures applied, and to verify the entries recorded and the accounting performed to restate the plant of these carriers on the basis of original cost.

Miscellaneous accounting matters.—With the view of further implementing effective rate regulation, studies were conducted to determine the reasonableness and propriety of the international telegraph carriers' accounting and reporting procedures. These studies, among other things, related to (*a*) expunging from the carriers' rate bases all plant not used and useful in the public interest, (*b*) plant retirements and installations, (*c*) segregation of operating revenues, (*d*) traffic-damage claims, and (*e*) ocean-cable maintenance.

STATISTICS

General

Reports were filed on an annual basis by 323 common carriers and 19 controlling companies for the calendar year 1953. Considerable financial and operating data taken principally from these reports are published annually in a volume entitled "Statistics of the Communications Industry in the United States" (see appendix list of Commission publications sold by the Superintendent of Documents). The larger telephone and telegraph carriers also file monthly reports of revenues and expenses, and summaries of these data are published monthly by the Commission.

Telephone Carriers

The annual reports received from common carriers include those from 64 telephone carriers and 249 carriers engaged in rendering mobile radiotelephone service. Selected financial and operating data concerning large telephone carriers for the year 1953 as compared to 1952 are shown in the following table:

Telephone carriers [1]

Item	1952	1953	Percent of increase or (decrease)
Investment in plant and equipment (as of Dec. 31)	$12,608,517,366	$13,749,883,288	9.05
Depreciation and amortization reserves	$3,411,440,935	$3,618,085,781	6.06
Net investment in plant and equipment	$9,197,076,431	$10,131,797,507	10.16
Local service revenues	$2,516,731,327	$2,777,053,634	10.34
Toll service revenues	$1,534,854,055	$1,641,990,139	6.98
Total operating revenues	$4,228,750,352	$4,628,417,965	9.44
Operating expenses	$2,986,565,273	$3,222,873,105	7.91
Taxes	$737,732,268	$838,052,515	13.60
Net operating income after all taxes	$504,452,211	$567,191,745	12.44
Net income	$420,733,463	$496,507,445	18.01
Dividends declared	$346,388,050	$398,972,071	15.18
Company telephones:			
Business	12,899,770	13,394,632	3.84
Residence	28,987,800	30,448,066	5.04
Number of calls originating during the year:			
Local [2]	68,369,589,937	69,978,334,496	([3])
Toll [2]	2,194,086,251	2,268,968,227	([3])
Number of employees at end of October	615,141	625,832	1.74
Male	207,350	215,080	3.73
Female	407,791	410,752	0.73
Total compensation for the year	$2,200,657,106	$2,378,679,557	3.09

[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 1953, due to enlargement of numerous local calling areas.

Business and Residence Telephones by States

There were 50,373,000 telephones in the continental United States, of which 35,342,300 were located in residences and 15,030,700 in business establishments, as of January 1, 1954. The number of telephones, arranged by States, is shown in the following table. The figures were compiled by the American Telephone & Telegraph Co.

State	Business	Residence	Total
Alabama	145,600	376,300	521,900
Arizona	78,500	137,900	216,400
Arkansas	90,900	195,600	286,500
California	1,553,000	3,100,000	4,653,000
Colorado	161,300	354,700	516,000
Connecticut	255,400	662,700	918,100
Delaware	44,800	99,200	144,000
District of Columbia	250,800	283,100	533,900
Florida	361,600	548,300	909,900
Georgia	222,100	495,300	717,400
Idaho	45,500	113,200	158,700
Illinois	1,074,700	2,302,600	3,377,300
Indiana	329,100	968,400	1,297,500
Iowa	184,100	705,500	889,600
Kansas	161,500	512,300	673,800
Kentucky	147,800	403,600	551,400
Louisiana	185,100	450,900	636,000
Maine	63,300	182,200	245,500
Maryland	230,800	588,700	819,500
Massachusetts	512,300	1,249,700	1,762,000
Michigan	624,400	1,751,600	2,376,000
Minnesota	250,400	759,000	1,009,400
Mississippi	79,100	189,400	268,500
Missouri	369,300	919,400	1,288,700
Montana	50,600	121,700	172,300
Nebraska	107,800	334,600	442,400
Nevada	28,200	38,000	66,200
New Hampshire	41,400	120,100	161,500
New Jersey	565,000	1,424,000	1,989,000
New Mexico	65,900	93,000	158,900
New York	2,223,800	4,275,300	6,499,100
North Carolina	210,800	502,800	713,600
North Dakota	35,600	104,400	140,000
Ohio	772,300	2,245,700	3,018,000
Oklahoma	191,100	453,700	644,800
Oregon	150,000	360,400	510,400
Pennsylvania	972,600	2,675,000	3,647,600
Rhode Island	77,800	190,800	268,600
South Carolina	101,800	224,300	236,100
South Dakota	40,000	126,000	166,000
Tennessee	206,900	542,100	749,000
Texas	733,800	1,565,600	2,299,400
Utah	67,100	173,000	240,100
Vermont	26,200	74,300	100,500
Virginia	259,200	585,500	844,700
Washington	249,500	606,600	856,100
West Virginia	105,700	294,500	400,200
Wisconsin	296,600	798,800	1,095,400
Wyoming	29,600	62,500	92,100
United States	15,030,700	35,342,300	50,373,000

Land Line Telegraph

Annual reports containing financial and statistical data for the calendar year 1953 were received from 10 domestic and international telegraph carriers. The accompanying table sets forth financial and operating data relating to the domestic land-line operations of the Western Union Telegraph Co. for the calendar year 1953 as compared to 1952. The data pertaining to its cable operations are included in a later table relating to ocean-cable carriers.

The Western Union Telegraph Co. [1]

Item	1952	1953	Percent of increase or (decrease)
Investment in plant and equipment (as of Dec. 31)	$286,371,865	$289,448,249	1.07
Depreciation and amortization reserves	$126,579,820	$128,776,085	1.74
Net investment in plant and equipment	$159,792,045	$160,672,164	0.55
Message revenues	$153,086,977	$174,649,515	14.09
Total operating revenues	$184,336,414	$208,578,008	13.15
Operating expenses, depreciation and other operating revenue deductions	$183,394,757	$193,863,321	5.71
Net operating revenues	$941,657	$14,714,687	[2]
Provision for Federal income taxes	[3] $200,000	[3 4] $9,417,000	[2]
Net income (or deficit)	($724,008)	$11,785,117	[2]
Dividends declared	$3,688,959	$3,690,143	0.03
Number of revenue messages handled [5]	159,735,155	162,187,632	1.54
Number of employees at end of October	39,853	38,957	(2.25)
Total compensation for the year	$126,974,301	$139,488,909	9.86

[1] Represents data for land-lines operations. Figures covering cable operations are included in the table below relating to ocean-cable carriers.
[2] Not comparable.
[3] Represents the provision for Federal income taxes on the net income of the company as a whole. Although applicable to both wire-telegraph and ocean-cable systems, this amount has not been allocated to such systems by the carrier in its records.
[4] Includes $2,217,000 allocated as Federal income tax on net capital gains from sale of investments in subsidiary companies.
[5] Includes domestic transmission of transoceanic and marine messages (about 8,620,000 in 1952 and about 8,438,000 in 1953).

Radiotelegraph and Ocean-Cable Carriers

There are shown in the accompanying tables the principal financial and operating statistics selected from the annual reports filed by the United States radiotelegraph and cable carriers furnishing international communications services. These tables compare the figures for the calender year 1953 to those for the previous year.

Radiotelegraph carriers

Item	1952	1953	Percent of increase or (decrease)
Investment in plant and equipment (as of Dec. 31)	$37,930,604	$39,129,876	3.16
Depreciation and amortization reserves	$16,966,280	$17,705,958	4.36
Net investment in plant and equipment	$20,964,324	$21,423,918	2.19
Message revenues:			
Domestic [1]	$1,830,865	$1,857,041	1.43
Transoceanic	$21,599,495	$21,235,725	(1.68)
Marine	$1,529,491	$1,528,362	(0.07)
Total operating revenues	$30,582,922	$30,237,680	(1.13)
Operating expenses, depreciation and other operating revenue deductions	$26,563,787	$27,309,420	2.81
Net operating revenues	$4,019,135	$2,928,260	(27.14)
Provision for Federal income taxes	$2,434,413	$2,780,734	14.23
Net income	$2,314,586	$2,477,000	7.02
Dividends declared	$503,000	$400,000	(20.48)
Number of revenue messages handled:			
Domestic [2]	57,706	49,421	(14.36)
Transoceanic	10,956,947	10,712,257	(2.23)
Marine	1,039,681	964,824	(7.20)
Number of employees at end of October	5,949	6,008	.99
Total compensation for the year	$22,295,352	$23,468,678	5.26

[1] Includes revenues from the domestic transmission of transoceanic and marine messages, and revenues from domestic classification messages (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.)

	1952	1953	Percent of increase or (decrease)
Investment in plant and equipment (as of Dec. 31)	$89,170,714	$92,038,046	3.22
Depreciation and amortization reserves	$55,957,080	$57,641,617	3.01
Net investment in plant and equipment	$33,213,634	$34,396,428	3.56
Message revenues;			
Domestic [1]	$182,616	$160,853	(11.92)
Transoceanic	$19,773,917	$21,312,199	7.78
Total operating revenues	$27,022,455	$29,488,941	9.13
Operating expenses, depreciation and other operating revenue deductions	$24,993,651	$25,907,756	3.66
Net operating revenues	$2,028,804	$3,581,185	76.52
Provision for Federal income taxes		$70,000	
Net income	$2,078,484	$2,369,930	14.02
Dividends declared			
Number of revenue messages handled;			
Domestic [2]	81,897	90,145	10.07
Transoceanic	9,599,431	9,926,457	3.41
Number of employees at end of October	5,591	5,678	1.56
Total compensation for the year	$13,759,322	$14,038,363	2.03

[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

According to the carriers' reports with respect to international telegraph message volume, a total of 511,256,493 paid words were transmitted out of or received in the United States during the calendar year 1953 by the international cable and radiotelegraph carriers. Of this total, 257,724,393 paid words were handled in the outbound direction, and 253,532,100 paid words were handled in the inbound direction. The cable carriers accounted for 243,749,717 paid words, or 47.7 percent of the total volume, while the radiotelegraph carriers handled 267,506,776 paid words, or 52.3 percent of the total volume. The number of telegraph words exchanged between the United States and each of the principal countries of the world during calendar 1953 is shown in the following tabulation:

United States—international telegraph (radio and cable) traffic in words, 1953 (includes traffic transiting the United States)

Country	Number of words		Country	Number of words	
	Outbound from the United States	Inbound to the United States		Outbound from the United States	Inbound to the United States
EUROPE, AFRICA, AND THE NEAR EAST			EUROPE, AFRICA AND THE NEAR EAST—Con.		
Algeria	151,697	110,335	France	14,828,636	12,996,882
Arabia	866,912	944,549	French West Africa	139,676	90,175
Austria	1,352,215	1,444,137	Germany	12,569,908	13,113,873
Belgian Congo	307,138	278,365	Greece	1,759,093	1,189,818
Belgium	4,649,214	3,992,816	Hungary	237,812	236,965
British East Africa	278,879	257,923	Iceland	289,390	296,127
British West Africa	228,984	206,619	Iran	628,457	1,186,833
Czechoslovakia	371,670	456,502	Iraq	281,527	207,105
Denmark	1,690,596	1,097,597	Ireland	779,550	908,094
Egypt	1,262,465	1,360,179	Israel	2,663,295	2,512,650
Ethiopia	193,218	143,312	Italy	9,554,576	7,464,462
Finland	501,741	484,680	Lebanon	840,666	939,039

United States—international telegraph (radio and cable) traffic in words, 1953 (includes traffic transiting the United States)—Continued

Country	Number of words	
	Outbound from the United States	Inbound to the United States
EUROPE, AFRICA, AND THE NEAR EAST—CON.		
Liberia	479,144	589,853
Libya	111,451	83,770
Luxembourg	122,818	91,344
Morocco—French	627,490	575,488
Morocco—Tangier	467,624	400,425
Netherlands	6,786,656	5,805,482
Norway	2,699,135	1,857,830
Persian Gulf	388,942	460,996
Poland	923,521	531,412
Portugal	1,420,836	826,863
Rhodesia	110,977	126,833
Rumania	145,544	108,277
Spain	3,375,638	1,869,576
Sweden	3,234,846	2,663,355
Switzerland	6,695,325	4,585,840
Syria	220,556	174,514
Transjordania	325,207	238,973
Trieste, Free Territory of	181,166	153,814
Turkey	1,156,068	995,423
Union of South Africa	2,256,801	2,359,618
U. S. S. R.	4,887,619	1,894,215
United Kingdom	47,694,606	46,927,189
Yugoslavia	1,099,338	1,132,270
All other places	1,034,628	1,849,705
Total	142,873,251	128,222,102
WEST INDIES; CENTRAL, NORTH, AND SOUTH AMERICA		
Argentina	5,178,414	6,313,341
Bahamas	770,067	912,450
Barbados	234,238	164,852
Bermuda	1,005,462	1,302,540
Bolivia	623,306	738,669
Brazil	9,658,228	10,446,054
British Guiana	188,011	247,657
British Honduras	114,109	110,657
Canada	8,447,705	10,797,326
Canal Zone	749,913	660,502
Chile	2,303,124	2,508,942
Colombia	5,377,909	5,088,895
Costa Rica	844,382	765,371
Cuba	5,767,601	8,380,534
Dominican Republic	1,198,265	1,128,447
Ecuador	1,340,734	865,934
Guatemala	1,228,903	1,286,892
Haiti	801,050	760,831
Honduras Republic	783,227	741,474
WEST INDIES; CENTRAL, NORTH, AND SOUTH AMERICA—CON.		
Jamaica	971,276	747,539
Mexico	1,943,844	1,503,533
Netherlands West Indies	892,446	1,083,718
Nicaragua	812,470	667,768
Other British West Indies [1]	165,676	111,029
Panama	1,185,649	1,247,191
Paraguay	263,847	326,874
Peru	2,275,586	1,904,603
Puerto Rico	3,944,234	3,605,488
Salvador	895,673	741,836
Surinam	137,919	137,068
Trinidad	757,176	510,420
Uruguay	1,880,407	1,846,414
Venezuela	6,719,497	7,973,861
Virgin Islands	297,577	288,953
All other places	185,358	99,054
Total	69,943,283	76,076,727
ASIA AND OCEANIA		
Afghanistan	169,403	76,841
Australia	3,364,942	2,804,090
Burma	716,292	186,768
Ceylon	383,647	302,124
Formosa	990,412	1,044,693
Guam	437,036	595,057
Hawaii	4,812,860	4,525,777
Hongkong	1,702,504	1,660,334
India	4,110,882	3,774,344
Indochina	306,780	371,990
Indonesia	2,130,842	2,128,251
Japan	15,481,901	19,010,679
Korea	412,884	687,733
Malaya, Federation of	1,296,567	1,225,474
New Zealand	985,200	773,242
Okinawa	402,862	634,421
Pakistan	1,020,880	1,025,704
Philippines	4,722,888	5,849,241
Thailand (Siam)	1,016,553	1,092,907
All other places	330,104	320,431
Total	44,795,439	48,090,101
Unknown destination or origin	112,420	1,143,170
Grand total	257,724,393	253,532,100

[1] Points not listed separately.

Common Carrier Radio Facilities

At the close of the fiscal year there were 1,635 authorizations in the common carrier radio services; namely, 610 domestic public land mobile, 39 fixed public telegraph, 24 fixed public telephone, and 962 experimental.

Common Carrier Applications

During the year, common carriers filed 4,168 applications (exclusive of Alaskan and marine mobile). They were in the following categories:

	Pending June 30, 1953	Received	Disposed of	Pending June 30, 1954
PUBLIC RADIO COMMUNICATION				
Domestic public land mobile	75	694	695	74
Fixed public telephone (domestic)	0	2	2	0
Fixed public telephone (international)	10	127	127	10
Fixed public telegraph (domestic)	0	2	2	0
Fixed public telegraph (international)	54	269	297	26
Canadian registration	0	41	41	0
Subtotal	139	1,135	1,164	110
WIRE COMMUNICATION				
Telephone extensions	3	209	212	0
Telegraph extensions	2	43	45	0
Telephone reductions	1	6	5	2
Telegraph reductions	225	1,211	1,327	109
Subtotal	231	1,469	1,589	111
Interlocking directorates	0	20	19	1
Jurisdictional determination	0	3	3	0
Submarine cable landing licenses	0	0	0	0
Petitions or motions (nondocket)	3	2	4	1
Experimental common carrier	46	1,539	1,521	64
Subtotal	49	1,564	1,547	66
Total	419	4,168	4,300	287

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Safety and Special Radio Services

" * * for the purpose of promoting safety of life and property through the use of wire and radio communication * * *"—(Sec. 1 of the Communications Act).*

" * * and generally encourage the larger and more effective use of radio in the public interest * * * "—(Sec. 303 (g) of the Communications Act).*

GENERAL

The Safety and Special Radio Services embrace radio activities necessary for the performance of the Commission's responsibility with respect to the licensing of stations for purposes other than broadcast or common carrier. These nonbroadcast services are almost as varied as they are numerous. They are highly important because their prime responsibility is to safeguard life and property. They are the largest and most active of all radio communication facilities in use today.

These services are of the following general classes:

1. *Safety services.*—Marine, Aviation, Police, Fire, Forestry-Conservation, Highway Maintenance, Special Emergency, and State Guard.

2. *Industrial services.*—Power, Petroleum, Forest Products, Special Industrial, Low-Power Industrial, Relay Press, Motion Picture, Agriculture, and Radiolocation-Land.

3. *Land transportation services.*—Railroad, Motor Carrier (formerly Urban Transit and Intercity Bus), Taxicab, Automobile Emergency, and Highway Truck.

4. *Amateur, disaster communications, and citizens services.*

This group represents the use of radio by ships afloat and by planes in the air; by police and fire departments; by electric and gas companies; by highway and forestry agencies; by railroad and streetcar systems; by ambulances, taxicabs, trucks, and buses; and by a host of other interests, including geologists, newspaper reporters, fishermen, lumber jacks, motion-picture directors, manufacturers, distributors, and individuals. In brief, the Safety and Special Radio Services embrace practically every radio usage which is neither broadcasting nor, for the most part, open for hire to the general public.

The number of authorizations in these services now exceeds 262,000, representing the use of nearly 653,000 fixed and mobile transmitters.

Since common use must be made of the relatively few available frequencies in the Safety and Special Radio Services, licensing and regulatory problems become more complex as additional transmitters are permitted to operate. This requires a high level of compliance with regulations governing operation of these stations which, in turn, places increased importance on the functions of enforcement nationally.

MARINE RADIO SERVICES

There are now more than 46,000 authorizations in the Marine Radio Services, representing eight classes of stations using radio for water navigational and other communication purposes.

Safety at Sea

Basic radio laws governing marine safety are contained in (1) the International Convention for the Safety of Life at Sea, (2) Title III, Part II of the Communications Act, and (3) the Ship Act of 1910, as amended. These laws require the installation of radio equipment, and provide for qualified radio operators and other safety features. They apply, respectively, to (1) certain classes of ships engaged on international voyages and registered in countries signatory to the Safety Convention, (2) certain classes of United States vessels when navigated on the high seas (approximately 1,600 ships), and (3) a few vessels on the Great Lakes. In addition, vessels of countries not parties to the convention are subject to the Communications Act when leaving United States ports.

The International Convention for the Safety of Life at Sea, negotiated in London in 1948, became effective November 19, 1952. Several rule changes were made during the past year to implement its requirements. On June 2, 1954, the Commission adopted a rule which will permit existing cargo ships to carry a spare antenna in lieu of an emergency antenna. On September 23, 1953, the Commission clarified the circumstances under which shipboard interior communication systems provide contact between navigation personnel and the radio room. In cooperation with shipping interests, an acceptable procedure for the annual checking of calibration of direction finders by shipboard personnel was developed.

Under the Safety Convention and Coast Guard regulations, most passenger ships are required to carry both portable and nonportable lifeboat radio equipment, and cargo ships must carry portable lifeboat radio equipment meeting Commission specifications. Most

United States seagoing vessels have portable lifeboat radio equipment of types approved by the Commission.

On June 23, 1954, the Commission modified its rules to permit continued use of existing installations of nonportable lifeboat radio equipment on passenger ships carrying less than 14 lifeboats until June 1, 1955. However, two new types of lifeboat nonportable radio equipment developed by the electronics industry in accordance with the Commission's rules have been type approved by the Commission. Powered entirely from storage batteries, these transmitters can be used by persons unfamiliar with radio communication. A built-in keyer provides for automatic transmission of the international distress and auto-alarm signals on 500 kilocycles and the international distress signal and a long dash for direction-finding purposes on 8364 kilocycles. In addition, the new transmitters give added distance range on both frequencies.

Title III, Part II, of the Communications Act.—On June 15, 1954, the Senate passed a bill (S. 2453) to implement the radio provisions of the Safety Convention. Consisting primarily of amendments to Title III, Part II, it was based on recommendations of the Commission designed to eliminate inconsistencies between the act and the convention and to facilitate administration of both laws. (It was adopted August 3, 1954.)

Great Lakes Agreement and Ship Act of 1910.—On May 17, 1954, a bill (S. 3464) to amend the Communications Act to make certain provisions for carrying out the Agreement for the Promotion of Safety on the Great Lakes by Means of Radio was introduced. The Great Lakes Agreement will come into force on November 13, 1954. Under its terms, a radiotelephone safety system is provided for several hundred vessels navigating the Great Lakes. The bill embodies recommendations of the Commission to repeal the Ship Act of 1910, which provides a radiotelegraph safety system now applying to only a few Great Lakes ships, as well as certain provisions to facilitate administration of the Great Lakes Agreement. (It, too, was adopted August 3, 1954.)

The Commission on June 10, 1954, proposed rules to implement the Great Lakes Agreement and, at the year end, was preparing for the inspections and certifications of ships' radio installations required by this treaty with Canada.

Exemptions from compulsory safety requirements.—The Commission is authorized by the Safety Convention and the Communications Act to, within prescribed limits, grant exemptions from ship radio installation requirements to certain vessels or classes of vessels. Under this authority it renewed blanket exemptions for 1 year to all passenger vessels of 15 gross tons and under when navigated

not more than 20 nautical miles from the nearest land; to all passenger vessels of less than 100 gross tons when navigated within certain areas along the coast; and to a number of individual vessels, most of which were to cover a single voyage.

Individual applications for exemption received during the year numbered 37, of which 23 were granted, the rest being included in existing blanket exemptions. Additionally, 6 passenger-ferry vessels were exempted from the radio requirements of the Safety Convention while engaged on short voyages on inland waters of the west coast between the United States and Canada.

Distress studies.—Studies of distress communication are used to strengthen the Commission's rules to promote use of marine radio for safety of life and property. Among other matters, these studies showed that the international radiotelegraph distress signal (S O S) was used throughout the world 150 times during the year. This was by or on behalf of 93 foreign ships, 25 United States ships, 24 foreign aircraft, and 8 United States aircraft. An outstanding instance was when this signal brought about speedy rescue of many persons on the British troopship *Empire Windrush* which caught fire and sank in the Mediterranean.

A telegraph alarm signal, transmitted before or in connection with a radiotelegraph distress signal, actuates auto alarms on vessels not maintaining continuous listening watch (generally cargo ships carrying only one operator), thus alerting the operator to receive the distress message. The effectiveness of this device was demonstrated in numerous cases during the year. One such alarm signal flashed by a coast station at Bermuda alerted 60 ships and resulted in rescue of the majority of the crew members of a United States Army B–29 aircraft which had been forced down in the open sea.

Detailed study was made of nine major ship collisions occurring in the Delaware River area during the years 1951 through 1953, which cost 27 lives and property loss of approximately 18 million dollars. The study indicated a need for ship-to-ship voice communication for navigational purposes in inland waters to guard against such circumstances.

Radiotelephone calling and distress frequency.—As concluding steps in establishing 2182 kilocycles as a universal radiotelephone calling and distress frequency, ship stations using the medium frequency radiotelephone band 1600 to 3500 kilocycles were required as of January 1, 1954, to maintain a listening watch during their hours of service on the frequency 2182 kilocycles. Coast stations were similarly required to keep such listening watch commencing July 1, 1954. Ships equipped with radiotelegraph and required to maintain a radiotelegraph listening watch on 500 kilocycles were excepted from this requirement.

At its seventh plenary assembly meeting in London, 1953, the International Radio Consultative Committee (CCIR) recommended an alarm signal for international use on the maritime radiotelephony distress frequently 2182 kilocycles and also set forth the conditions which automatic devices intended for reception of the alarm signal should fulfill. This concludes the CCIR study program involving practical tests by interested nations to determine a suitable worldwide radiotelephone alarm signal.

Radio Aids to Navigation

Shore-based radar stations are being developed to assist the piloting of ships entering, leaving, or mooring within harbors. 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 its concurrence. Very high frequency maritime radiotelephone systems are being used developmentally by such radar stations.

Authorizations were renewed for operation on a developmental basis of shore-based radar stations in the harbors of Long Beach, Los Angeles, and San Francisco, Calif. Two developmental shore radar stations were also authorized for use in the Gulf of Mexico for the navigation of vessels in connection with offshore oil-well-drilling operations.

As of June 30, 1954, more than 2,400 United States ships were authorized to use radar.

General Marine Radio Communication Systems

Two-way radiotelegraph or radiotelephone communication between coast stations and ship stations and between ship stations accounts for the great bulk of frequency utilization in the maritime mobile service. This communication may be for public, business, or ship operational purposes. Frequencies involved range widely throughout the radio spectrum covering service over distances of a few miles up to several thousands of miles. Thus, these stations may be in overlapping categories. However, the following figures (as of June 30, 1954) reflect the more important categories:

Utilizing frequencies in the 2–3 megacycle band for telephony:	
Public coast	45
Limited coast	3
Ship	41,020
Utilizing very high frequencies for telephony:	
Public coast	26
Limited coast	98
Public ship	1,333
Limited ship	925

Utilizing high frequencies for long distance telephony:
Public coast 5
Utilizing various frequencies for telegraphy:
Public coast 28

One of the most significant factors affecting maritime stations has been the implementation of the Atlantic City table of frequency allocations below 27 megacycles. The substantial progress made in this matter during the fiscal year 1953 was continued during fiscal 1954. Thus, during 1954, the use of the high frequency ship telegraph calling bands was inaugurated. Regulatory steps were completed for inaugurating, beginning July 1, 1954, the implementation of the new cargo-ship high frequency telegraph working bands and discontinuance of the old Cairo working frequencies by January 1, 1955. Plans were completed for bringing into force during the early part of calendar year 1955 the new passenger-ship high frequency radiotelegraph working bands. Also, during fiscal 1954, the plan heretofore adopted for assignment of high frequencies to coast telegraph stations was almost completely effectuated. Additionally, plans for assignment of high frequency radiotelephone frequencies to coast and ship stations in the Great Lakes and Mississippi River areas were put into effect. Assignment of high frequency radiotelephone frequencies in the ocean areas continued to be made as new frequencies became available.

Rulemaking was finalized for revision of 2-megacycle radiotelephone frequencies proposed during the year. Since finalization, some of these frequencies have been cleared and made available and considerable relief to marine congestion in this band is anticipated.

In addition to frequency assignment changes, various steps were taken by the Commission looking toward improvement of maritime mobile radio equipment so as to promote more efficient usage of frequencies. Some primary examples of these efforts are:

1. Proposed application of type acceptance procedures so that standards of performance for marine radio equipment will be uniformly and effectively applied.
2. Proposed establishment of definite standards for attenuation of harmonic emission and application of a certification requirement before a ship station is permitted to operate on the frequency 2738 kilocycles.
3. Proposed establishment of minimum transmitter power inputs for radiotelephone equipment below 25 megacycles and requirement of effective grounding systems for such installations.
4. Application as of January 1, 1955, of new and closer frequency tolerances to all ship stations operating on frequencies below 25 megacycles.

Maritime Fixed Services

Stations in the maritime fixed service are classed as marine fixed, marine control, marine repeater, marine relay, and receiver test stations.

Approximately 60 marine fixed stations communicate on ship radiotelephone frequencies, being normally located in coastal waters, and are authorized to communicate with public coast stations primarily for safety purposes. This class of station is intended to meet the communication needs of the petroleum industry in offshore oil-well-drilling operations.

One marine control and one marine repeater stations are authorized. Operation of these stations is in the 72–76-megacycle band and they function in connection with the operation of coast stations.

Seven marine receiver test stations are licensed. They operate on certain ship frequencies to test remote receivers associated with public coast stations.

Alaska Fixed Public and Maritime Mobile Services

Alaskan communities depend largely on radiotelephone and radiotelegraph communication for safety and business purposes because of the scarcity of wire line facilities. Special frequencies are allocated for communication between communities in Alaska, between communities and the Alaska Communication System (ACS), and between coast and ship stations. The main intra-Alaska communication trunklines are operated by ACS under the Department of National Defense. The ACS routes message traffic to all parts of the world. The Commission maintains liaison with it in coordinating communications facilities in Alaska to serve the public interest.

Plans were completed during the latter part of fiscal 1954 for an on-the-spot survey of Alaskan stations and informal conferences with Alaskan licensees. It is hoped that the facts so gathered will furnish the groundwork for improving Alaskan radio communication and aiding regulation by the Commission.

At the close of the fiscal year there were, exclusive of Government stations, 495 point-to-point telephone stations, and 67 point-to-point telegraph stations operating in Alaska. In addition, 10 public coast stations employing telegraphy and 391 public coast stations employing telephony are authorized.

Radio Technical Commission for Marine Services

The Commission continued its participation in the activities of the Radio Technical Commission for Marine Services (RTCM). It is through its special committees that this Government-industry organization comes to grips with the current problems of marine telecom-

munications. Following is a brief report of its committee activities:

Special Committee 16, studying the marine identification problem, has not concluded its work. This problem has been raised to the international level and will be studied by the International Radio Consultative Committee (CCIR). The RTCM will probably be the medium selected to carry out the CCIR study in this country.

Special Committee 17, established at the request of the Commission, prepared technical specifications covering new lifeboat radio equipment required by the Safety Convention. Its final project was the drafting of technical specifications for compulsory 2-megacycle radiotelephone equipment for installation where required by that convention.

Special Committee 18 was established at the request of the Commission to study and make recommendations with respect to a standardized method of identifying marine radiotelephone channels for geographic areas. Although the work of the committee has been concluded, no recommendations will be made by the RTCM until the findings have been coordinated with Canada.

Special Committee 19 is continuing its study of a reliable short-range radiotelephone system for communication from ship to ship and ship to shore.

Special Committee 21 concluded its study of the marine radio beacon direction-finding system and its recommendations were transmitted to various Government departments as well as to industry.

Special Committee 22 was established at the request of the Commission to study the problem of whether provision should be made to set up worldwide common working frequencies in the 2-megacycle band preparatory to the United States ruling on this question at the next Administrative Radio Conference.

Special Committee 23 was established because certain Government agencies, particularly the Coast Guard and the Navy, have anticipated a need for coast station transmission on 8364 kilocycles in particular emergency situations and the RTCM was asked for its recommendations on this subject.

Special Committee 25 was created to study shipboard radiotelephone equipment and, in cooperation with Radio-Electronics-Television Manufacturers Association (RETMA), to draw up suitable standards.

The RTCM collaborated with the RTCA (its sister organization for aeronautics) in a study of the operational objectives for long-distance navigation aids by supplying the marine requirements for inclusion in the report, which was utilized as a recommended position for the United States delegation to an ICAO meeting in Montreal.

AVIATION SERVICES

The Aviation Services provide the radio communication which is vital in connection with the operation of aircraft, both from the standpoint of safety of life and property as well as for efficient, expeditious, and economical operation. The more than 40,000 authorizations in these services cover navigational aids, traffic control operations, approach and instrument landing systems, special devices such as radio altimeters, all involving the use of radio.

Aviation Organizations and Conferences

During fiscal 1954 the Commission met with various coordinating and policy groups, both on a domestic and international scale, to solve the many new problems which are occurring as a result of telecommunications developments. The most important of these groups are the Air Coordinating Committee (ACC), the Radio Technical Commission for Aeronautics (RTCA), and the International Civil Aviation Organization (ICAO).

A major and continuing function of the Commission is participation in the work of the Air Coordinating Committee. The ACC recommends proposed United States policy on aviation to the President, and acts as a vehicle for coordinating aviation matters between Government and industry. The Commission is active in the ACC through its membership on the Technical Division and the following subcommittees of that division: Aeronautical Communications and Electronic Aids; Air Space—Rules of the Air and Air Traffic Control; Search and Rescue; Airmen Qualifications; and Aerodrome, Air Route, and Ground Aids.

In addition, the Commission is represented on the Air Traffic Control and Navigational Panel. This panel was established on the recommendation of the Congressional Aviation Policy Board and the President's Air Policy Commission for the purpose of guiding the program relating to all-weather air navigation and traffic control facilities as well as the national air-defense system.

The Radio Technical Commission for Aeronautics is a cooperative association of Government-industry aeronautical telecommunication agencies. It conducts studies for the purpose of providing guidance to, and coordinating the efforts of, the organizations concerned. The Commission is represented on the executive committee and special technical committees.

During the past year the RTCA studied and made recommendations on such problems as (1) implementation of the VHF utilization plan and review of transition period communication requirements; (2) high altitude grid plan for VOR/DME frequency pairing; (3) minimum performance standards for airborne electronic equipment

for the transition period common system; (4) VOR and localizer test equipment adjustment standards; (5) amended program for implementation of the common system of air navigation traffic control; (6) evaluation of the necessity for VOR test signals; (7) reevaluation of VOR airways lateral separation procedures; (8) helicopter air-navigation communication and traffic control; (9) radar safety beacons; (10) possible interference to aeronautical radio facilities from TV operation in the UHF band; (11) remoting of long-range radar displays; and (12) control of airport lighting by aircraft radio.

The Extraordinary Administrative Radio Conference (EARC) of the International Telecommunication Union (ITU) Geneva, 1951, concluded an agreement which allocated exclusive frequencies for the Aeronautical Mobile Route (R) service. Since then the Commission has cooperated, domestically and internationally, in aeronautical frequency planning to implement the provisions of the agreement. This work included participation in ICAO meetings and, in addition, the Commission assisted in the preparation for and participated in the United States-Mexican discussion regarding frequency assignment problems which was held in Mexico City, and participated in the Ottawa meeting of the United States-Canadian officials concerning implementation of the agreement.

The International Civil Aviation Organization (ICAO) was established to develop standards and recommend practices for international civil aviation through the process of regional and divisional agreements among the nations of the world. During the year the Commission assisted in the preparation of the United States position and participated in the fifth session of the Communication Division of the ICAO held in Montreal, and in the Special Middle East Communication Meeting of the ICAO, held on the Island of Rhodes, and helped prepare for the Second African-Indian Ocean Regional Air Navigation meeting at Santa Cruz.

Aircraft Radio Stations

As of June 30, 1954, there were nearly 2,300 authorized aircarrier aircraft, and nearly 26,000 private aircraft radio stations.

Aeronautical En Route and Aeronautical Fixed Radio Stations

These stations, of which nearly 1,400 are authorized, furnish a non-Government radio communication service necessary for the safe, expeditious, and economical operation of aircraft. Aeronautical land stations are used to communicate with aircraft, whereas aeronautical fixed stations are employed for point-to-point communications.

The Civil Air Regulations require domestic air carriers to maintain radiotelephone facilities at terminals 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.

Aeronautical fixed stations are used primarily in international operations and in Alaska, and provide the primary point-to-point communication service.

Civil Air Patrol Radio Stations

These stations are used in connection with Civil Air Patrol activities and emergencies pertaining to the protection of life and property. Air shows, missing-aircraft search missions, training missions, and communication systems at encampments; bases and meetings are examples of their services. There are approximately 9,400 authorized fixed and mobile CAP radio stations.

Airdrome Control Stations

These stations are used for transmitting necessary control instructions to aircraft arriving at and departing from airports. Such control is necessary so as to maintain safe separation of aircraft to prevent collision and to govern the flow of air traffic into and out of airports. They may also communicate with aeronautical mobile utility stations installed aboard vehicles essential to the operation of an airport. Though, for the most part, operated by the Federal Government, nearly 50 such stations are licensed by the Commission.

Aeronautical Mobile Utility Stations

This type of facility is installed aboard ground vehicles used in the operation of an airport, and provides communication between such vehicles and the airdrome control tower and aircraft on the ground. One hundred and twenty-five stations of this type are licensed by the Commission.

Aeronautical Navigational Aid Radio Stations

These stations are used to transmit special radio signals to assist an aircraft in determining its position with reference to the navigational facility involved. Included are radio beacons, radio direction finders, radio ranges, localizers, glide paths, marker beacons, and ground-control-approach stations. This service, for the most part, is operated by the Federal Government; however, over 250 such stations hold Commission licenses.

Flying School Radio Stations

Aircraft and ground flying school radio stations are used to transmit instructions to students or pilots while operating aircraft in flight. There are now 11 ground stations of this type.

Flight Test Radio Stations

Aircraft and ground flight test radio stations transmit communications essential to the testing of aircraft or major components of aircraft. More than 130 stations are used for this purpose.

Aeronautical Advisory Radio Stations

These stations are authorized for landing areas not served by an airdrome control station. They are used to provide an advisory communication service limited to the necessities of safe and expeditious operation of aircraft pertaining to the condition of runways, types of fuel available, wind conditions, available weather information, or other information necessary for aircraft operations.

Such stations may also communicate with private aircraft engaged in organized civil-defense activities in event of enemy attack and be used on a secondary basis to provide communication with private aircraft engaged in organized civil-defense activities. There are over 400 licensed stations of this type.

Aeronautical Public Service Radio Stations

Nearly 300 aircraft public service radio stations handle public correspondence between private individuals aboard aircraft in flight and persons on the ground. The aeronautical public service station connects with the nationwide land-line telephone system through the facilities of public coast stations.

PUBLIC SAFETY RADIO SERVICES

The Public Safety Radio Services comprise the Police, Fire, Forestry-Conservation, Highway Maintenance, Special Emergency, and State Guard Radio Services. Collectively, authorizations in these services are approaching 16,000, representing the use of nearly 165,000 transmitters.

In discharging its responsibilities to these vital services for public protection, the Commission has been assisted immeasurably by the cooperation of various committees such as the Associated Police Communication Officers, Inc.; the International Municipal Signal Association; and dozens of frequency advisory committees which serve their respective areas and services. The members of these committees give unsparingly of their time and their specialized knowledge with no compensation except the satisfaction which accrues from the resulting mutual benefits.

In keeping with past practice, the Commission has assigned representatives and speakers to the national meetings of these groups to

discuss ways and means to increase the utility of radio in connection with their particular services.

Rules Governing the Public Safety Radio Services (part 10) were reprinted this year to incorporate all the amendments adopted since the original printing in 1949. Copies can be purchased from the Superintendent of Documents, Government Printing Office.

Police Radio Service

Licenses in the Police Radio Service are issued only to law enforcement agencies of States, Territories, possessions, and towns, cities, counties, and other governmental agencies. Private or company police departments are not eligible to hold licenses in this service.

Police radio authorizations total nearly 8,800 covering an estimated 108,000 transmitters. Under the Commission's simplified license procedure, one license usually covers the base station and associated mobile and packsets.

Police stations use radiotelephone for base station to mobile station communication. Zone and interzone radiotelegraph networks effect regional and nationwide communication coverage.

Radio keeps police units in almost instantaneous contact and speeds dispatching of assistance. There have been occasions when radio patrol cars were within less than a block of the scene of the crimes and were able to quickly apprehend the criminals.

A relatively new use of radio by police departments affects the motoring public. More and more signs along the highways warn that the speed of automobiles is being checked by radar. This can be done so quickly and without the knowledge of the motorist that the speeder is no longer alerted by his rearview mirror showing a police car pacing him. The speed of traffic invariably slows down after a radar traffic control is set up. Police departments are also experimenting with closed-circuit television pickup in several areas in connection with suspect "lineups" and other operations.

Fire Radio Service

Eligibility requirements for the Fire Radio Service are the same as for the Police Radio Service except that persons and organizations such as volunteer fire departments may obtain a license upon a showing that they are responsible to local governments for maintaining a firefighting facility. While many fire departments, especially those in the smaller communities, still receive service from police radio, the trend is for separate fire radio facilities. The larger communities have separated their police and fire radio systems for quicker and more efficient operation.

The usual fire radio system consists of a combination of base, mobile, and pack or "handie-talkie" radio sets. Lightweight portable sets are carried by firemen into the burning building so that communication can be maintained with the mobile station nearby. Where seconds count and danger is great, the ability to integrate the different elements of a firefighter group by radio is of immeasurable assistance.

The number of fire radio stations increased to more than 1,600, with over 22,200 transmitters.

Forestry-Conservation Radio Service

The Forestry-Conservation Radio Service is used in forest areas to facilitate the work of detection and suppression of forest fires. The fire towers scattered throughout the forests are equipped with radio to enable forest rangers to communicate with headquarters. Many States use radio-equipped aircraft to carry men and material to the scene of a fire. The men and equipment, including a lightweight radio set, are dropped in the vicinity where it is a simple matter to maintain communication between the groups engaged in fighting the blaze.

In lieu of a forest ranger on duty in the fire tower, developmental use of closed-circuit television is being studied. When perfected, it appears probable that 1 man may perform the detection duties now performed by 10 men.

Operation of forestry-conservation stations is almost exclusively in the hands of State government departments, except for a few private organizations with large timber holdings and in New England where many cities use such stations to integrate their fire departments with the State forestry firefighting department under a mutual-aid plan.

The number of these stations increased to nearly 2,700, with nearly 19,000 transmitters.

Highway Maintenance Radio Service

Authorizations for stations in the Highway Maintenance Radio Service are issued only to States, Territories, possessions and other governmental subdivisions including counties, cities, towns, and similar entities.

The use of radio to coordinate the many phases of highway maintenance work not only greatly enhances the safety of the motoring public but also, through more efficient use of men and heavy, expensive roadbuilding equipment, reduces costs considerably.

This service has nearly 1,100 authorizations with 10,000 transmitters.

Special Emergency Radio Service

This particular service provides communication facilities for the safety of life and property for diverse groups of persons such as physicians and veterinarians normally practicing in rural areas, ambulance operators and rescue organizations, beach patrols providing a lifesaving service, school-bus operators, persons in isolated areas where public communication facilities are not available, communication common carriers desiring to provide standby facilities or make emergency repair, and disaster relief organizations.

Heretofore, the various chapters of the American Red Cross were the only disaster relief organizations seeking special emergency radio station licenses. Now there is a tremendous growth in the use of these stations by governmental subdivisions to provide civil-defense communication facilities.

In the past 2 years the Special Emergency Radio Service has grown from 670 to nearly 1,500 stations with about 5,400 transmitters.

State Guard Radio Service

This service was established to meet the radio communication requirements of State semimilitary organizations established to assume the duties normally performed by the National Guard during such times as the latter may be on active duty. There are about 140 stations with over 300 transmitters.

DISASTER COMMUNICATIONS SERVICE

The Disaster Communications Service is designed to provide essential communication in connection with disasters or other incidents which involve disruption of regular communication facilities or which require temporary supplemental communication facilities. The frequency band 1750 to 1800 kilocycles is allocated to this service.

Any person eligible 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 to carry communications necessary or essential to relief work, including those concerning personal matters in the case of individuals directly affected.

A majority of the applications submitted, and disaster communications plans filed, has been for use of the stations for civil-defense purposes. Nearly 300 disaster communications stations are licensed under 25 approved disaster communication plans. They employ nearly 1,500 transmitters.

INDUSTRIAL AND LAND TRANSPORTATION RADIO SERVICES

The Industrial and Land Transportation Radio Services encompass a wide range of "private" radio users, such as power utility, petroleum, taxicab, railroad, manufacturing, agricultural, forestry, mining, trucking, urban transit, and intercity bus. The rules governing specific services in this group are designed, and are periodically revised, to meet the unfolding needs of users in relation to the public interest.

The large volume of applications filed in these services requires that frequencies be allocated and that eligibility standards be set on an industrywide basis. Though interference between licensees sharing the same frequency is somewhat alleviated by coordinating individual frequency assignments with licensee-advisory committees, the Commission finds that the overloading of available channels in some areas is resulting in an increasing number of interference complaints. In adjusting such complaints, the Commission first endeavors to enlist the cooperation of the licensees involved in order to help achieve the maximum equitable utilization of available frequencies.

Long-range programs having as their object the improvement of frequency utilization by such means as geographic assignment, reduction of channel spacing (split-channel assignments), and allocation of additional spectrum space to these services, are being considered. These studies will not, however, afford any immediate relief from the problem of VHF band congestion in the mobile service because of the long-term implementation required to carry any particular program into effect.

In the private fixed-service field, the Commission, assisted by representatives of both manufacturers and users of equipment, is engaged in a continuing study of private microwave systems with a view to establishing a permanent license policy. This study, participated in by the Radio-Electronics-Television Manufacturers Association (RETMA), deals with the capabilities and technical characteristics of microwave systems employing frequencies above 890 megacycles. Beyond the technical phases of this study are considerations of public policy stemming from the question of whether or not communications common carriers could render equivalent service. Requests for microwave facilities will, therefore, continue to be handled on a developmental basis pending completion of this study.

In the 72–76-megacycle fixed band, the Commission has adopted a new policy governing assignment of frequencies which, it is expected, will permit the continued use of this band for nonbroadcast repeater-control links without causing harmful interference to reception on adjacent television channels 4 and 5. In carrying forward the general concept that all operations in the 72–76-megacycle band shall remain subject to the condition that no harmful interference will be caused to TV reception, the new criteria establish interference contours along which the probable effect on TV signals at any location can be estimated.

Rulemaking proceedings, concluded this year, effected a suballocation of 450–460-megacycle band frequencies to the various industrial and land transportation radio services. This action provides more efficient frequency utilization by permitting the regular assignment of paired frequencies in this band for two-frequency duplex system operation, at the same time continuing to provide for fixed control circuits under certain conditions. It is expected that many industrial users in the overcrowded VHF portion of the spectrum will reestablish their facilities in the higher band, thereby reducing interference.

The Commission has undertaken a complete revision of the rules governing the Special Industrial Radio Service and, effective October 15, 1954, consolidated the Intercity Bus and Urban Transit Radio Services into a new "Motor Carrier Radio Service" designed exclusively for motor carriers engaged in the transportation of passengers as a regular business.

With respect to the Special Industrial Radio Service, the Commission feels that the public interest is better served by determining eligibility on the basis of the activity performed rather than on the basis of who performs it. It is therefore proposed to open that service to certain classes of persons engaged in specialized services for those who could themselves qualify for radio. Illustrative of this group are crop dusters and oilfield service organizations. These proposals also recognize other types of service and delivery functions which, it is believed, are entitled to private radio by reason of geographic isolation or because they involve inherently dangerous or split second timing operations. Heavy machinery maintenance and the delivery and pouring of transit mixed concrete and hot asphalt are examples.

CITIZENS RADIO SERVICE

Frequencies allocated to the Citizens Radio Service are used to carry communications for which no specific provision is made elsewhere in the Commission's rules.

Originally, this service was of interest primarily to individuals desiring short-distance, two-way radio communication for personal convenience or miscellaneous business purposes. During the past year, however, its use by large business organizations increased sharply. This growth is attributable in part to the added number of equipments on the market under the Commission's type-approval program. Corporate licensees use citizens radio systems chiefly in connection with miscellaneous urban dispatch operations that are beyond the scope of the rules governing other safety and special radio services. The 460–470-megacycle band is specially well suited for use in large cities where the reflection of signals from building surfaces and other structures tends to overcome the shadow effect experienced at lower frequencies. Owing to the fact that some type-approved citizens radio equipment is now being mass produced, the per-unit price is almost competitive with conventional VHF equipment.

The Citizens Radio Service has more than 7,000 authorization covering nearly 16,000 transmitters.

The range of citizens radio stations is limited essentially to line of sight. This very limitation, however, increases the number of systems that can be accommodated. For this and other reasons, the Commission has no present plan to channelize this band, feeling that interference problems can be best solved at the local level by cooperative effort among licensees. The frequency 27.255 megacycles in this service remains available for the control of objects and devices by radio.

In order to encourage the development and manufacture of low-cost equipment of the "walkie-talkie" type, the Commission relaxed the technical requirements applicable to transmitters employing 3 watts or less input power.

No major substantive changes in the rules governing citizens radio are contemplated at this time. However, the administration of this service during the past year has exposed deficiencies in the rules with respect to operation from remote control points, automatic relaying by self-actuating means, antenna painting and marking requirements, and civil-defense participation. The Commission intends to institute rulemaking proceedings looking toward clarifying these matters.

AMATEUR RADIO SERVICE

The Amateur Radio Service affords opportunity for interested persons to engage in radio communication and experimentation as a hobby. Amateurs have pioneered in many phases of radio. Many early broadcast stations grew out of amateur experimentation with

radiotelephony. Amateurs were the first to discover and utilize the "shortwaves" (below 200 meters) for international communication. Many other "firsts" can be attributed to the radio amateur.

For many years amateurs have transmitted personal messages for the general public and, where international regulations permit, are currently handling many messages between members of the Armed Forces and their families at home. This, of course, is done without charge. Amateur activity includes long-distance (DX) competition, emergency and disaster service, participation in civil-defense programs, and the development and testing of numerous new experimental and operational techniques.

A person desiring to operate an amateur radio station must demonstrate knowledge of radio theory, laws, treaties, and regulations, and ability to send and receive the International Morse Code in order to successfully pass the examination for one of the five classes of amateur operator license. The Novice Class license is available, upon successful completion of the examination, to the beginner. It permits limited operation for a 1-year period to provide operating and technical experience in preparation for higher class license examinations. Since their inception in 1951, the Commission has issued 34,257 Novice Class and 10,520 Technician Class authorizations. The Technician Class license is for amateurs interested in experimental operation above 220 megacycles and, since the requirements differ only in code speed from the General and Conditional Class, it is often used as a stepping-stone to the attainment of these classes of license.

During the period 1947–51, the growth in the number of licensed amateurs had averaged approximately 5,000 a year, and since the advent of the Novice and Technician classes, the average growth has been approximately 10,000 per year. At the close of the fiscal year, more than 120,000 amateur operator licenses of different classes and over 123,000 amateur station licenses were on the Commission's books. However, these figures include about 3,000 authorizations which have expired but are renewable because they are within the 1-year "grace" period.

While the record of adherence to the rules by such a large group has been very commendable, a moderate number of citations for technical and operational infractions were issued. The Commission also ordered the suspension of the licenses of 10 amateurs involved in more serious violations of rules.

A most important part of amateur activity is their service to the public in providing much needed communication during an emergency. Their value in this field has been officially recognized by the creation,

in 1952, of the Radio Amateur Civil Emergency Service (RACES). This service makes use of the amateurs, their equipment, and portions of their normal frequency bands in time of war or other national emergency.

While amateur communication assistance during floods, fires, tornadoes, and other natural disasters has been an amateur tradition for many years, the organization of RACES communication networks furnishes an even greater reserve of volunteer communication facilities available for such emergencies. When normal amateur activity is shut down during a time of enemy attack or other national emergency, the amateurs may continue to serve the public through their participation in the RACES. Since wire and other radio facilities can be expected to be severely burdened during an enemy attack, amateur communication will fill a vital and most important civil-defense need.

During the past year, 98 RACES communication plans were approved, making a total of 123 plans approved and 754 RACES stations licensed since the establishment of this service.

Reports of amateurs furnishing communication during more than 35 separate natural disasters came to the Commission's attention during fiscal 1954. Over 100 amateurs in the Flint, Mich., area provided vital communication service to that tornado-ravaged city over a period of 6 days. Amateurs handled over 900 emergency messages after a tornado struck Worcester, Mass.

During the year, the amateur rules were revised to incorporate amendments adopted prior to November 20, 1953, including necessary changes and additions to bring the appendix up to date. Subsequent to their revision, the operator examination procedures were changed to provide for Novice and Technician Class examinations to be given by mail only, and to reduce the distance from examination points beyond which a resident is eligible for the Conditional Class examination from 125 miles to 75 miles. After oral argument, the rule permitting amateur portable and mobile operation outside the continental United States was amended to include such use of the 21-megacycle amateur frequency band. The rule limiting use of the 3.5-megacycle amateur frequency band to amateur stations in those Pacific Territories and possessions east of 170 degree West Longitude was amended to extend such operation to all possessions in the Pacific area that are under the Commission's jurisdiction.

In rulemaking status at the end of the fiscal year were two proposals affecting amateurs. One is to expand telephony subbands in the 14- and 28-megacycle amateur bands and the use of type AØ emission in

the 50-megacycle amateur band. Comment concerning the general principle of further subdivision of the amateur bands for special groups was solicited. The second matter proposes amending the amateur eligibility requirements to exclude members of the Communist Party or allied organizations and, further, would provide that only persons of good moral character could hold an amateur radio operator's license (see "National Defense" chapter). Factors including past membership in subversive organizations and whether a person has been convicted of a felony would be considered in determining the character qualifications of amateur applicants.

ENFORCEMENT UNIT

The Enforcement Unit of the Safety and Special Radio Services Bureau acts as legal adviser to the chief of that bureau. In addition, it has the responsibility of enforcing compliance with the Communications Act and the Commission's rules by licensees in the various radio services administered by the bureau. The time of the Enforcement Unit is divided about equally between these two primary functions.

A major problem in this enforcement work has been how to most effectively eliminate harmful interference to the aviation services caused by second harmonic radiations emitted by marine radio stations. The need of a solution is urgent because of the impact on frequency shifts to implement the Atlantic City agreements. In a considerable number of cases, individual license modification proceedings have been initiated to delete use of frequencies when repeated warnings have failed to produce compliance.

In the field of legislation during the year was enactment of a measure eliminating the requirement of construction permits for amateur mobile radio stations and the granting of authority to the Commission to waive construction permits for certain other classes of amateur stations. Appropriate rule changes to reflect these changes are in progress.

STATISTICS

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 262,000 at the close of the fiscal year. This represents a net increase of about 31,000 during the year. The numbers of authorized stations in the various services are shown in the following table.

Each separate license, construction permit, or combination construction permit and license is counted as one station. For example, a station might include a base transmitter and many mobile units.

Class of station	June 30, 1953	June 30, 1954	Increase or (decrease)
Aviation Services:			
Carrier aircraft	2,190	2,289	99
Private aircraft	27,945	25,819	(2,126)
Public service aircraft	380	284	(96)
Aeronautical and fixed	1,343	1,391	48
Civil air patrol	6,620	9,396	2,776
Airdrome control	47	46	(1)
Aeronautical navigational	226	255	29
Flight test	101	133	32
Flying school	12	11	(1)
Aeronautical utility mobile	124	125	1
Aeronautical advisory	327	405	78
Total	39,315	40,154	839
Marine Services:			
Ship	36,889	42,618	5,729
Ship radar	2,282	2,420	138
Coast	196	210	14
Marine utility	10	12	2
Alaskan coastal	368	401	33
Alaskan fixed public	516	562	46
Maritime radiolocation service	20	17	(3)
Maritime fixed service	76	59	(17)
Total	40,357	46,299	5,942
Public Safety Services:			
Police	8,005	8,728	723
Fire	1,134	1,627	493
Forestry-conservation	2,425	2,686	261
Highway maintenance	877	1,088	211
Special emergency	1,072	1,429	357
State Guard	118	139	21
Total	13,631	15,697	2,066
Land Transportation Services:			
Railroad	928	1,219	291
Urban transit	101	98	(3)
Intercity bus	68	76	8
Taxicab	4,018	4,361	343
Automobile emergency	227	305	78
Highway truck	580	832	252
Citizens	3,829	[1] 7,054	3,225
Total	9,751	13,945	4,194
Industrial Services:			
Power	6,989	7,562	753
Petroleum	4,540	5,505	965
Forest products	877	1,034	157
Special industrial	4,563	6,587	2,024
Low power industrial	419	673	254
Relay press	54	68	14
Motion picture	23	32	9
Agriculture	9	9	0
Radiolocation—land	84	128	44
Total	17,378	21,598	4,220
Amateur and Disaster Services:			
Amateur	111,289	[2] 123,287	[2] 11,998
Disaster	191	283	92
RACES	99	754	655
Total	111,579	124,324	12,745
Grand total	232,011	262,017	30,006

[1] Includes 5,088 authorizations issued by field offices through March 31, 1954.

[2] The number of amateur authorizations shown includes certain (3,000 estimated) authorizations which have expired but are renewable because they are within the 1-year "grace" period.

Applications in Safety and Special Radio Services

Almost 141,000 applications for stations in the Safety and Special Radio Services were received during 1954. This represents a decrease of 3,310 applications compared to the previous year. The number of applications received in each service is shown below:

Class of Station	Received 1953	Received 1954	Increase or (decrease)
Aviation Services:			
Aircraft	16,527	19,998	3,471
Ground	2,808	3,461	653
Civil air patrol	7,548	3,161	[1] (4,387)
Total	26,883	26,620	(263)
Marine Services:			
Ship	16,819	19,161	2,342
Ship radar	1,136	745	(391)
Coast	454	344	(110)
Marine utility	0	0	0
Alaskan coastal	680	229	(451)
Alaskan fixed public	829	300	(529)
Maritime radio location service	25	17	(8)
Maritime fixed service	57	85	28
Other marine services	42	[2] 0	[2] (42)
Total	20,042	20,881	839
Public Safety Services:			
Police	5,650	5,454	(196)
Fire	1,193	1,152	(41)
Forestry-conservation	1,223	1,362	139
Highway maintenance	780	734	(46)
Special emergency	1,256	927	(329)
State Guard	136	42	(94)
Total	10,238	9,671	(567)
Land Transportation Services:			
Railroad	856	790	(66)
Urban transit	78	60	(18)
Intercity bus	86	50	(36)
Taxicab	3,871	2,576	(1,295)
Automobile emergency	229	260	31
Highway truck	673	669	(4)
Citizens	696	928	232
Total	6,489	5,333	(1,156)
Industrial Services:			
Power	4,167	4,126	(41)
Petroleum	3,659	3,232	(427)
Forest products	700	633	(67)
Special industrial	4,768	4,579	(189)
Low power industrial	452	445	(7)
Relay press	22	43	21
Motion picture	24	12	(12)
Agriculture	39	17	(22)
Radiolocation—land	148	158	10
Total	13,979	13,245	(734)
Amateur and Disaster Services:			
Amateur	66,018	64,051	(1,967)
Disaster	159	173	(14)
RACES	141	769	628
Total	66,318	64,993	[1,325]
Grand total	143,949	140,743	[3] [3,206]

[1] Civil Air Patrol applications in 1953 were abnormally high because new simplified application forms were filled out by nearly all previously authorized Civil Air Patrol units. The 1954 reduction reflects the accomplishment of this relicensing.

[2] "Other marine services" are now included in other marine classifications.

[3] The overall decrease in applications is primarily the result of using FCC Application Form 400 in the Public Safety, Industrial, and Land Transportation Services. This form permits issuance of combined construction permits and licenses in most cases, thereby eliminating the filing of a separate license as formerly.

Transmitters in Safety and Special Radio Services

Approximately 653,000 transmitters were authorized to operate in the Safety and Special Radio Services as of January 1, 1954. Of these, 153,000 land and fixed stations represent an increase of 1,500, and 499,000 mobile units represent an increase of about 66,500, or a total increase of 68,000 transmitters during a 10-month period.

Class of station	Land or fixed station transmitters	Mobile station transmitters	Total transmitters
Aviation Services:			
Aircraft	0	32,118	32,118
Ground	2,133	597	2,730
Civil air patrol	2,434	4,752	7,186
Total	4,567	37,467	42,034
Marine Services:			
Ship	0	40,105	40,105
Ship radar	0	2,384	2,384
Coast	202	7	209
Marine utility	0	77	77
Alaskan coastal	385	0	385
Alaskan fixed public	555	0	555
Maritime radiolocation	22	0	22
Maritime fixed	86	0	86
Total	1,250	42,573	43,823
Public Safety Services:			
Police	6,318	101,594	107,912
Fire	1,106	21,170	22,276
Forestry-conservation	2,397	16,428	18,825
Highway maintenance	727	9,122	9,849
Special emergency	1,079	4,308	5,387
State Guard	115	189	304
Total	11,742	152,811	164,553
Land Transportation Services:			
Railroad	942	12,597	13,539
Urban transit	80	2,256	2,336
Intercity bus	61	768	829
Taxicab	4,156	90,397	94,553
Automobile emergency	253	2,782	3,035
Highway truck	549	8,293	8,842
Citizens		15,851	15,851
Total	6,041	132,944	138,985
Industrial Services:			
Power	5,356	59,941	65,297
Petroleum	4,110	19,898	24,008
Forest products	634	7,260	7,894
Special industrial	3,309	37,296	40,605
Low power industrial	0	6,911	6,911
Relay press	28	691	719
Motion picture	13	334	347
Agriculture	9	0	9
Radiolocation	56	94	150
Total	13,515	132,425	145,940
Amateur and Disaster Services:			
Amateur	115,518	0	115,518
Disaster communications	502	641	1,143
RACES	266	532	798
Total	116,286	1,173	117,459
Grand total	153,401	499,393	652,794

Broadcast Services

" 'Broadcasting' means the dissemination of radio communications intended to be received by the public, directly or by the intermediary of relay stations."—(Sec. 3 (o) of the Communications Act).

" * * a person engaged in radiobroadcasting shall not * * * be deemed a common carrier."—(Sec. 3 (h) of the Communications Act).*

*"Nothing in this Act shall be understood or construed to give the Commission the power of censorship over * * * radio communications * * * "—(Sec. 326 of the Communications Act).*

TELEVISION (TV) BROADCAST SERVICE

Authorizations

There was a net increase of slightly more than 100 television broadcast station authorizations during the year as compared to the banner number of nearly 400 in fiscal 1953, which was the first year following the lifting of the temporary freeze.

The result was that, as of June 30, 1954, the Commission had granted construction permits to 603 TV broadcast stations.

Commercial

Of this number, 573 were for commercial operation and 402 such stations were on the air or authorized to go on the air. The total grants represented 340 VHF (very high frequency) and 233 UHF (ultra high frequency) stations, of which 265 VHF and 137 UHF stations had operating authorizations. They were bringing TV service to a vast audience over most of the United States and in Alaska, Hawaii, and Puerto Rico.

Common carrier TV relay facilities are treated in the "Domestic Telephone" section of the chapter on "Common Carrier Services".

By the end of the fiscal year, all noncompetitive applications which were in a position to be granted had been so acted upon by the Commission. Consequently, of the 200 still-pending commercial applications, 186 were in hearing status. Only four competing applications, all in one city, remained to be set for hearing, pending determination on petitions for rulemaking relating to the channel requested by the applicants involved.

Action on TV applications was, in large measure, speeded by continued study and adjustment of the Commission's temporary process-

ing procedure. As adopted in April of 1952, it set up a priority system based upon the availability of TV service. After many grants had been made, the Commission felt that emphasis should be placed on local outlets rather than upon availability of outside service. Accordingly, on July 14, 1953, it gave primary consideration to cities which had no local TV stations. The Commission subsequently disposed of its TV application backlog and consequently abandoned this temporary processing procedure.

Noncommercial Educational

At the close of the fiscal year the number of construction permits granted for noncommercial educational TV operation had increased to 30, of which number 14 were VHF and 16 UHF.

Six educational TV stations were operating—3 in VHF and 3 in UHF.

Sixteen applications for such stations were pending, two of which were competitive.

Though a number of educational TV applications had been withdrawn since the service was first established, KTHE, Los Angeles, was the first grantee to cease operation (in September 1954).

Six educational TV channels were added during the year. This brought to 251 the number of channels reserved for that purpose, or 9 more than the original figure (242) in 1952. (Still another was added in September 1954.)

While several shifts of educational reservations were made upon petition, and after rulemaking, the Commission continued to frown upon any effort to transfer educational channels to commercial use.

Color TV

The green light for compatible color TV was given by the Commission on December 17, 1953, when it adopted new color transmission standards that were developed and advocated by the industry through the National Television System Committee (NTSC). The new color standards, which are based on the "simultaneous" system, replace the noncompatible "field sequential" system approved in 1950 as the best of three systems then proposed, but which was not subsequently exploited by the industry.

At that time the Commission stated that if a satisfactory compatible system had been available it would have been adopted. By "compatible" it is meant that transmission in color can, in addition to being received on color sets, be viewed in black and white on ordinary monochrome receivers. The NTSC, comprising technicians representative of many segments of the broadcasting industry, evolved and tested the compatible standards which the Commission adopted after rulemaking proceedings initiated on August 7, 1953.

The new rules for color do not specify a minimum number of hours during which TV stations must transmit color programs. However, the number of colorcasts has been increasing as more stations install color equipment and the telephone company extends its color relay facilities to additional cities and stations.

Most of the color receivers produced initially had the equivalent of a 15-inch picture tube. But larger tubes are in production, and indications are that as more color sets become available there will be a resultant reduction in cost to the public.

UHF Problems

Of 87 commercial TV grants canceled since the lifting of the freeze, 81 deletions occurred during fiscal 1954. Of these, 12 were VHF and 69 were UHF. Seven cancellations involved authorizations to operate, 6 being UHF.

Some of the conditions adversely affecting UHF were the slow rate of converting existing sets to ultra high reception, small sales of UHF receivers, the lack of high-power UHF transmitting equipment, inability of many UHF stations to obtain popular network programs, their difficulties in obtaining coverage equivalent to VHF stations, advertising support and various other reasons.

This became a matter of concern to the Commission which instituted study of UHF problems and their possible solutions. The Senate Interstate and Foreign Commerce Committee, through its Subcommittee on Communications, conducted hearings on the UHF situation, in which the Commission and the broadcast industry participated. At the close of the fiscal year, the subcommittee and the Commission were analyzing the various recommendations made at the hearing, and the Commission was preparing data and recommendations for the subcommittee.

Meanwhile, the Commission revised its multiple ownership rules so as to permit any one interest to operate 7 TV stations, provided that at least 2 are UHF. This is intended to encourage interests with program know-how and resources, but not previously eligible for additional TV grants, to enter the UHF field. The Commission will also consider applications for UHF stations to broadcast the programs of and extend the coverage of parent stations.

Several Commission rulemaking proceedings are underway looking to further alleviating some of the difficulties confronting the development of UHF operation. One proposal is to revise the chain broadcasting rules in the matter of territorial exclusivity to prevent a station from contracting with a network to keep a station in a neighboring community from obtaining that network's programs. Another involves proposals that TV stations be permitted to operate their

own intercity relay systems despite the availability of common carrier relay facilities.

"Satellite" and "Booster" TV Stations

The Commission also has under consideration, as a particular aid to UHF, the authorization of "booster" or "satellite" TV stations. Such low-power, low-antenna-height supplemental stations could be used to extend coverage or to fill in coverage in "shadow" (poorly served) areas. Operation would be on the same channel as that of the main station or on a different channel.

The fiscal year saw an intensified interest in such possible service, and a number of experimental operations was authorized to obtain technical information. Research was continued in using cross-polarization to control the size of the interference zone which surrounds a "booster" station. "Satellite" experimentation was largely devoted to the improvement and development of transmitting equipment and to field-intensity measurements of these transmitters.

The Commission continued to deny requests for experimental authority to operate TV boosters and satellites intended to sound out public reaction. This was because the technical aspects of that type of operation have not been fully determined and there could be no assurance that such a service, once started, would continue. By providing a temporary improvement to TV reception in certain areas, such stations might encourage substantial investments in TV receivers which would become useless when the experimental operations were terminated.

(On August 5, 1954, the Commission announced that it would consider applications for UHF stations which would not originate local programs but would duplicate the programs of another TV station controlled by the same party in a nearby community and thereby extend the service of the parent station. Such a station, while acting as a satellite, would be considered as a separate TV station and would use the channel assigned to the particular community in which it operated. The Commission will also consider such program duplication by stations under common control.)

Community Antenna TV Systems

At the present time, Commission authorization is not required for the installation and operation of a community antenna TV system or for any other closed-circuit TV system which is operated solely over wires. However, there is a question whether such systems, if they involve interstate communication, are common carriers subject to Commission jurisdiction. The Commission is continuing its study of various problems relating to these services.

The Commission now requires that all wired TV systems be operated so as to not cause harmful interference to regular radio services. Moreover, the Commission has proposed rules which would place a limit on the amount of radiation from such systems.

The number of community antenna TV systems in operation by the end of fiscal 1954 increased to about 300, with more than 150,000 subscribers being served.

Subscription TV

The Commission continued to authorize technical experimentation with subscription TV methods and apparatus while pursuing its study of problems involved by proposals for regular "pay-as-you-see" TV service. Such contemplated service differs in the way "scrambled" pictures are sent to decoding receivers in the homes of subscribers and the method of collecting the fees for programs.

It raises questions of public interest, and whether it is "broadcasting" within the meaning of the term as defined in the Communications Act or is a common carrier or a special operation, and where frequencies can be found for such a service.

"Party in Interest" Protests

The year confronted the Commission with a growing problem arising from protests filed under section 309 (c) of the Communications Act, as amended in 1952, which provides that a party in interest, upon making the specified showing, is entitled to a hearing on an application that has been granted by the Commission and that, pending outcome of that hearing, the protested grant is stayed. AM and FM stations, and even nonbroadcast interests, have seized this new provision of the law to protest and thus hold up TV grants after they have been made. This not only frustrates the processes of the Commission by delaying, impeding, and complicating its normal considerations, but also denies the public expected and long-awaited service.

In consequence, the Commission has requested remedial legislation of Congress which would retain the intended advantages of the protest procedure but would reduce the unanticipated ease with which the 309 (c) amendment is being used to delay the introduction of a new service to a community.

3-Year TV License

As part of its overall expediting program, the Commission on November 5, 1953, after a rulemaking proceeding, established a 3-year license period for TV broadcast stations in lieu of the previous 1-year period. The Commission determined, in essence, that sufficient experience had been gained in television operations to warrant TV the same license duration as for other broadcast services. This exten-

sion of the TV license period is expected to reduce substantially the workload for licensees and the Commission. In particular, it will ease the burden on TV licensees who also have AM and FM stations, since the licenses of all broadcast stations in the same geographical area will expire on the same date.

TV Assignment Table

Unlike AM broadcasting, the TV rules provide that applications for new stations may be filed only for channels which are listed in the table of assignments. These rules provide, further, that changes in this table may be made only by rulemaking proceedings. The Sixth Report and Order which promulgated the new TV rules made provision, with certain exceptions, for 1-year waiting period in order to expedite processing of the then backlog of TV applications and to give the Commission experience in implementing the new rules. This 1-year waiting period expired on June 2, 1953.

During the past year, 82 changes were made in the assignment table through rulemaking. These changes included 56 additional channel assignments. At the year end, 19 petitions for rulemaking to further amend the table were pending.

STANDARD (AM) BROADCAST SERVICE

Authorizations

The past year saw unabated increase in the use of the standard broadcast band. Most of the new AM assignments were to the smaller communities previously without local stations. The majority of these new stations operate daytime only.

The reasons for this trend toward daytime stations would appear to be twofold: (1) With the present comparatively crowded condition of the AM band, the addition of daytime rather than unlimited time stations is more feasible from an engineering and economic viewpoint, and (2) the continued growth of TV has resulted in a substantial loss in listeners to AM programs at night, but subtracted comparatively little from the daytime AM audience. Consequently, stations operating only during the most profitable daytime hours are considered more favorably by prospective licensees than was formerly the case.

During the year the Commission granted 142 additional AM authorizations, making a total of 2,697 such authorizations at its close.

North American Regional Broadcasting Agreement (NARBA)

This treaty, intended to regulate the assignment of AM broadcasting stations in the North American region, was signed by all countries in that region, except Mexico and Haiti, on November 14, 1950. To become effective it requires ratification by three of its major signa-

tories; namely, the United States, Canada, and Cuba. The latter country did so in December 1951. In this country the document was submitted to the Senate in February 1951, where it was referred to the Committee on Foreign Relations. A subcommittee held hearings in July 1953, but no further action has been taken.

Since the expiration in 1949 of the Interim Agreement which, with some modification, extended the provisions of the first NARBA (1937), the Commission has pursued a policy, formalized in 1951, of refraining from making new assignments or modifying existing assignments which might endanger the new agreement. The other signatory governments have, in general, followed a similar procedure.

Recently, however, there have been indications that certain of these governments may be departing from this procedure in the face of the long delay in the effectuation of the agreement. If this trend continues, there is the prospect that present undesirable foreign interference to United States stations, which would have been substantially reduced with the implementation of the new treaty, will increase still further.

Various exchanges of views have taken place between the United States and Mexico since the signing of the NARBA looking toward a settlement between the two countries on broadcast matters. This activity culminated in a series of meetings, held in Washington, March 29–April 2, 1954, for the purpose of negotiating an interim agreement between the two countries. While this end was not achieved at that time, a further conference was scheduled for October 28, 1954, at Mexico City.

Clear Channels

In 1953 the Commission initiated steps looking toward a final decision in the pending rulemaking proceeding relating to "daytime skywave" transmissions of AM broadcast stations (docket 8333). It had instituted this proceeding in 1947 to determine whether rules governing the allocation of AM stations should be modified to give more consideration to the ionospheric effect during daytime hours. The Commission later that year consolidated this proceeding with the clear-channel proceeding (docket 6741).

Meanwhile, it was found necessary to defer action on applications for new and increased daytime and limited-time facilities on those clear channels on which the United States has priority for dominant class I stations. Upon further review of this problem, the Commission severed the daytime skywave proceeding from the clear-channel proceeding and on March 11, 1954, adopted a proposed report and order, and proposed further rulemaking in the daytime skywave proceeding.

In that document the Commission proposed certain changes in its rules which would provide somewhat increased protection to class I stations against interference caused by the daytime skywave type of transmission. (On July 15, 1954, thereafter, oral argument was heard on the question whether these proposed rules should be adopted for the consideration of future applications for AM construction permits.) A period was also provided for interested parties to comment on the question whether existing stations should be required to comply with the proposed operating restrictions.

Several other rulemaking matters affecting clear channels were instituted during the year.

The Commission adopted rules which permit unlimited-time stations in United States territories to operate on frequencies upon which Mexico has priority of class I–A station use, provided that such stations protect the Mexican border. The frequencies involved are set forth in the "Gentlemen's Agreement" with Mexico (1941—Executive Agreement Series 227) in which the United States agreed to limit its class II stations to daytime operations of 1-kilowatt power or less. Similarly, the Commission has proposed that the United States clear channels be made available to unlimited-time station operations in the territories, with similar requirements to protect Mexico.

In another rulemaking proceeding, the Commission altered its rules by reclassifying the frequency 1540 kilocycles, thereby permitting a class I–B station to operate thereon at Waterloo, Iowa. This action was taken to safeguard the United States interests under the provisions of NARBA.

Revision of "10% Rule"

On August 4, 1954, the Commission revised one of its standard broadcast allocation rules, commonly called the 10% rule, which has been in effect since the inception of the AM Standards of Good Engineering Practice. The rule is designed to preclude inefficient utilization of frequencies by limiting the degree of interference which a proposed assignment would receive from existing stations to 10 percent of its normal service area.

In administering this rule, the Commission has consistently taken into consideration the need for additional service in particular areas as a factor which might warrant departure from the strict requirements of the rule.

Revision in this rule takes the need for additional service into specific account and thus brings it into line with the Commission's administrative precedents.

540 Kilocycles

On December 17, 1953, the Commission made its first AM grant to operate on 540 kilocycles (at Clarksville, Tenn.). This frequency was added to the standard broadcast band by international agreement. Rule changes were necessary to open it for domestic use. NARBA gives Canada priority for clear-channel operation on this frequency. However, United States stations can use it provided protection is afforded the Canadian priority.

FREQUENCY MODULATION (FM) BROADCAST SERVICE

Commercial

The year closed with 569 commercial FM authorizations outstanding. Authorizations were issued for 22 new stations while 54 authorizations were deleted, leaving a net loss for the year of 32 stations.

Thirteen of the new stations were granted to licensees of AM stations, 7 of which operate their AM facilities daytime only. The remainder of the new FM stations have no connections with AM stations and are independently operated.

Four of the 22 new stations went to applicants who previously held FM authorizations but had requested their deletion for one reason or another. FM still provides a nighttime outlet for AM licensees who find it impossible to obtain nighttime facilities in the AM broadcast band.

Five States now have no FM broadcast stations—Montana, Nebraska, North Dakota, Vermont, and Wyoming. No FM applications have ever been received from Montana, while the other four mentioned States once had FM stations. One commercial FM broadcast station is operating in Hawaii. This is the only FM station in any of the Territories or island possessions of the United States.

The hi-fidelity capabilities of FM are obtaining increasing recognition. A number of FM stations specialize in programing good music to devoted listening audiences. One new FM grantee proposed 100 percent good-music programing, and another one promised over 98 percent good music. Some manufacturers have developed lines of high-fidelity equipment for the "hi-fi" enthusiasts. "Hi-fi" fairs have been held in a number of cities and their attendance shows considerable interest in this field.

"Functional Music," "Storecasting," and "Transit Radio"

In order to help FM stations economically and to make a more efficient utilization of FM frequencies, the Commission is engaged in a rulemaking proceeding which would permit supplemental services to be rendered by commercial FM broadcasters. It would make pos-

sible such additional services as "functional music," which has many variations including, for example, restaurant, factory, and other background music; also "storecasting," background music in stores, and "transit radio" on passenger-carrying vehicles.

The proposed rule would relax the present minimum of 42 hours of operation a week to 36 hours for regular FM broadcast stations, besides authorizing secondary, or subsidiary, licenses for FM stations to engage in these auxiliary services.

The special programing would be authorized on a simplex basis during nonbroadcast hours using a supersonic ("beep") signal to activate special receivers owned or rented by commercial and industrial establishments for this purpose. The proposal would also permit additional program transmissions on a multiplex basis during regular broadcast hours to individuals and organizations having the necessary multiplexing receiving equipment. "Binaural" broadcasting, a type of broadcasting which undoubtedly would be welcomed by the hi-fidelity fans, would be possible on a single FM channel under the proposed rules. The rules would impose such technical standards as would insure the technical quality of the regular broadcast service.

Noncommercial Educational FM

Though comparatively small, noncommercial educational FM broadcast is the one FM service which has shown a steady increase in both authorizations and licenses over the past 6 years.

During the past year 9 new stations were authorized in this service. Five of them were for operation with 10-watt transmitters, while the others proposed to use higher powered equipment. There are presently 123 stations authorized in this service, 117 of which have qualified for regular licenses.

The noncommercial educational FM broadcast service offers a contrast to the commercial FM broadcast service insofar as deletions of stations are concerned. During this past year only 1 noncommercial educational FM broadcast station requested cancellation of its authorization.

One of the new stations authorized was the second station for the same educational licensee in the same city.

The Commission's proposal to amend the rules to permit multiplexing by FM broadcast stations would enable stations in this service to transmit a number of programs simultaneously. This would make possible the broadcast of several educational programs at the same time.

During the year the period of noncommercial educational FM licenses was extended to three years, the same as for commercial FM stations.

Facsimile Broadcast Service

Facsimile broadcasting means the transmission of still pictures, graphs, and printed or written matter to the general public. Commission rules permit FM broadcast stations to transmit "fax" on a simplex or multiplex basis. However, there appears to be no current interest in this service; no stations are now engaged in such operation.

EXPERIMENTAL BROADCAST SERVICES

The experimental broadcast services are for the purpose of conducting research and development in the technical phases of broadcasting in order to improve equipment or techniques and to obtain engineering data that will prove useful to the broadcasting industry as well as to the Commission.

Commission rules provide for three classes of experimental broadcast stations; i. e., Experimental Television Stations, Experimental Facsimile Stations, and Developmental Broadcast Stations. Experimental stations are classified on the basis of their operation in the field of video, "fax" [facsimile], or aural broadcasting.

Experimental TV Stations

Besides looking into techniques of "booster" and "satellite" and "subscription" TV operation as previously noted, experimental TV stations continued to be used by manufacturers of TV equipment for testing and developing new and improved equipment, and prospective TV applicants were given experimental authority to test new antenna sites for their proposed stations.

Developmental Broadcast Stations

The Developmental Broadcast Service is the aural counterpart of the Experimental Television Broadcast Service. Activity in this field has for the most part been limited to the development and testing of aural broadcast transmitting equipment by manufacturers. The recent surge of interest in high-fidelity sound systems may lead to some experimental broadcast operation in the field of binaural or stereophonic systems which are intended to give a three-dimensional quality to sound.

Experimental Facsimile Broadcast Stations

There was no activity in this field during the fiscal year.

AUXILIARY BROADCAST SERVICES

Auxiliary broadcast services cover the use of portable or mobile radio-transmitting apparatus to pick up programs or other events which occur outside a regular studio, and of permanently installed

transmitters to provide program circuits between the studio and transmitter of AM, FM, or TV broadcast stations and, in the case of FM and TV stations, to provide intercity relay circuits for network operation in lieu of coaxial cable facilities. During the fiscal year, rules were adopted to provide for the licensing of FM intercity relay stations.

There are now six categories of auxiliary broadcast stations, as follows:

Remote Pickup Broadcast Stations

Remote pickup broadcast stations are operated by broadcast stations for on-the-spot coverage of outside events. They are used primarily for pickup of AM and FM programs but are becoming popular with TV broadcasters, not only for relaying the aural portion of TV program pickups but also for providing communication between the field crews in setting up TV pickup equipment and for cueing and dispatching the pickup crews to the scenes of newsworthy events.

Portable or mobile equipment generally employed for this purpose ranges in power from a fraction of a watt to a few hundred watts. Most of this apparatus is self-powered and provides a reservoir of emergency communication equipment which could be used in the event of disruption of normal circuits resulting from floods, storms, or other disasters.

Aural Broadcast STL Stations

Aural broadcast STL (studio-transmitter link) stations provide a radio circuit for the transmission of programs from the studio to the transmitter of an aural broadcast station. With such service available, AM and FM stations may locate their transmitting facilities in isolated areas in order to take advantage of the most favorable site without regard to the availability or suitability of wire line transmission. The growth of this service tends to keep pace with the growth of aural broadcasting.

FM Broadcast Intercity Relay Stations

This service is intended to meet the problems of FM broadcast networks in situations where the special high-quality circuits are not available from communication common carriers. Since this class of broadcast auxiliary service is comparatively new, no stations have yet been licensed.

TV Pickup Stations

Television pickup stations are the visual counterpart of remote pickup stations and are used by TV licensees for on-the-spot broadcasts. They are a particularly useful adjunct to telecasting since costly and expensive special cables are required to handle the fre-

quency bandwidths required for the transmission of moving visual images and, without these mobile transmitters, TV programs would be restricted in most cases to those produced in the studios.

The comprehensive coverage of sporting events by TV stations is almost entirely due to the availability of this pickup service. They are also widely used in other instances where timeliness makes the use of motion-picture photography undesirable.

Television STL Stations

Television STL (studio-transmitter link) stations are used in the same manner as aural broadcast STL stations. As in the case of pickup stations, the need is greater for TV since the cost of a physical link between the studio and transmitter would prohibit the use of mountaintop transmitter sites or other locations favorable for wide-area TV coverage.

TV Intercity Relay Stations

Although Commission policy in general requires intercity relaying of TV network programs to be handled exclusively by communications common carriers, its rules permit the operation of private intercity relay systems by TV stations on an interim basis where it is shown that adequate common carrier facilities are not available. With the rapid expansion of television during the fiscal year, a number of these private systems have come into being.

(On September 16, 1954, the Commission invited comments and proposals to a petition that it authorize TV stations to operate their own intercity relay facilities in preference to using more costly common carrier facilities, especially to stimulate the development of live network service in less densely populated areas.)

HEARINGS

In conformity with its efforts to simplify and expedite the general broadcast hearing procedure, the Commission on July 15, 1954, announced substantial revisions of its covering rules. These modifications were adopted in the light of clarifying experience with expediting procedures previously adopted, and again after full consultation with representatives of the outside bar.

In brief, the Commission further changed its cutoff rules to require all competing applications for the same broadcast facility to be on file at least 60 days (in lieu of the previous 30) prior to the scheduled hearing, and that in broadcast cases the Commission will endeavor to give applicants 60 days advance notice of a hearing.

Each applicant now provides all parties to the hearing with a full set of exhibits to be offered as part of its direct case. Unless otherwise directed by the examiner, this exchange of exhibits takes place

at least 20 days in advance of the hearing date. These exhibits contain all data which the applicants desire to submit concerning their qualifications and proposals. Oral testimony by an applicant or his witnesses, with respect to his direct case, is limited to appropriate qualifications and explanation of his exhibits, if necessary, and to such testimony in connection with the applicant's direct case in substitution of exhibits or portions thereof which may have been rejected by the examiner on grounds solely of competency or form.

In all hearings involving applications for authority to construct new broadcast stations, except for good cause found in advance by the presiding officer, prehearing conferences are held both prior to and after the exchange of exhibits, with a view to eliminating, by agreement, the necessity of proving some facts, the possibility of agreement disposing of evidentiary issues raised by the exhibits exchanged, the limitation on cumulative evidence, and numerous other matters which may effectively shorten the hearing. The second prehearing conference, in most instances, is held at least 10 days prior to the date for commencing the hearing.

There is also a provision which enables any party to obtain, upon written request, from any other party to the proceeding, such detailed information relevant to its proposals as may reasonably and timely be requested, including any material falling within eight specified categories; e. g., background and experience, integration of ownership and management, and other matters bearing upon the criteria previously employed by the Commission in selecting between competing applicants for the same facilities.

Under these modifications, broadcast hearings no longer commence, as was previously the case, with hearing conferences, but instead with the actual preesntation of proof. It is no longer required that the applicants make a preliminary submission of detailed information supplemental to their applications in six different categories specified in an attachment to the Commission's letter sent to applicants prior to the designation of their applications for hearing. Also eliminated is the previous requirement that the parties state the matters upon which they propose to rely in conferences at which time the hearings were deemed to have started, but prior to the actual presentation of proof.

Findings are still made upon the basic qualifications of the applicants (legal, financial, technical, etc.) before designating their applications for hearing on a comparative basis. Thus, lengthy testimony on which no actual controversy exists continues to be eliminated.

Related expediting actions taken during the year included a February 10, 1954, rule amendment which limits the number of pleadings

which may be filed in a proceeding. This was done because numerous and repetitious pleadings tended to delay and complicate Commission consideration of the cases involved, and indications were that many of these pleadings were unnecessary to disposition of the cases involved.

On Augut 20, 1953, the procedural rules were amended to provide that when any party fails to file exceptions within the specified time to an initial decision which proposes to deny its application, such party shall be deemed to have no interest in further prosecuting its application and the latter may be dismissed for failure to prosecute.

MULTIPLE OWNERSHIP RULES

The Commission's rules concerning multiple ownership of broadcast stations were, on November 25, 1953, amended to preclude any party, or any of its stockholders, officers, or directors, having an interest in more than 7 commercial AM, 7 commercial FM, or 5 commercial TV stations.

This was the first time that these rules were applied to indirect interest and the first time that a maximum had been placed on total AM stations. The limitation on FM holdings was raised from its previous ceiling of 6. The 5 figure for TV was retained. There was no change in the existing rule which prohibits the same interest or group from operating more than one network, or more than one AM, FM, or TV station in the same area.

Subsequently, on December 23, 1953, the Commission proposed and, on September 17, 1954, amended its multiple-ownership rules to increase the maximum permissible ownership of TV broadcast stations by the same interest from 5 to 7, not more than 5 of which may be in the VHF band, effective October 22 thereafter.

POLITICAL BROADCASTS

On September 2, 1954, the Commission's rules were amended to reflect and interpret a 1952 amendment to the act which stipulates that charges for broadcasts by legally qualified candidates for public office shall not exceed the charges made by the station for other comparable purposes. Later that month the Commission issued a reference compilation and guide on "Use of Broadcast Facilities by Candidates for Public Office".

In substance, the Communications Act provides that if any station permits its facilities to be used by a legally qualified candidate for public office, it must afford equal opportunities to all other such candidates for that office, without censorship or extra charge.

OTHER BROADCAST RULE CHANGES

In addition to the more important rule changes reported elsewhere in this chapter, there were other revisions affecting the broadcast field.

For one thing, the Commission banned the filing of applications in conflict with its rules, even when accompanied by petitions for rulemaking. This action is intended to promote more orderly procedure and, in particular, to eliminate the pendency of applications which cannot be acted upon because of their relation to complex, unresolved and protracted rulemaking proceedings.

Rules were finalized to required all applicants for new AM broadcast stations to specify definite transmitter sites. This step is expected to reduce the Commission's workload and to remove a number of uncertainties with respect to coverage and interference to other services that prevailed when no specific site was proposed.

One of the most controversial rules in AM allocations known as the "blanketing rule" was modified in order to ease the requirements for the selection of transmitter sites. While the rule has been liberalized in certain respects, the Commission has increased the responsibility of AM licensees in satisfying complaints of listeners of blanketing interference from excessive field intensities emitted by their stations.

The Commission has deleted provisions requiring the making of AM skywave field intensity recordings for the reason that the duration of recordings which can practically be prescribed produces unreliable results. It believes that use of its skywave curves, which were founded upon and verified by relatively large numbers of skywave recordings, provides a more satisfactory tool in allocations. The Commission stated this view as early as 1940 and has consistently reiterated it. The codification of this principle in the AM allocation rules will tend to prevent applicants from spending time and effort in expensive but unfruitful skywave recording programs to support requests for new or different broadcast facilities.

The auxiliary broadcast service rules were revised to accommodate the needs of TV broadcast stations, especially UHF stations, for pick-up, studio-transmitter links, and intercity relay stations.

In another proceeding involving TV engineering standards, the delineation of zone 1 was changed to include the entire State of West Virginia.

A further proceeding having an impact on TV was one which amended the rules for the operation of fixed stations in the band 72–76 megacycles in order to give protection to TV stations operating on adjacent channels 4 and 5.

Financial reporting requirements of broadcast networks and licensees were further materially reduced by discontinuance of the preliminary report form (FCC Form 324A) and elimination of several schedules in the "Annual Report of Networks and Licensees of Broadcast Stations" (FCC Form 324).

Also during the year, the Aural Facilities and Television Facilities Divisions of the Broadcast Bureau were merged into a Broadcast Facilities Division.

STATISTICS

Broadcast Authorizations

Broadcast authorizations totaled 5,838 at the end of fiscal 1954, which was a net gain of 408 for that year. Television authorizations increased from 500 to 603, including 30 for noncommercial educational operation. Commercial FM authorizations continued to drop, numbering 569 at the close of the year as compared to 601 the year previous. However, noncommercial educational FM stations continued to gain, adding 7 during the year to set a new mark of 123. AM authorizations continued to mount, adding 113 for the year to reach a new high of 2,697.

Year-end totals for authorizations in the different classes of broadcast services were:

Class	June 30, 1953	June 30, 1954	Increase or (decrease)
Commercial AM	2,584	2,697	113
Commercial TV	483	573	90
Educational TV	17	30	13
Auxiliary TV	259	397	138
Experimental TV	17	18	1
Commercial FM	601	569	(32)
Educational FM	116	123	7
Remote pickup	1,305	1,384	79
Studio-transmitter link	47	45	(2)
Developmental	1	2	1
Totals	5,430	5,838	408

These figures do not include international broadcast stations, which are in a state of flux.

Broadcasting Since 1949

The number of authorized, licensed, and operating broadcast stations, also pending applications, at the close of each fiscal year for the past 6 years is shown in the following tables, together with totals for the number of deletions during those years:

Year	Grants	Deletions	Pending applications	Licensed	CP's on air	Total on air	CP's not on air	Total authorized
COMMERCIAL AM								
1949	200	55	382	1,963	43	2,006	173	2,179
1950	194	70	277	2,118	26	2,144	159	2,303
1951	116	35	270	2,248	33	2,281	104	2,385
1952	60	25	323	2,333	22	2,355	65	2,420
1953	187	23	250	2,439	19	2,458	126	2,584
1954	148	29	226	2,565	18	2,583	114	2,697
COMMERCIAL FM								
1949	57	212	65	377	360	737	128	865
1950	35	169	17	493	198	691	41	732
1951	15	91	10	534	115	649	10	659
1952	24	36	9	582	47	629	19	648
1953	29	79	8	551	29	580	21	601
1954	27	54	5	529	24	553	16	569
EDUCATIONAL FM								
1949	18	7	9	31	3	34	24	58
1950	25	4	3	61	1	62	20	82
1951	19	6	2	82	1	83	12	95
1952	12	2	2	91	1	92	12	104
1953	13	1	3	106	0	106	10	116
1954	9	2	1	117	0	117	6	123
COMMERCIAL TV								
1949	15	7	338	13	56	69	48	117
1950	0	8	351	47	57	104	5	109
1951	0	0	415	81	26	107	2	109
1952	0	1	716	96	12	108	0	108
1953	381	6	572	101	97	198	285	483
1954	174	81	200	104	298	402	171	573
EDUCATIONAL TV								
1952	0	0	1	0	0	0	0	0
1953	17	0	29	0	1	1	16	17
1954	13	0	17	0	6	6	24	30

Authorizations cover all stations built, building, or for which construction permits were granted. Licenses are issued only when stations meet the engineering specifications in their construction permits. Many stations go on the air with temporary facilities prior to qualifying for licenses. Noncommercial educational TV operation was first authorized in 1952.

Any seeming slight discrepancies in the relation of grants and deletions during the year to total authorizations at the end of the year are due to reinstatement of some deleted authorizations and other considerations impossible to detail in this general table.

Broadcast Applications

Broadcast applications received during the year totaled 8,200, which was 1,220 more than the previous year. Applications for new TV sta-

tions decreased from 655 in 1953 to 106 in 1954. However, in the last fiscal year 248 applications for new TV stations had to be designated for hearing as compared to 53 for AM and none for FM.

Nonhearing broadcast application statistics for the year follow:

	Received	Granted	Dismissed, denied, or returned	Designated for hearing	On hand
AM					
New stations	227	140	76	53	156
Major changes	161	116	32	27	132
Transfers	521	473	55	2	42
Renewals	1,509	1,535	60	1	246
Licenses	326	300	18	0	76
Other	990	913	80	1	70
AM total	3,734	3,477	321	84	722
FM					
New stations	33	36	1	0	6
Major changes	118	136	0	0	15
Transfers	88	89	0	0	10
Renewals	305	283	0	0	75
Licenses	95	92	0	0	14
Other	147	142	0	0	8
FM total	786	778	1	0	128
TV					
New stations	106	121	210	248	31
Major changes	201	187	11	0	24
Transfers	124	111	4	0	17
Renewals	77	80	10	2	23
Licenses	83	15	8	0	77
Other	960	886	44	5	80
TV total	1,551	1,400	287	255	252
Miscellaneous					
New stations	438	376	25	0	73
Major changes	119	108	3	1	15
Transfers	242	224	3	0	32
Renewals	867	904	4	5	146
Licenses	411	213	17	0	264
Other	52	51	3	0	3
Miscellaneous total	2,129	1,876	55	6	533
Grand total	8,200	7,531	664	345	1,635

FM and TV figures include noncommercial educational applications.

Pending Broadcast Applications

Of the 1,635 broadcast applications pending at the close of the fiscal year, over half (915) were more than 3 months old, 438 had been pending for from 3 months to a year, 158 from 1 to 2 years, and 124 for more than 2 years.

Broadcast applications are, in general, processed in the order in which received. However, some involve considerations which require more time to resolve.

Many applications indicate objectionable interference, not only to other stations in this country but to those in neighboring countries. Some applications are not properly or completely filled out, which can invite considerable correspondence. Some applications are fre-

quently amended, and this necessitates a restudy in each instance. Some applicants ask for facilities that require special case study and interpretation of the rules. Some applications are contigent upon the grant of other applications, thereby involving dual considerations. Other applications are being held up at the request of the applicant. Engineering, financial, or legal questions often arise in considering applications for renewal of license on the basis of operation during the license period. This can also result in protracted correspondence.

In every case where an application cannot be granted, the Commission has, since 1952, been required by law to formally advise the applicant of that fact and to await word from the applicant as to whether he wants to go to a hearing before the case can be designated for hearing.

The reasons for seeming delay in passing upon some broadcast applications are many, but they may be grouped in the following major categories:

Awaiting hearing because of competition with other applications. The law obliges the Commission to make a selection through the hearing process, which must follow a prescribed Federal procedure.

Awaiting final decision in hearings in which the hearing record and the subsequent filings and counterfilings can be voluminous and require extensive reading and analyzing.

Awaiting decisions in specific rulemaking on general proceedings, the outcome of which will determine whether a particular application can be granted.

Awaiting the ratification of an international broadcasting treaty or agreement.

Awaiting the outcome of legislation, litigation, bankruptcy proceedings and other legal actions.

Awaiting receipt of additional information that has been requested from the applicant.

Awaiting the applicant's compliance with financial, legal and engineering requirements, including approval of antenna site and clearance of antenna height for air navigation safety.

Awaiting negotiations between parties seeking to iron out mutual difficulties.

Awaiting the outcome of general studies or particular inquiries.

The age of pending broadcast applications as of June 30, 1954, is shown in the following table:

Service	Total	Under 3 months	3 to 12 months	12 to 24 months	Over 24 months
AM					
New stations	156	60	50	16	40
Major changes	132	46	31	16	39
Renewals	246	186	45	7	8
Other	188	132	32	13	11
AM total	722	414	158	52	98
FM					
New stations	6	5	0	0	1
Major changes	15	4	1	7	3
Renewals	75	66	8	0	1
Other	32	22	5	3	2
FM total	128	97	14	10	7
TV					
New stations	31	6	8	16	1
Major changes	24	16	7	1	0
Renewals	23	20	3	0	0
Other	174	98	55	18	3
TV total	252	140	73	35	4
Miscellaneous					
New stations	73	66	7	0	0
Major changes	15	11	3	0	1
Renewals	146	108	30	3	5
Other	299	79	153	58	9
Miscellaneous total	533	264	193	61	15
Grand total	1,635	915	438	158	124

Receiving Sets

Broadcast receiving sets are not licensed or otherwise regulated by the Commission, although it does endeavor to curb interference to or from these receivers. Industry estimates that more than 117 million radio sets are in use, including 9 million equipped to receive FM. About 47 million homes, or 98 percent of the total, have one or more AM sets, and over 25 million automobiles have radio receivers. In addition, there are more than 30 million TV sets in about 29 million homes, and of these sets less than 4 million can get the UHF band. The number of color TV receivers is estimated to be between 6,000 and 7,000, and production is increasing.

Networks

Broadcast networks as such are not licensed or otherwise regulated by the Commission. However, individual stations are subject to the chain broadcasting regulations adopted by the Commission in 1941 to promote competition in broadcasting. There are five national networks—American Broadcasting Co.; Columbia Broadcasting System, Inc.; Mutual Broadcasting System, Inc.; National Broadcasting Co.; and Du Mont Television Network—and many regional and State networks. (On August 4, 1954 the Senate Interstate and Foreign Commerce Committee announced that it would conduct an investigation of radio and television networks.)

Broadcast Industry Financial Data

In the calendar year 1953, the grand total revenues of the broadcasting industry (radio and television) passed $900 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 $908 million. Radio revenues increased from $469.7 million in 1952 to $475.3 million in 1953, while aggregate TV revenues of $432.7 million in 1953 were 33.5 percent greater than the $324.2 million for 1952.

Broadcasting profits of $123 million in 1953 were 6.4 percent greater than those of 1952. The industry reported a profit from television broadcast operations of $68 million, 22.5 percent higher than in 1952. Earnings from radio AM and FM broadcast operations decreased by 8.4 percent from $60.1 million in 1952 to $55 million in 1953. All profit figures are before payment of Federal income tax.

The following tables show the comparative calendar year 1952–53 radio and television financial data for the radio and television broadcast industries:

All networks and stations, 1952–53

Item	1952	1953	Percent increase or (decrease) in 1953
	Millions	*Millions*	
Total broadcast revenues	$793.9	$908.0	14.3
Radio [1]	469.7	475.3	1.1
Television	324.2	432.7	33.5
Total broadcast expenses	678.3	785.0	15.7
Radio	409.6	420.3	2.6
Television	268.7	364.7	35.7
Broadcast income (before Federal income tax)	115.6	123.0	6.4
Radio	60.1	55.0	(8.4)
Television	55.5	68.0	22.5

[1] Radio includes AM and FM broadcasting.

NOTE.—1953 radio data cover the operations of 4 nationwide networks and 3 regional networks, 2,434 AM and AM–FM and 45 independent FM stations. 1952 data are for the same networks and 2,324 AM and AM–FM and 56 independent FM stations. 1953 TV data cover the operations of 4 networks and 334 stations; 1952 data are for the same networks and 122 stations.

Nationwide networks only, 1952–53 (including owned and operated stations)

Item	1952	1953	Percent increase or (decrease) in 1953
Broadcast revenues	*Millions*	*Millions*	
Radio	$95.8	$92.6	(3.3)
Television	180.2	231.7	28.6
Total	276.0	324.3	17.5
Broadcast expenses			
Radio	85.6	83.2	(2.8)
Television	170.3	213.7	25.5
Total	255.9	296.9	16.0
Broadcast income (before Federal income tax)			
Radio	10.2	9.4	(7.8)
Television	9.9	18.0	81.8
Total	20.1	27.4	36.3

NOTE.—Radio data include the operations of 16 network-owned stations in 1953 and 18 such stations in 1952. TV data include the operations of 15 network-owned stations in 1952 and 16 such stations in 1953.

FM broadcast revenues, expenses and income, 1952–53

Item	1952		1953	
	Number of stations	Amount	Number of stations	Amount
FM broadcast revenues				
FM stations operated by:				
AM licensees:		*Millions*		*Millions*
Reporting no FM revenues	406		412	
Reporting FM revenues	149	$1.5	137	$1.3
Non-AM licensees	56	1.1	45	0.8
Total FM Stations	611	2.6	594	2.1
FM broadcast expenses				
FM stations operated by non-AM licensees	56	2.1	45	1.6
Industry total		(1)		(1)
Total FM broadcast income (before Federal income tax)				
FM stations operated by non-AM licensees	56	(1.0)	45	(0.8)
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, expenses and income, 1953

[In thousands]

Item	4 networks and their 16 owned and operated TV stations	244 other TV stations	Total 4 networks and 260 TV stations [1]
A. Revenues from the sale of time:			
1. Network time sales:			
a. Nationwide networks	$126,541	$45,270	$171,811
b. Miscellaneous networks and stations		89	89
Revenue from network time sales	126,541	45,359	171,900
2. Nonnetwork time sales to:			
a. National and regional advertisers and sponsors	36,870	87,448	124,318
b. Local advertisers and sponsors	19,576	68,898	88,474
Total revenues from nonnetwork time sales	56,446	156,346	212,792
Total revenues from time sales	182,987	201,705	384,692
3. Deduct commissions to regularly established agencies, representatives, brokers and others	[2] 34,999	27,462	62,461
Net revenues from time sales	147,988	174,243	322,231
B. Revenues from incidental broadcast activities:			
Talent	60,888	9,681	70,569
Sundry broadcast revenues	22,792	16,185	38,977
Total revenues from incidental broadcast activities	83,680	25,866	109,546
Total broadcast revenues	231,668	200,109	431,777
C. Total broadcast expenses of networks and stations	213,661	146,853	360,514
D. Broadcast income before Federal income tax	18,007	53,256	71,263

[1] Excludes data for 74 stations with less than $25,000 in time sales. Such stations report only total revenues and total expenses.

[2] Of this amount $26,211,189 is applicable to the total sale of network time.

TV investment in tangible broadcast property, 1953

Item	Number of stations	Investment in tangible broadcast property	
		Original cost	Depreciated cost
		Thousands	*Thousands*
4 networks and their owned and operated stations	16	$71,622	$50,401
Prefreeze stations	91	87,361	55,960
Total Prefreeze	107	158,983	106,361
Postfreeze stations:			
VHF	109	40,913	38,123
UHF	109	33,238	30,703
Total Postfreeze stations	218	74,151	68,826
Grand Total	[1] 325	233,134	175,187

[1] Nine TV stations (1 prefreeze and 8 postfreeze) reported no ownership of tangible broadcast property.

Radio [1] broadcast revenues, expenses, income and investment, 1952–53

[In thousands]

Item	4 nationwide networks and their stations [2]		3 regional networks and their stations [2]		All other stations [3]		Industry total	
	1952	1953	1952	1953	1952	1953	1952	1953
Total broadcast revenues	$95, 824	$92, 654	$4, 796	$4, 679	$367, 972	$377, 252	$468, 592	$474, 585
Total broadcast expenses	85, 590	83, 220	3, 807	3, 702	318, 119	331, 867	407, 516	418, 789
Total broadcast income (before Federal income tax)	10, 234	9, 434	989	977	49, 853	45, 385	61, 076	55, 796
Investment in tangible broadcast property:								
Original cost	28, 241	24, 602	976	1, 712	[4] 238, 124	[4] 249, 926	267, 341	276, 240
Depreciation to date	15, 375	13, 480	862	1, 209	100, 394	113, 258	116, 631	127, 947
Depreciated cost	12, 866	11, 122	114	503	137, 730	136, 668	150, 710	148, 293

[1] Excludes independently operated FM stations, 56 in 1952 and 45 in 1953.
[2] Includes the operations of 25 network owned stations in 1952 and 22 network owned stations in 1953.
[3] Includes 2,299 stations in 1952 and 2,412 stations in 1953.
[4] Data available from 2,289 stations in 1952 and 2 400 stations in 1953.

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Field Engineering and Monitoring

*"Have authority to inspect all radio installations. * * *"—(Sec. 303 (n) of the Communications Act).*

" * * prevent interference between stations * * * "—(Sec. 303 (f) of the Communications Act).*

" * * require the painting and/or illumination of radio towers. * * * "—(Sec. 303 (q) of the Communications Act).*

" * * prescribe the qualifications of station operators * * * "—(Sec. 303 (l) of the Communications Act).*

GENERAL

The Field Engineering and Monitoring Bureau operates a field organization extending throughout the United States and its Territories to provide on-the-spot service to industry, the public, and Government agencies; to enforce radio laws, treaties, and regulations; and to answer radio station and operator questions at field level. Surveillance is maintained by station inspection and by monitoring. Complaints of radio interference are investigated and radio operator examinations are given.

These field units locate and close unauthorized radio stations; perform special monitoring and engineering tasks for military and civil agencies; participate in rendering direction-finding assistance to lost or disabled aircraft and ships; and, in general, act as fact-finding units to provide the Commission with technical data for domestic and international use.

The bureau processes application data regarding radio antenna construction to insure that the towers will present a minimum hazard to air navigation. It also administers the Commission's rules pertaining to restricted and incidental radiation devices, and to radiating industrial, scientific, and medical equipment.

Regional offices have been reduced from 9 to 7 and, together with 24 district offices, 6 suboffices, 2 ship offices, and 18 monitoring stations, are supervised by the bureau's Field Operating Division. Three other staff divisions (Monitoring, Inspection and Examination, and Engineering) advise the bureau chief regarding standards, procedures, and evaluation of field work.

MONITORING

Monitoring Facilities

The monitoring and direction-finding network continued to operate with 10 primary and 8 secondary monitoring stations (see list in appendix to this report). All monitoring stations are equipped with high-frequency, long-range direction finders. In addition, 7 of the stations have low-frequency direction finders.

The Anchorage, Alaska, monitoring station was changed during the year from primary to secondary, and relocated locally, because of personnel shortages. The Lexington, Ky., secondary station is being moved to Chillicothe, Ohio. Forty acres were added to the Allegan, Mich., primary station, and 37 acres to the Fort Lauderdale, Fla., secondary station.

The Commission pursued its plans to eventually locate all of its monitoring stations on Government-owned lands. Close liaison is maintained with the General Services Administration and other Government agencies so that the Commission may be aware of Government sites which might be suitable for relocating monitoring stations now occupying leased properties.

Propagation characteristics on the frequencies used for television broadcasting are such that only a small percentage of the TV stations in operation can be received at the Commission's monitoring stations. Mobile facilities are, therefore, necessary to provide a means of assuring that video transmissions are of good technical quality.

To meet this need, the Commission obtained funds in 1954 for the establishment of one such unit which can be driven to the service area of the station being checked. It will be equipped with precision frequency-measuring equipment as well as instruments for determining the engineering quality of both monochrome and color TV signals.

Other equipment purchased during fiscal 1954 included some needed receivers covering the ultra high and super high frequency ranges, a number of field intensity meters to provide additional facilities for obtaining propagation and coverage data required by the Commission for making decisions concerning matters of frequency allocations and establishment of engineering standards, a panoramic recording receiver for use in making channel occupancy surveys, and a panoramic analyzer which will be the basic unit for a new spectrum analyzer to determine bandwidths of emissions of stations in the various services.

Monitoring for Defense

The demand for FCC monitoring and direction-finding services in connection with military defense projects increased considerably. The staff and facilities were not sufficient to handle all the work requested. However, it was possible to undertake three assignments amounting to

a total cost of $136,960. This sum, received by transfer of funds from the requesting agencies, was expended mainly for personal services. The Commission's monitoring and direction-finding network is the only one in existence which can perform certain work required in defense projects.

The largest contract ($129,000) provided for tracking of high-altitude weather balloons for the Air Force Cambridge Research Center. A still larger contract ($132,000) will continue this work in fiscal 1955. Other contracts were with the Naval Research Laboratory, also for tracking high-altitude weather balloons, and with the Air Force Rome Air Development Center.

Monitoring Surveys

The Commission made 45 monitoring surveys relating to problems of international frequency usage and allocations. This is 8 more than last year.

Some surveys involved only a few days' work but others required periodic observations at frequent intervals by all monitoring stations. One survey extended for 10 months and covered all 6 of the Atlantic City ship telegraph high-frequency calling bands. This was the first step in the implementation of newly allocated frequencies for the various services.

Monitoring for ITU

The United States is one of the principal participants in furnishing technical data concerning the usage of radio frequencies and band occupancy to the International Telecommunication Union at Geneva (ITU). This information is essential to a logical frequency allocation plan for global communication and intercommunication between countries. It also provides protection from interference, and assures that radio transmissions are conducted within allocated bands.

The Field Engineering and Monitoring Bureau was designated by the ITU as the centralizing office for monitoring in the United States. The Commission's monitoring stations were the only domestic source of data for the International Frequency Registration Board (IFRB) of the ITU during the past year; however, one of the large communication companies will start participation in the program. This year, monitoring index slips were forwarded by the FCC to the IFRB each month, a total of 23,317 slips.

Monitoring for Interference

Resolution of radio-interference problems frequently requires monitoring operations on a large geographical scale. Requests for such services were received during the past 2 years as follows:

	Fiscal year 1953	Fiscal year 1954
U. S. Air Force	200	150
U. S. Army	125	109
U. S. Navy	40	52
U. S. Coast Guard	78	66
Civil Aeronautics Administration	125	88
Other Government agencies	30	26
Law enforcement agencies	15	13
Commercial airlines	256	186
Commercial concerns	410	398
Foreign governments	35	13
Miscellaneous	[1] 400	1,898
Total	1,714	2,999

[1] Estimated.

The following are examples of interference problems solved by monitoring:

One of the large commercial airlines complained of serious interference to its radio communication at Memphis, Nashville, and Cincinnati. By coordinating monitoring stations and mobile units, the source was traced to a plywood plant in Tennessee where an electronic heater was found to be operating outside the assigned frequency band.

A United States Armed Forces broadcast station in Morocco requested identification of a station causing interference to one of its channels. Through long-range monitoring and direction finding, the interfering station was located in a southern European country.

The monitoring network intercepted a steady unidentified signal on the international radiotelephone distress frequency. This signal was a hazard to use of the channel for distress purposes, as well as interfering with normal operations. Direction-finding bearings placed its origin in the San Pedro, Calif., area. The mobile investigative unit at Los Angeles traced the cause to a blocked transmitter relay at a local public coast radiotelephone station.

Monitoring for Small-Boat Interference

An extensive monitoring program was conducted during the year and is still in progress to identify small boats radiating second harmonics from their radiotelephone transmitters on 2738 kilocycles and thus blocking the aeronautical service from shifting to its new Atlantic City assignment of 5476.5 kilocycles. The problem was serious because other frequency shifts were held up until the aeronautical stations released their old frequency. The monitoring effort was also directed towards seeing that small-boat transmitters using 2738 kilocycles are certified as free of harmful harmonic radiation from that frequency. The 5476.5-kilocycle channel was sufficiently cleared of interference by June 1954 to permit the aeronautical service shift.

Other Monitoring Cases

Interference is responsible for the majority of monitoring cases. However, other cases involve location of illegal radio transmitters, and special survey or other factfinding assignments. The number of major noninterference cases handled during the year totaled 519 compared to 448 in 1953. In addition, 4,655 local cases were handled by individual field units without reference to the entire net or to Washington.

Direction Finding

Long-range direction-finder bearings are the only means of definitely determining the source and type of an unknown signal. For example, the FCC was requested by the British monitoring system to identify a "printer system." Through the use of special monitoring equipment and analysis of the multiplex emission, the FCC found that it came from a European country. But that country denied knowledge of the use of the particular frequency, and the British asked for further observations. However, the Commission confirmed its previous identification.

Monitoring stations in fiscal 1954 obtained a total of 104,480 bearings compared to 80,208 for the preceding year. The increase was made possible by the new remote controlled type of direction finders in use. As part of the Commission's participation in the air-sea search and rescue program, the direction-finder network obtained 1,877 bearings on lost or disabled aircraft and seacraft. There were 100 requests for emergency assistance compared to 130 for the previous year. Typical cases were:

The fishing vessel *Queen Mab*, while near Hawaii, asked through the Coast Guard for a radio direction-finder fix to assure that it was following the most direct course in rushing two sick men to a shore hospital. The FCC net obtained a fix which enabled the vessel to speed its mercy errand.

The CAA at Oakland, Calif., requested assistance in locating a disabled Air Force plane. The plane, inbound from Hawaii, was about 300 miles offshore. Bearings were obtained, and two fixes were reported to the CAA within 20 minutes of the initial transmissions. An escort plane then conducted the disabled plane to the mainland.

The FCC was requested by the Coast Guard to help locate an Air Force C–47 plane lost between Florida and the Bahama Islands. The first of four fixes was reported to the Coast Guard within 8 minutes. As a result, the lost plane was enabled to return safely to base.

The Coast Guard requested assistance in locating the *O. S. Mary Adeline* which was in distress off southern California. The Coast Guard cutter *Morris* was searching for the stricken vessel with

the aid of a plane and a patrol boat. The cutter had been running all day on "dead reckoning" in a heavy fog with her radar out of order. Since it was near dark, the cutter was about to give up and wait for the next day, but FCC fixes enabled her to locate and save the vessel and crew. The master of the rescued ship sent the FCC a letter of appreciation.

Additional Monitoring Statistics

	Fiscal year 1953	Fiscal year 1954
Alerts, unknown or suspicious signals	6,500	8,111
Identification cards made	56,950	83,523
Cases referred to other agencies	33	7
Citations served (monitoring)	8,762	6,839

INVESTIGATIONS

Investigative Facilities

During fiscal 1954, direction-finding-equipped cars were assigned to two more offices, though without additional personnel, bringing to 33 the total number of field offices and monitoring stations so equipped. These special cars are used in tracking down unlicensed stations and interference sources localized to a particular area by the Commission's monitoring stations, or which are under investigation as the result of reports or complaints from the public, radio stations, and Government agencies.

Interference Complaints

The number of interference complaints received by investigative units during the year was 18,037 as compared to 21,749 in 1953. Of these, 16,089 concerned AM, FM, and TV broadcast, principally the latter, as compared to 19,992 in 1953. The decrease in the number of complaints of interference to TV is due in part to the effectiveness of Commission-sponsored TV interference committees which resolve such complaints locally. The number of TVI committees has increased to 370 in 351 communities, as compared to 293 in 282 communities in 1953. Amateur radio operators, TV set owners, manufacturers' representatives, and others concerned thus work together to solve TV interference problems at a local level.

Because of their large number, it was not possible to accord prompt or complete attention to each and every interference complaint. As in the past, priority was given those which imperiled safety services, such as aviation, and to cases involving illegal radio activity.

Restricted radiation devices, such as "community antenna systems" and radiating receivers, continued to present an interference problem. Radiation from the growing number of community antenna systems—

i. e., cable systems which distribute TV programs by wire directly to subscribers' receivers in poor reception areas—invites interference complaints from persons attempting direct reception of TV stations in the vicinity of such cables.

Unfortunately, interference to aural and TV reception continues to be caused by radiations from broadcast receivers in the neighborhood, At the same time that a person may be complaining of interference to TV reception, his own TV receiver may, unknown to him, be causing interference to TV or AM broadcast reception of his neighbors—or may even be radiating on a frequency assigned a safety service, such as aviation. The following cases indicate the extent to which some receiving equipment can cause interference to reception by others.

A single excessively radiating FM receiver resulted in a complaint from 42 TV receiver owners at Wardensville, W. Va. A TV receiver booster in Beaumont, Tex., interfered with an estimated 3,000 TV receivers within the range of more than a mile. An amplifier associated with an apartment building master TV antenna at Buffalo, N. Y., was defective. Its interfering oscillations were stronger than the signal of the local TV station. Complaining calls jammed the telephone switchboard at the TV station and at a nearby hospital as viewers mistakenly blamed equipment at the hospital for the interference.

Examples of interference from restricted and incidental radiation devices are illustrated by the following:

Interference to a marine-calling and distress frequency, reported by the Coast Guard, was traced to an electric fence on an inland farm. Interference to a telephone company's carrier current system in Oklahoma was caused by a carrier-current telemetering circuit of another service. In Chicago, TV interference was traced to the complainant's own electronic garage door-opening device.

In 1954 there were 576 cases of interference from industrial, scientific, and medical equipment as compared to 641 in 1953. The fact that interference may be caused to important radio services hundreds of miles away, even though no complaints may have been received, is evinced by the following cases:

An illegal diathermy machine heard in Oregon, Washington, California, and many other States was traced to a doctor's office in Miami, Fla. When a check was made on a radiating diathermy machine at Portland, Oreg., it was no surprise to find that it could be heard as far as the Atlantic coast. In neither of these instances was the owner aware of the transcontinental effect of his equipment.

Serious interference to military and other communication in the New York area was considerably alleviated after mobile units traced the cause to inadequately shielded industrial-heating equipment in a number of plants manufacturing plastic products such as toys, raincoats, pocketbooks, etc.

Interference from other equipment brought complaints involving aircraft communication near Bellingham, Wash., the cause being traced to arc welders utilizing radio frequency energy, while interference to Civil Air Patrol communication at Tulsa, Okla., was due to radiations from an electronic "health machine".

Sometimes radio stations get out of adjustment and cause interference. For example, in Oregon disruption of railroad switchyard radio communication was found to be caused by a "spurious" emission from a local taxicab company radio station. The taxicab company promptly remedied it.

Also, interference complaints may arise against a radio station though the station is not at fault. For instance, when an additional TV station was established in San Diego, Calif., rendering improved service to viewers within its normal range, complaints were received from some San Diego residents that it was interfering with reception of a Los Angeles station more than 100 miles away which was not intended to serve San Diego.

Control of manmade interference is discussed in the chapter dealing with "Technical Research and Laboratory".

Unlicensed Stations

Mobile investigative units located and closed 52 illegal stations in 1954 as compared to 92 in 1953. This continued decrease is due in part to growing awareness of inevitable apprehension, and in part to concentration on the heavy workload of interference complaints and similar problems. Another contributing factor is the introduction of the Novice and Technician types of amateur license, whereby youngsters and others interested in radio operation can qualify to go on the air prior to acquiring the greater knowledge and skill necessary to obtain a General type amateur license.

An operator previously apprehended for operation of an illicit station at one Florida racetrack was arrested at another track on the same charge, even though litigation concerning his first operation was still pending.

INSPECTIONS

Fewer inspections were made of radio stations during fiscal 1954 as compared to the previous year. This was due to field personnel and budgetary limitations.

Broadcast Station Inspections

Commission field engineers inspect broadcast station transmitting equipment. Technical operation of the station, observed throughout the various operational phases, and the station's records of past technical operations are reviewed to assure that it is and has been operating efficiently and in compliance with technical rules, standards, and terms,

of its authorization. These inspections do much to maintain adequate technical service to the listening and viewing public. Also, inspections reveal whether the station's tower (some TV towers are over a quarter of a mile in height) create a hazard to air navigation due to improper marking or lighting and whether interference to other broadcast stations through improper technical adjustments is imminent.

During the year, 533 broadcast station inspections were made, and 181 discrepancies were noted, as compared to 881 inspections and 366 discrepancies the year previous.

Ship Radio Inspections

Marine radio equipment must be both accurate and reliable to promote safety of life and property. Therefore, inspections of radio equipment on board passenger ships and certain freight vessels are made by Commission engineers under the provisions of the Communications Act and the Safety of Life at Sea Convention.

Adequate installation, protection, and maintenance in a state of full effectiveness and readiness for emergency operation is required. Furthermore, the inspection is to assure that qualified operators are in charge of the installation at all times when safety of life and property could be endangered.

During the past 2 years ship inspections were made as follows:

	U. S. ships		Foreign ships		1954 *total*
	1953	1954	1953	1954	
Number of inspections	5,923	2,823	2,942	501	3,324
Number of deficiency notices served	3,564	1,417	1,243	150	1,567
Violations cleared during inspection	2,844	2,297	554	319	2,616
Total	12,331	6,537	5,739	970	7,507

The Commission continued to furnish small-boat owners, yacht clubs, flotillas, and squadrons with informative pamphlets to assist them in the achievement of maximum usefulness in the operation of their radio communication equipment.

Further steps taken in connection with the small-boat owners' "self-education" program enabled them to check each other's installations upon request, for the purpose of discovering and correcting improper operating practices or conditions and mutually eliminating unnecessary interference.

Other Radio Station Inspections

Inspections of other than broadcast and ship radio stations totaled 6,622 contrasted with 7,134 such inspections made during 1953. Technical discrepancies totaling 1,514 were discovered as compared to 1,360 the year previous.

COMMERCIAL RADIO OPERATORS

All radio transmitters in the United States and its Territories (except Government) are required to be licensed by the Commission and, in general, to be operated by persons who must also be licensed by the Commission. The grade of license which a radio operator must possess is determined by the type and complexity of the station and the extent to which the station's operations contribute to the safety of life and property. Radio operator requirements for certain "pushbutton" types of transmitters have been waived by the Commission.

Radio operator licenses are issued only to citizens of the United States. On June 10, 1954, the Commission proposed to deny commercial operator licenses to members of subversive groups (see chapter on "National Defense").

Operator Examinations

Radio-operator examinations are given quarterly, semiannually, or annually at 88 examintion points throughout the United States and its Territories. The locations and times of these examinations are published in a schedule obtainable from any of the district engineering field offices listed in the appendix to this report.

A decrease was noted in the number of amateur operator examinations given during the year. A total of 42,004 such examinations were conducted in 1954 as compared to 44,685 in 1953. (See section of the chapter on Safety and Special Radio Services which deals with amateurs.)

As of February 1, 1954, the Commission discontinued its special aircraft radiotelephone authorizations. Used by private fliers, this permit was instituted in 1946 when there was a postwar boom in aviation interest. As a convenience, it was issued by CAA flight examiners in the field. Equivalent operating authority is now covered by the restricted radiotelephone permit, the term of which was extended for life as of November 15, 1953.

On April 16, 1954, the Commission proposed to discontinue its temporary limited second-class radiotelegraph operator license. This class of license was established to meet the demand for radio operators during the Korean hostilities, but is no longer needed.

Commercial Radio Operator Authorizations

Commercial-operator authorizations exceeding 179,000 were issued in 1954 as compared to over 176,000 in 1953. This represents a slight increase, bringing the total of outstanding commercial licenses of all classes to more than 842,000 at the close of the year.

Comparative figures by grades of licenses follow:

Class	June 30, 1953	June 30, 1954	Increase or (decrease)
Radiotelegraph:			
1st class	5,477	5,628	151
2d class	9,694	9,538	(156)
3d class	1,930	1,992	62
Temporary limited: 2d class	644	641	(3)
Radiotelephone:			
1st class	47,221	49,602	2,381
2d class	30,297	29,540	(757)
3d class	13,218	18,027	4,809
Restricted radiotelephone operator permit	525,685	649,121	123,436
Aircraft radiotelephone operator authorizations	95,970	77,999	(17,971)
Total	730,136	842,088	111,952

No allowance made in these figures for decreased operators.

FIELD ENGINEERING PROJECTS

Activity involving field-intensity recording and record analysis to obtain propagation data was materially reduced during 1954. On an average, 20 recorders were operated as compared to 39 during the previous fiscal year.

Reduction in the number of VHF recorders was partially offset by increased emphasis on recording TV stations in the UHF bands. Special field-intensity surveys were conducted to obtain propagation data and to determine the effective service area of each of three UHF stations.

Field-intensity measurements were also made of industrial heaters, radio-frequency-stabilized arc welders, and various types of carrier-current systems to determine the extent of radiation and interference potentialities of such equipment; of emissions of marine coastal stations and certain long-range, low-frequency stations to determine their coverage capabilities; and of harmonic emissions of transmitters installed in commercial fishing vessels in connection with enforcement of the limitations on harmonic emissions.

Many field functions require the use of special equipment which is not commercially available, and such equipment must be developed and fabricated either by the Commission's field personnel or its laboratory. For example, the Field Engineering and Monitoring Bureau is required to fix the location of illegal radio transmitters and sources of interference to authorized services. This necessitates continuing development of new direction-finding equipment and improving the accuracy and efficiency of existing direction finders.

Considerable progress was made during the year by placing in service a new remote-controlled rotating adcock direction finder. Experience gained with this installation indicates that it represents a worthwhile improvement over the older equipment which it will eventually replace at other stations. The new direction finder combines the proven accuracy and operating features of the older device and makes use of a truly symmetrical all-metal housing for the remote equipment.

INDUSTRIAL, SCIENTIFIC, AND MEDICAL SERVICE

The beginning of the fiscal year marked the end of the period when older types of medical diathermy and industrial heating equipment could be operated without meeting the technical requirements of the Rules Governing Industrial, Scientific, and Medical Service (Part 18). However, it was apparent that much obsolete equipment continued in operation either because of a reluctance on the part of operators to spend money for new equipment or for conversion, or because they were unaware of the hazards to life and property that result from noncompliance.

The Commission inaugurated an extensive program to further publicize the necessity and importance of compliance. This accelerated the replacement of obsolete diathermy machines with type-approved equipment and efforts were intensified to acquaint users of old equipment with their interference potentialities.

Replacement of obsolete medical diathermy equipment is made in most instances by machines type approved by the Commission, rather than by machines certified by an engineer. In a few instances, doctors require the use of out-of-band frequencies or spark-type emissions, and since type approval is not applicable to out-of-band operation, these special kinds of equipment can meet the requirements of the rules only through certification.

Obsolete industrial-heating equipment is generally modified by shielding and filtering to comply with the rules rather than by being replaced with new equipment. Modification and conversion of heaters require planning, testing, and contracting for materials and professional services before the equipment can be certified. Consequently a longer time is required to bring a heater into compliance than is required to replace a diathermy machine with an FCC type-approved model.

In order to eliminate serious interference to military and other radio communication caused by industrial-heating equipment used in the manufacture of plastic products, it was necessary to issue nine show-cause orders. In all of these cases except two, the operators brought their offending equipment into compliance. In one of the two remaining cases, the operators had their equipment shielded but had not completed certification by the end of the year. In the other case, it was necessary for the Commission to obtain a Federal court injunction to enforce its cease-and-desist order. Although obliged to commence formal action in the aforementioned cases, the Commission has been successful in obtaining voluntary compliance in many cases.

The Commission delegated authority to the Chief of its Field Engineering and Monitoring Bureau on September 30, 1953, to require

operators of industrial, scientific, and medical equipment believed to be in violation of the rules to show cause why a cease-and-desist order should not be issued, and to issue, in certain cases, such orders. This greatly facilitated the enforcement of part 18.

Electric arc-welding devices using radio-frequency energy, manufactured prior to September 1, 1952, continued to be exempt from part 18 provided no interference results to authorized radio services. These older type welders were permitted to continue to be operated in order to give the welding industry additional time to develop equipment that can meet the technical requirements. Because radio-frequency-stabilized welders generally use spark-gap oscillators, and because long torch leads are employed, special problems are involved in designing equipment which will not cause interference.

Welders manufactured after September 1, 1952, are subject to the technical limitations and standards established for industrial heating equipment, with some exceptions, and require certification. In a number of instances the older types of welding equipment caused interference which resulted in complaints to FCC, but these situations were promptly corrected.

Because there was considerable confusion on the part of electrologists as to the rules governing epilators (hair-removal instruments utilizing radio-frequency energy), the Commission extended the final date of applicability of part 18 to June 30, 1954, for epilators manufactured before December 31, 1950, and to December 31, 1955, for epilators manufactured between December 31, 1950, and June 1954, provided interference is not caused to authorized radio services.

Inquiries indicate considerable interest in medical ultrasonic equipment. The Commission has proposed to classify ultrasonic equipment used for scientific, therapeutic, industrial, and other purposes as miscellaneous equipment under part 18 with conditions for type-approval to prevent interference. This kind of equipment generally operates at around 1000 kilocycles and on lower frequencies.

RESTRICTED RADIATION DEVICES

Reports from field offices indicate that there are thousands of electronic devices in use designed for operation under the rules governing restricted radiation devices (part 15). Among these are garage-door openers, burglar alarms, phonograph players, electronic "baby-sitters", intercommunication systems, also highway traffic, power and telephone line, and "college campus" carrier current systems. Field-intensity measurements indicate that college carrier current systems operating in the standard broadcast band tend to exceed the radiation limitations specified in part 15 in an endeavor to cover as large an area

as possible. Carrier current systems operating below 550 kilocycles caused no serious problem during the year.

There have been many inquiries, particularly from rural areas, as to what regulations apply to interference to broadcast reception caused by horizontal sweep circuit radiation from TV receivers and by electrical noise from high voltage power transmission lines. The Commission is seeking the cooperation of manufacturers to build TV receivers that have a minimum of radiation. With regard to radio interference by powerlines, the Commission invites cooperation in eliminating this kind of interference.

Many inquiries have also been received as to what regulations are applicable to the fast-growing TV "community antenna" systems. Though there is no transmission on the air, in many instances, because of improper design or operation, such cable systems radiate energy and interfere with nearby TV receivers. The Commission's efforts toward encouraging cooperation of community antenna operators to eliminate this interference have resulted in improvement, but many systems still cause trouble.

Rules applicable to community antenna systems, carrier-current systems, receiver oscillators, and the myriads of restricted and incidental-radiation devices are contained in proposed amendments to part 15 (docket 9288), released April 15, 1954.

ANTENNA OBSTRUCTION MARKINGS

The Communications Act stipulates that the Commission require painting and/or illumination of radio towers if and when in its judgment such towers do or may constitute a menace to air navigation. Pursuant to this stipulation, the Commission has rules concerning the construction, marking and lighting of antenna structures (part 17).

The Antenna Survey Branch in the Engineering Division administers part 17. Its primary functions are to apply the criteria set forth in subpart B of part 17 to proposals for new or modified antenna structures, to refer all antenna proposals that exceed these criteria to appropriate Regional Airspace Subcommittees (ASP) of the Air Coordinating Committee (ACC) for special aeronautical study by aviation interests outside the Commission, to approve antennas that do not exceed these criteria, and to prescribe, when necessary, obstruction markings for antenna towers.

Some TV-transmitting antennas exceed a thousand feet in height structurally; one new one (KWTV, Oklahoma City) rises 1,572 feet.

The number of antenna proposals processed by the Antenna Survey Branch for all services during fiscal 1954 increased approximately 500. Notwithstanding this increase, the number referred to ASP

for special aeronautical study decreased to less than 50 per month, a consequence of a reduction of approximately 40 percent in the number of TV tall-tower proposals. The quantity of referrals to ASP would have been larger but for a procedure mutually acceptable to the Commission and to the ASP, whereby an applicant may request an ASP Regional Subcommittee to make a preliminary aeronautical study of an antenna proposal prior to the filing of the application. The Commission takes cognizance of ASP preliminary recommendations which result from such direct requests.

During the year the Commission, through its membership on the Subcommittee on Aerodromes, Air Routes, and Ground Aids (AGA) of the Air Coordinating Committee (ACC), participated in drafting national standards on obstruction lighting and marking. Pursuant to these standards, the Commission amended part 17 to provide for markings other than standard painting and lighting for tall antenna towers where standard painting and lighting is considered inadequate to safeguard air navigation. An example of such markings is the "HAZ" symbols to be installed on the ground adjacent to the anchor foundations of the tower guy wires to designate the area encompassed by the guy wires.

Currently, a Government-industry ad hoc group, in which the Commission is participating, is set up under the ACC/AGA Subcommittee to determine if there is a requirement for amending existing standards on obstruction lighting and marking so as to make special provisions for tall structures and, in particular, guy-wire marking for tall guyed structures, and to recommend appropriate action if there is such a requirement. Concurrently, a technical group established by the same subcommittee has prepared a proposed national standard for determining obstructions to air navigation. This draft is now under consideration by the subcommittee.

Antenna Statistics

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

Services	Pending July 1, 1953	Received in ASB	Cleared by ASB	Pending June 30, 1954 [1]
Broadcast:				
AM	29	536	537	28
FM	7	124	131	0
TV	405	916	1,292	29
International	0	0	0	0
Experimental	0	1	1	0
Total broadcast	441	1,577	1,961	57
Safety and Special	255	5,357	5,453	159
Common Carrier	11	457	463	5
Total	707	7,391	7,877	221

[1] Totals in this column include totals shown in last column of the next table.

The number of proposals referred to the Airspace Subcommittee for special aeronautical study was:

Services	Pending at Airspace July 1, 1953	Sent to Airspace during year	Received from Airspace during year	Pending at Airspace June 30, 1954
Broadcast:				
AM	5	103	90	18
FM	0	6	6	0
TV	131	299	409	21
International	0	0	0	0
Experimental	0	0	0	0
Total broadcast	136	408	505	39
Safety and Special	14	128	124	18
Common Carrier	0	36	34	2
Total	150	572	663	59

Research and Laboratory

*"Study new uses for radio, provide for experimental uses of frequencies * * * "—(Sec. 303 (g) of the Communications Act).*

*"The Commission * * * shall keep itself informed * * * as to technical developments and improvements in wire and radio communication and radio transmission of energy to the end that the benefits of new inventions and developments may be made available to the people of the United States."—(Sec. 218 of the Communications Act).*

TECHNICAL RESEARCH DIVISION

General

The Technical Research Division deals with problems relating to technical standards, miscellaneous radio-frequency devices, wave propagation, experimental operations, equipment specifications and approval, and allied subjects. Technical information obtained from within the Commission, other Government sources, colleges and universities, and private industry is used in connection with its studies. The division maintains current lists of equipment approved for use by the various services, and administers the Experimental Radio Services.

Division personnel participated in Panel II of the Telecommunications Planning Committee, with the division chief being chairman of that panel. This panel is concerned with the coordination of development and application of new and improved systems of communication. Staff members serve on several panel committees in liaison between the Commission and other Government and private organizations.

Ground conductivity map.—From the work started last year, a new official ground conductivity map was completed. It has been incorporated in part 3 of the rules and a larger version may be purchased separately from the Superintendent of Documents, Government Printing Office (see list of publications in appendix). This large-scale map is being used extensively by consulting engineers and others in plotting the service areas of AM and other radio stations.

Sunspot cycle recording.—Information accumulated during a complete sunspot cycle in this field strength recording project has been useful to Commission studies of clear-channel and daytime-skywave interference problems. Nearly 11 years are required to complete a sunspot cycle. To determine whether variations in long-distance

propagation on AM broadcast frequencies are due entirely to sunspot activity, or in part to other natural phenomena, data covering at least two complete sunspot cycles for the same propagation paths are required. These recordings are being continued on a reduced scale at two FCC monitoring stations and the recorder charts are being stored for later analysis because of the pressure of more urgent work in connection with VHF and UHF propagation research.

Technical consultation and advice.—The amount of time devoted to technical problems encountered by other divisions of the Commission increases each year. This activity requires numerous staff conferences, participation in the work of Government and industry committees, attendance at hearings, and preparation of memoranda and formal reports. In some cases, the information and procedures developed in this work have been adopted by foreign administrations through conferences arranged by the United States.

Among technical subjects investigated and reported on during the fiscal year were the following:

Calculation of 0.5-millimho groundwave field intensity curves for the AM broadcast band.

Investigation of daytime skywave transmission in the AM broadcast band.

Investigation of the relationship between signal coverage, power, and transmitting antenna heights, utilizing latest available propagation data, for use in the development of TV rules and standards.

Preparation of new allocation curves concerning distance of TV transmitted from principal city in relation to antenna height and power.

Derivation of information showing distances to the "Grade A service contour" as related to transmitted power and antenna height for study of TV station overlap.

Investigation of skip distances and maximum usable frequencies for fixed services.

Study of frequencies from 2848 to 7640 kilocycles and participation in a related hearing.

Derivation of propagation data for consideration in connection with the shifting of aviation frequencies.

Government-industry propagation committees.—Several meetings were held of the Radio Propagation Advisory Committee, which was organized last year. This committee seeks to speed the resolution of new problems involving radio-wave propagation, particularly those concerning VHF and UHF television, and standards for measurement and frequency allocations. The committee is composed of engineers

from the Commission and other Government agencies, from the industry, and consulting engineers who practice before the Commission.

The division participated on various committees of URSI (International Scientific Radio Union), CCIR (International Radio Consultative Committee), and the Executive and Budget Committees for CRPL (Central Radio Propagation Laboratory), which are also concerned with propagation studies.

Field measurements of VHF and UHF propagation.—Many special studies have been made of the data previously obtained in a project financed by the Central Radio Propagation Laboratory of the National Bureau of Standards. This support was concluded in June 1953. However, new data have since been accumulated by FCC monitoring stations, but on a reduced scale, and close cooperation is being maintained with the CRPL. Effort is being made to obtain information regarding the nature of UHF propagation by recording the field strengths of new UHF television stations. The special types of antennas used yield results which do not appear to agree with those previously obtained with older types of antennas. There is urgent need for UHF propagation information based on actual measurements.

The division, under a contract with the Signal Corps of the Army, is also supervising a VHF field intensity recording and study program.

Special VHF–UHF propagation studies.—Special measurements, in a program which began several years ago, are being continued to obtain further information on certain aspects of VHF ionospheric transmissions. The project is now supported financially by the Department of Defense, which has enabled the Commission to increase this particular activity. New VHF and UHF television propagation curves are being prepared and the problem of predicting VHF and UHF field intensities over different types of terrain is being studied.

Experimental Radio Services

In encouraging radio experimentation and development, the Commission provides for the operation of experimental stations. During fiscal 1954 the rules governing these stations were amended so as to spread the work of renewing licenses throughout the 12-month period (part 5).

The rules provide for two classes of experimental stations, namely: Experimental (Research) stations and Experimental (Developmental) stations. Research stations are for the use of persons engaged in fundamental or general research, experimentation and developmental of radio in general; or for the development, testing, or calibration of radio equipment not relating to an existing service. Developmental stations are for the development of equipment, engineer-

ing data, or techniques for an existing or proposed radio service. Approximately 60 percent of the experimental authorizations are of the research type. However, during the past year the number of developmental stations increased 172 percent.

There are several subclasses of research stations. Those in greatest use are "contract developmental" and "export developmental" stations. The former classification includes stations for developing equipment or techniques under contract with various Federal agencies. The latter classification is for the development of equipment intended for export and eventual use in stations under foreign jurisdiction.

The majority of research stations are operated by manufacturers of equipment and by research and development organizations. These stations are engaged in evolving new equipment and improving existing equipment, perfecting new techniques, and fundamental studies of radio propagation or similar phenomena. Developmental work is being continued on narrow-band equipment which will effect a more efficient use of the radio spectrum. New and improved radio aids to navigation are being evolved, also radiolocation and microwave equipment.

Experimental work continues in ionospheric investigations and propagation studies on various frequency bands, particularly in the upper range where information is meager. Several experimental stations operate on frequencies above 30,000 megacycles, which space was previously considered unusable for radio purposes.

The Commission's rules provide for the experimental use of various bands of frequencies above 25,000 kilocycles, on condition that harmful interference is not caused to the services to which these frequencies are regularly assigned.

Research stations are used extensively by manufacturers and sales engineers for making field-intensity or coverage surveys in areas where it is proposed to establish radio systems. These surveys provide information useful in determining the operating frequency, power, and antenna location for best performance. Normally, a special temporary authorization is issued for each survey.

Applications for developmental stations (formerly known as class 2 experimental stations) include new uses of radio and types of operation not provided for in other parts of the rules. Hence, the experimental service is a proving ground for new radio equipment and techniques. Such developments as radar and microwave relay systems grew out of experimental authorizations.

Due to the rapid expansion of the radio and electronics industry and the ever-increasing number of companies entering the field, the number of experimental authorizations has increased rapidly over the past few years, as shown in the following table:

Class of experimental station	June 30, 1952	June 30, 1953	June 30, 1954	Percent increase in 2 years
Research	322	384	417	29
Developmental	47	60	169	259
Total	369	444	586	59

Control of Manmade Interference

One of the important problems facing the Commission is the control of manmade radio interference, as indicated by the interference complaints reported in the chapter of "Field Engineering and Monitoring". This interference comes from two general sources. First and most important are devices which generate radio-frequency for various noncommunication purposes, such as medical diathermy, industrial heating, scientific, and other apparatus. This energy is used at or very close to the point of its generation. Any energy that escapes as radiation represents a loss in the effectiveness of the apparatus. Moreover, it is this wasted energy that causes interference. Such radiation must be controlled to prevent disruption of radio communication.

Many of these devices employ power far in excess of the maximum (50 kilowatts) permitted AM broadcast stations, and their combined power exceeds the total transmitter power for all forms of radio communication. There have been cases where the energy emitted by apparatus of this type has skipped-jumped clear across the continent to bound up into the ether to disrupt communication for safety purposes thousands of miles away.

The other important source of manmade interference arises from the countless electrical devices and "gadgets" upon which we have become so dependent. Every switch that closes or opens an electric circuit is a potential source of interference. Every spark plug in every automobile can cause interference. Interference has even been traced to oscillations from the filament in an oldstyle electric light bulb.

Restricted radiation devices.—The Commission has long recognized that steps to prevent interference before it happens are more satisfactory than trying to seek out and eliminate the interference after it occurs and becomes widespread. As early as 1938, it formulated rules to govern the operation of certain low-power radio-frequency devices then used for remote control purposes. These rules provided, basically, that such devices could be operated without a license if the radiated field did not exceed a specified value. They were applied with a fair amount of success to other radio frequency devices which do not depend on radiation for their operation, such as carrier current sys-

tems, or which are capable of operating with extremely limited radiation, such as wireless microphones or garage door-openers.

Recognizing the inadequacy of the then existing rules, the Commission, in 1949, proposed broad administrative and engineering factors to be considered in controlling the interference hazard of millions of unlicensed radio-frequency generating devices. As a result of comments and study, the Commission, on April 15, 1954, proposed specific radiation limitations for devices subject to part 15 of the rules which govern restricted radiation devices.

Subpart A of this proposal sets forth a table of radiation limitations which varies with the frequency of operation. This table is applicable to all devices subject to this part unless specifically exempted. Subpart B contains provisions for devices that are exempt from the general requirement, chiefly carrier current systems, including campus broadcasting and community TV antenna systems. These exempted devices would require certification before they may be operated.

In order to establish a suitable limit for community TV antenna systems, the Commission made a detailed study of existing systems as well as the equipment used—particularly the different types of cables. This study dealt basically with the technical problems involved in establishing a system and stressed the radiation aspects.

The proposed rulemaking of April 1954 also looks to establishing a certification procedure for receivers that operate on frequencies above 25 megacycles, such as FM, TV, and most land mobile. This certification, made by the manufacturer or an independent laboratory, would assure the user that radiation from the certified receiver met the requirements of part 15.

Industrial, scientific, and medical devices.—Even in the early 1930's certain devices seriously interfered with long distances point-to-point, with ship-to-shore, and with other similar communication services. The chief offenders were identified as medical diathermy and industrial heating devices. As early as 1938 the Commission contacted the persons concerned in an effort to enable the diathermy and heating equipment to operate but, at the same time, eliminate or at least minimize the interference.

The outcome of these conferences was the adoption in 1947 of part 18 of the rules governing the Industrial, Scientific, and Medical Service. These rules provided several bands within which the diathermy and industrial heating equipment could operate with unlimited radiation without affecting radio communication, and imposed fairly stringent limitations on radiation on bands used by regular radio services.

Diathermy and miscellaneous equipment are type approved by the Commission through tests at the Commission's laboratory.

June 30, 1953, marked the end of the 6-year period provided for replacement of noncomplying equipment. During the fall of that year it was necessary to engage in an extensive educational campaign to secure the cooperation of manufacturer and user in complying with these requirements.

A new type of medical equipment came into the picture during the year when the Electro Medical Manufacturers Association petitioned the Commission to provide for type approval of medical ultrasonic apparatus. Ultrasonic equipment has been used in industry for some time for such purposes as agitating solutions while cleaning metal parts. Its use for medical purposes is new. Acting on the petition, the Commission initiated rulemaking to establish radiation limitations and to provide for type approval of ultrasonic devices.

While the diathermy problem was being dealt with, the Commission received a petition requesting an extension in the effective date of part 18 with respect to epilation (hair removing) equipment. The Commission granted the petition insofar as to permit the use of certain noncomplying equipments until December 31, 1955, with the proviso that any interference that may be caused will be promptly corrected.

One problem still confronting the Commission is the use of radio-frequency energy for stabilizing the arc when welding stainless steel or certain nonferrous metals, such as aluminum, in an inert gas atmosphere. These arc welders use spark-gap-type oscillators and, as a consequence, produce a broad range of interference. The Commission has successively postponed the effective date of part 18 as it pertains to such arc welding stabilizers, while working with industry to develop mutually satisfactory standards. In April 1954 the Commission joined with the Navy Department in an interference study of arc-welding equipment. This may point the way to a permanent solution of this problem, either by developing methods to meet the requirements of the rules or by establishing limits that can be met by arc welders.

Equipment performance standards.—Further progress was made in promulgating equipment performance standards for various classes of stations. The increasing occupancy of the radio spectrum has emphasized equipment performance which will minimize interference between stations. Other aspects which relate to safety and reliability were also considered in specifying equipment performance requirements. Proposed rules specifying spurious emission limitations were issued for international broadcast stations, and for ship radiotelegraph and radiotelephone stations.

These spurious emission requirements generally provide for relatively greater attenuation at higher levels of power output, with consideration given to an orderly schedule for compliance of existing equipment. The urgency of reducing harmful interference on 5476.5 kilocycles, an aeronautical mobile frequency, caused by ship stations operating on 2738 kilocycles led to a Commission order limiting use of the latter frequency to stations using equipment certified to have second harmonic (5476 kc) emission 40 decibels (0.01 percent) or more below the power on the fundamental frequency (2738 kc).

Equipment Type Approval and Type Acceptance

The "type approval" and "type acceptance" procedures are designed to assure that certain items of transmitting equipment meet the equipment performance standards for the class of station where it is used, and that interference from other radiating devices is minimized.

Type approval is based on tests made by the Laboratory Division. Type acceptance is based on test data submitted by the manufacturers and evaluated by the Technical Research Division. Lists of type-approved and type-accepted equipment are compiled by the latter. These lists show equipment acceptable for licensing in various services, thereby avoiding the necessity for review of the technical characteristics of equipment proposed in each application for license.

In addition to the type-acceptance and type-approval procedures previously adopted for AM and FM broadcast, citizens, and certain marine services, type-acceptance procedures were proposed for the domestic public, public safety, industrial and land transportation services, and the remainder of the marine service. Type approval was proposed for frequency and aural modulation monitoring equipment in the TV broadcast service.

Proposed amendments to the rules would provide the basis for more uniform treatment of type approval and type acceptance in the various services and for further expanded use of these procedures. Other proposed rules would type accept TV transmitters and change the nomenclature in AM and FM broadcast from type approval to type acceptance so as to be consistent with other services.

One list of equipment acceptable for licensing and three supplements were issued. The list was expanded to include equipment previously type approved or type accepted under parts 7, 8, and 19 of the rules.

The following tabulation summarizes the type-acceptance and type-approval activity, excluding equipment used for industrial, scientific, and medical purposes discussed previously:

	Type acceptance	Type approval	Specifications filed
Received	16	23	141
Issued	14	13	0
Pending	9	10	0

LABORATORY DIVISION

General

The Laboratory Division, which maintains a laboratory near Laurel, Md., makes technical measurements and studies essential to the Commission's engineering work, and tests certain types of equipment for compliance with service and noninterference functioning.

Exacting technical information is required as a basis for allocating frequency bands to the different radio services, establishing engineering standards for the individual services, and regulating the emissions of noncommunications equipment.

The laboratory studies, among other things, various methods of transmission and reception to determine their utility and interference factors; and the degrees of interference produced by radio-frequency energy employed by industrial, scientific, and other equipment.

It tests transmitters—to determine whether they give interfering signals on frequencies other than those assigned; receivers—to determine how close together stations may be located without interfering with one another and what interference one receiver may produce in other receivers; apparatus involving safety of life and property at sea—for reliability of operation; and frequency and modulation monitors—for accuracy.

Also, the laboratory develops special monitoring equipment used by Commission engineers in the field, and calibrates the signal generators, field intensity sets, and other apparatus used in field enforcement and investigation activities.

In endeavoring to anticipate interference problems and have remedial measures taken prior to the manufacture and distribution of a large number of units, the laboratory mainly tests types of proposed equipment rather than individual units already in use.

In addition to type tests required by the rules, the laboratory tests other equipment which may involve service and interference problems. Such testing often discloses shortcomings in the submitted apparatus not anticipated by the manufacturer. Making any needed change before quantity production is less expensive to the manufacturer than correcting a large number of units in actual operation.

Following are examples of particular activities of the laboratory during the year:

Broadcast

Laboratory work in the broadcast field largely concerned tests of receiver oscillator radiation and the various spurious responses of receivers, with especial attention to the impact of these problems on the implementation of the UHF television band. Studies were made of a number of proposed UHF tuners and receivers submitted by manufacturers.

In order to obtain propagation data for the UHF band, the laboratory made continuous field-intensity recordings of two UHF stations. Studies were made of the coverage of three UHF stations in Roanoke, Va., Reading, Pa., and Charleston, W. Va., by means of mobile field-strength-measuring equipment. Special UHF field-strength recording equipment was developed and furnished for installation in six monitoring stations for use in accumulating more UHF propagation data.

Work was begun on the development of TV monitoring techniques to be employed in a mobile TV monitoring unit of the Field Engineering and Monitoring Bureau.

The laboratory conducted tests on color TV receivers made available by four manufacturers to determine the susceptibility of the color system to interference, and to compare color set susceptibility with that of monochrome receivers. It was found that color TV will have a greater probability of interference than monochrome. This information was considered by the Commission in adopting color TV standards. The laboratory's technical findings were further made available to industry through the presentation of a paper at the 1954 spring television conference of the Institute of Radio Engineers.

Nonbroadcast

The laboratory was consulted in connection with the program of listing various classes of radio transmitters as being acceptable for licensing by the Commission, in order to determine the adequacy or accuracy of technical information supplied by the manufacturers in applying for listing.

Type-approval tests were conducted on a marine radiotelegraph auto alarm, 2 auto alarm keying devices, and 2 nonportable lifeboat transmitters, in addition to 2 marine radar equipments. This equipment is related to the safety of life and property at sea.

Tests for type approval were made on a number of devices using the citizens' radio band. These include three transmitters for use in automobiles, a transmitter intended for paging doctors in hospitals, and a portable "walkie-talkie" unit.

Noncommunication Equipment

The laboratory tests industrial, medical, diathermy, and other devices using radio-frequency energy which, as explained in sections of this report dealing with interference, can play havoc with regular radio services.

During the year, 36 diathermy machines were submitted for test, 2 of which operated in the 2450 megacycle band. In the same period, 12 diathermy machines and 16 kinds of miscellaneous equipment were type approved.

In the mutual Government-industry effort to reduce interference, the Laboratory Division is represented on the following committees: IRE Industrial Electronics Committee; AIEE Subcommittee on Induction and Dielectric Heating; AIEE Subcommittee on Radiation Measurements above 300 Megacycles; IRE Oscillator Radiation Subcommittee; ASA Technical Subcommittee No. 1 of Committee C63; and CCIR Study Groups.

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Frequency Allocation

*"Assign bands of frequencies to the various classes of stations * * * "—(Sec. 303 (c) of the Communications Act).*

" * * carry out * * * any international radio or wire communications treaty or convention * * * "—(Sec. 303 (r) of the Communications Act).*

GENERAL

The radio spectrum must be studied continuously so that channels can be allocated and used in conformity with advancements in electronics and rendition of maximum public service.

Portions of the spectrum have different characteristics. For that reason, one group of frequencies may be useful to a particular service but not to others. Consequently, bands must be allocated to those services for which they are most suitable. In some instances these bands have to be subdivided to serve more specific purposes.

Since radio transmissions extend beyond national boundaries, there must be cooperation by nations to minimize interference by stations of one country with those of other countries. Also, there must be international agreement on the designation of frequencies for the many radio services, and universal practice in their use. Since the United States is the world's largest user of radiocommunication facilities, international concord and coordination is essential to protecting our interests.

INTERNATIONAL FREQUENCY ALLOCATION

In the international radio field the Commission has been chiefly concerned with carrying out domestically the provisions of the Geneva Agreement (1951), to which some 65 countries are parties. Progress in this connection has been made for six principal radio services in the high-frequency spectrum as follows:

Aeronautical mobile (R) is the designation for frequencies used by the civil aviation industry for control and operation of aircraft on domestic and international routes. The R (route) designation includes stations on the ground and stations on board the aircraft.

Eighty percent of all of the aeronautical mobile (R) frequencies called for by the Geneva Agreement have been cleared for activation.

The prospect for additional clearances is encouraging. A year ago only 53 percent of the frequencies were available for aviation use.

Changeovers were completed during the year by all countries involved in the establishment of scheduled new communication systems for the North Atlantic (R) and European-Mediterranean (R) areas. Aviation communication in these areas has been improved substantially as a result.

Similarly, a communication plan identified as Atlantic-Middle East Meteorological Broadcast has been placed in effect with a resulting improvement in quality of service for transmission of essential weather information.

In the Caribbean area, all (R) plan frequencies in which civil aviation has an interest have been cleared of conflicting assignments and are available for use by the aviation industry as required.

Aeronautical mobile (R) plans for the North, Central, and South Pacific areas are being studied with a view toward placing them in effect during fiscal 1955. When this is done it will represent substantial completion of all such plans internationally agreed upon. Domestically, there are 64 frequencies available for assignment in the aeronautical mobile (R) service. Of these, 51 were clear of conflicting assignments at the close of the year.

Aeronautical mobile (OR) is the designation for frequencies used primarily for Government aeronautical operations. The Commission does not at this time license any stations in the aeronautical mobile (OR) (off route) service but it does recognize the importance of clearing these bands for use at the earliest possible date. A year ago, 29 of 41 conflicting assignments had been cleared. At the close of fiscal 1954, all but two conflicting assignments had been cleared, and these two are scheduled for deletion by December 1, 1954.

Amateur service.—All adjustments in the frequency allocations for the amateur service envisaged by the Atlantic City conference were completed in early 1952. No additional action is required of the United States with respect to amateur frequencies.

Fixed service.—The fixed service presents a serious frequency problem. This service is allocated more spectrum space between 4 and 25 megacycles under the Atlantic City allocation table than all the other services combined. It represents our major use of the high-frequency spectrum.

Fixed stations provide rapid communication by telegraph, telephone, facsimile, radiophoto, and other transmissions to most of the principal countries. Yet there is no international plan of time and frequency sharing for this vital radio service, nor will there be until agreement is reached by the various countries on the International Frequency List. Drafts of this list are being prepared by

the International Frequency Registration Board (IFRB), based on the in-band fixed-service occupancy now developing as the result of the Geneva Agreement procedures.

Of the 166 assignments in the fixed service which were out-of-band with respect to the Atlantic City allocations, all have been deleted or replacement frequencies have been found and the remaining few are planned for deletion not later than December 1, 1954.

Completion of the fixed-service adjustments represents the end of the most complex reassignment program ever undertaken by the Commission. It could not have been achieved without the cooperation of the licensees and Federal agencies using frequencies in this part of the spectrum. It is a significant achievement because the adjustments have been made without the necessity of holding hearings on modification or cancellation of licenses. Making the necessary adjustments has occasioned some hardship and financial sacrifice on the part of the Commission's fixed-service licensees, but that is their contribution to overall service benefits.

HF broadcast service.—All high-frequency broadcast stations licensed by the Commission are now assigned frequencies within the Atlantic City broadcast bands.

However, the Geneva Agreement provides that the IFRB adjust the Mexico City basic plan and the draft plans prepared by the Technical Plan Committee at Paris, and prepare such additional plans as are considered necessary to deal with seasons and phases of solar activity. These plans have not yet been completed by the IFRB. The various countries will have to reach agreement on precise frequencies and hours for high-frequency broadcast operation. At the present time there is no international channeling of the high-frequency broadcast bands and no specifications as to hours of their use.

Although some constructive steps can be taken, it does not appear that an international plan for use of frequencies for HF broadcasting which would be acceptable to the United States can be placed in effect so long as Russian jamming of United States HF broadcasts continues.

Maritime mobile service.—The Atlantic City radio regulations provide the maritime mobile service with exclusive bands for each of four classes of stations—ship telephone, ship telegraph, coast telephone, and coast telegraph.

The Geneva Agreement anticipates the introduction of the ship telegraph bands in successive steps as follows: Calling bands, cargo working bands, and passenger working bands. Introduction of these three subbands at 4, 6, 8, 12, and 16 megacycles, in the order listed, is to be followed by the introduction of the Atlantic City ship telephone bands. The Commission has completed all of the frequency changes envisaged by the Geneva Agreement for the entire spectrum between 20 and

27.5 megacycles. The Geneva Agreement anticipates the introduction of coast telegraph and coast telephone assignments, one at a time, as clearances can be effected.

Use of the Atlantic City ship telegraph calling bands was introduced on September 1, 1953, as scheduled. However, the next phase of adjustment, introduction of the Atlantic City cargo-ship working bands, had to be postponed from March 1, 1954, to July 1, 1954. These bands (4187–4238, 6280.5–6357, 8374–8476, 12561–12714, 16748–16952, and 22270–22400 kilocycles) were activated successfully on the latter date. Most countries have completed similar action and cargo ships now are able to operate with comparatively little interference from stations in other services.

The Commission has not yet completed its part of the third phase of the adjustment, namely, clearance of the passenger-ship working bands for ship telegraph stations. Appropriate announcements will be made as these clearances occur, and the shipping industry and affected licensees will be kept advised in a manner similar to that employed for the clearance and introduction of the ship calling bands and the cargo ship working bands. The target date for opening of the passenger-ship working bands is January 1, 1955.

As regards coast telegraph stations, there are 127 assignments to be activated between 4 and 20 megacycles and 22 coast telegraph assignments in the 22-megacycle band, making a total of 149 assignments between 4 and 27.5 megacycles. By the year end, 136 of these (91 percent) had been cleared for activation and the licensees notified. Additional clearances are being arranged on a continuing basis and affected licensees are being kept informed.

In the matter of maritime mobile telephone service for public correspondence, a substantial portion of the frequency adjustments resulting from the Geneva Agreement has been made and this service to ships is now provided on 85 percent of the planned ship assignments and 81 percent of the planned coast assignments.

NATIONAL FREQUENCY ALLOCATION

Commission actions during the past year concerning the allocation of frequencies on a national scale were directly or closely related to carrying out the international commitments of the United States.

Some of the major domestic frequency allocation actions were:

Following an extensive survey of high-frequency radiotelephone communication on the Mississippi River system, frequency adjustments were made to minimize out-of-band operations.

Held a hearing on the proposed deletion of certain high frequencies presently available to stations in the Fixed Public Agricultural service.

Amended part 8 of the rules to prohibit use of 2738 kilocycles by

vessels unable to restrict their harmonic radiation below a specified level to protect the activation of aeronautical mobile frequencies.

Proposed to amend part 2 of the rules to permit non-Government radiolocation stations (used principally for radiopositioning and radiosurveying) to use frequencies in the 10–14- and 90–110-kilocycle bands if no harmful interference is caused to radionavigation stations operating in the same bands.

The Commission also began a comprehensive study of the effect on existing allocations which can be expected to result from exploitation of certain new techniques of radiocommunication involving the VHF and UHF portions of the spectrum.

The Commission completed about 80,000 individual studies of frequency assignments proposed in that portion of the spectrum which is used jointly by Government agencies and Commission licensees. The majority of these studies resulted directly or indirectly from steps taken to implement the Atlantic City frequency allocations. As a result, 18,000 formal actions were taken jointly by the Commission and the Frequency Assignment Sub-Committee (FAS) of the Interdepartment Radio Advisory Committee. In addition, some 2,400 separate frequency studies were made and coordination effected for applications filed under the Commission's rules governing the Experimental Radio Services.

Approximately 300 cases of interference between Government and non-Government stations were reported during the year. They were resolved by interfering users agreeing to share time or by one or both shifting frequency.

The Commission participated in approximately 200 Government interagency meetings relative to formulation of domestic frequency policy, frequency-management and frequency-assignment problems.

INTERNATIONAL FREQUENCY COORDINATION

In connection with Commission activities concerned with the world-wide program for bringing into force the Atlantic City allocation table, some 33 foreign administrations were contacted to determine their plans for moving to in-band frequencies some 221 of their active assignments which were operating out of band. Similarly a few administrations requested information relating to the change in frequency of Commission-licensed stations operating out of band. This international contact is pursuant to the Geneva Agreement which prescribes the methods and procedures for implementing the Atlantic City regulations.

Most of the assignments which were the source of conflicts have been cleared. Nearly a thousand letters, telegrams, and radiograms were exchanged between the Commission and foreign administrations in this cooperative effort.

The exchange of technical data concerning proposed frequency assignments in portions of the VHF and UHF spectrum continued between the Commission and the Canadian Department of Transport. This procedure, announced in 1950, permits an effective exchange of engineering comments on proposed United States and Canadian assignments in border areas. Its effectiveness is demonstrated by the fact that no insoluble case of harmful interference exists between stations of the two countries in these portions of the spectrum. Approximately 600 letters on this subject were exchanged.

During the year approximately 43,000 fanfolds (records of frequency assignments giving particulars designed to assure protection of United States interests) were forwarded to the International Frequency Registration Board. They related to assignments to United States stations between 14 kilocycles and 76 megacycles, of which approximately 23,000 fanfolds involved assignments between 14 kilocycles and 27,500 kilocycles. Most of the latter dealt with changes in assignments of existing stations required in implementing the Atlantic City allocation table.

Additionally, machine records (IBM) were processed for every frequency assignment made by the Commission throughout the year, regardless of the part of the spectrum involved. In printed form, this record runs to three volumes and contains approximately 115,000 entries. The IRFB reported approximately 85 unsatisfactory findings relative to United States stations due to prior cochannel or adjacent frequency registration by another country. These were resolved through coordination with the users.

INTERNATIONAL INTERFERENCE AND INFRACTION

One of the fundamental responsibilities of the Commission in carrying out the radio provisions of treaties is to take action in cases of complaints of interference involving a domestic licensee and a foreign station. During the year, approximately 300 instances of reported harmful interference came to the Commission's attention, either from foreign sources or from domestic stations, most of which were resolved satisfactorily. In general, an international interference case is much more difficult of solution than a comparable situation involving United States stations.

Approximately 600 cases of infractions of international radio agreements by foreign stations and by foreign radio operators, which are detected by the Commission's monitoring and inspection activities, were screened and reported to appropriate foreign administrations. Most of these involved spurious emissions, harmonic radiations, off-frequency operation, or some other technically improper operation, all of which constitute sources of harmful interference to radio com-

munication or involve the safety of life and property afloat and in the air.

INTERNATIONAL CONFERENCES AND MEETINGS

The Commission assisted in the United States preparation for and participation in 13 international conferences and meetings during the year. These were worldwide, regional, or bilateral in nature. Most of the major conferences were convened under the auspices of the International Telecommunication Union (ITU) or the International Civil Aviation Organization (ICAO). Approximately 90 nations participate in the activities of the ITU and some 62 participate in the activities of the ICAO.

The Commission furnished 3 delegation chairmen or vice chairmen and 15 representatives to the following 8 conferences and meetings:

Name	Place	Date
United States-Mexico Bilateral Meeting on Frequency Implementation Problems.	Mexico City	Aug. 18, 1953.
CCIR Plenary Meeting—7th Session	London	Sept. 1–Oct. 9, 1953.
United States-Mexico Informal Meeting on Standard Broadcasting.	Washington	Mar. 29–Apr. 2, 1954.
United States-Canada Meeting on Frequency Problems Relative to Implementing EARC Agreement.	Ottawa	Apr. 12–13, 1954.
ICAO Communications Division—5th Session	Montreal	Mar. 9–Apr. 9, 1954.
United States-Cuba Meeting on CONELRAD	Havana	Apr. 21–23, 1954.
ICAO Special Middle East Regional Communications Meeting.	Rhodes	May 11–29, 1954.
CCIT Study Group XI—International Telegraph Problems.	Geneva	June 30, 1954.

In addition, the Commission engaged in preparatory or followup work directly connected with these 5 conferences and meetings:

Name	Place	Date
United States-Venezuela Discussions Concerning Frequency Implementation Problems.	Washington	August 1953.
URSI Technical Meeting	Ottawa	Oct. 5–8, 1953.
United States-Canada Informal Discussion on Civil Aviation.	Washington	Dec. 12–14, 1953.
ITU Administrative Council—9th Session	Geneva	May 1–29, 1954.
ICAO Assembly—8th Session	Montreal	June 1, 1954.

The following 25 conferences and meetings are projected for the future:

Name	Place	Date
ICAO Informal South American Communications Meeting	Lima	July 1954.
URSI—11th General Assembly	Amsterdam	Aug. 23, 1954.
CCIF—General Switching Program	Geneva	Sept. 1–5, 1954.
CCIR—Study Group IX	do	*Sept. 10–23, 1954.*
2d International Congress on Communications	Undetermined	October 1954.
United States-Mexico Meeting on Standard Broadcast	Mexico City	Do.
CCIF—XVII Plenary Assembly	Geneva	Oct. 4–12, 1954.
United States-Libyan Arrangement To Resolve Frequency Problems.	Undetermined	1954.
ICAO—Air Navigation Conference 2d Session	Montreal	Fall 1954.
ICAO—North Atlantic Regional Air Navigation Meeting—3d Session.	do	Do.
United States-Bahama Meeting on CONELRAD	Undetermined	1954.
United States-Bermuda Meeting on CONELRAD	do	1954.
United States-Canada Meeting on CONELRAD	do	1954.
United States-Haiti Meeting on CONELRAD	do	1954.
United States-Jamaica Meeting on CONELRAD	do	1954.
United States-Mexico Meeting on CONELRAD	do	1954.
ITU Administrative Council—10th Session	Geneva	Apr. 23, 1955.
ICAO—Search and Rescue Division	Montreal	1955.
ICAO—Personnel Licensing Division—5th Session	do	1955.
5th Plenipotentiary Inter-American Telecommunications Conference.	Rio de Janeiro	1955.
CCIR—8th Meeting	Undetermined	1955.
ICAO—North Pacific Regional Air Navigation Meeting	do	1956.
ICAO—South Pacific Regional Air Navigation Meeting	do	1956.
ITU International Telegraph and Telephone Conference	Geneva	1956.
CCIT—8th Plenary Assembly	do	1956.

Appendix

FIELD OFFICES

The Commission maintains 61 field offices. Fifty-seven of these constitute the major force of the Field Engineering and Monitoring Bureau, and the other four are accounting offices of the Common Carrier Bureau.

The field engineering offices consist of 7 regional offices, 24 district offices with 6 suboffices and 2 ship offices, and 18 monitoring stations—10 primary and 8 secondary.

A list of all Commission field offices follows:

FIELD ENGINEERING AND MONITORING BUREAU

Regional Offices	*Headquarters*
Region 1	954 Federal Bldg., New York 14, N. Y.
Region 2	411 Federal Annex, Atlanta 3, Ga.
Region 3	323–A Customhouse, San Francisco 26, Calif.
Region 4	802 Federal Office Bldg., Seattle 4, Wash.
Region 5	P. O. Box 1142, Lanikai, Oahu, T. H.
Region 6	832 U. S. Courthouse, Chicago 4, Ill.
Region 7	1029 New Federal Bldg., Detroit 26, Mich.

District Offices	*Address*
1	1600 Customhouse, Boston 9, Mass.
2	748 Federal Bldg., New York 14, N. Y.
3	1005 New U. S. Customhouse, Philadelphia 6, Pa.
4	500 McCawley Bldg., Baltimore 2, Md.
5	402 Federal Bldg., Norfolk 10, Va.; (ship office) 200 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.
10	500 U. S. Terminal Annex Bldg., Dallas 22, 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.

District Offices	*Address*
13	433 New U. S. Courthouse, Portland 5, Oreg.
14	802 Federal Office Bldg., Seattle 4, Wash.
15	521 New Customhouse, Denver 2, Colo.
16	208 Uptown Post Office and Federal Courts Bldg., St. Paul 2, Minn.
17	3100 Federal Office Bldg., Kansas City 6E, Mo.
18	826 U. S. Courthouse, Chicago 4, Ill.
19	1029 New Federal Bldg., Detroit 26, Mich.
20	328 Post Office Bldg., Buffalo 3, N. Y.
21	502 Federal Bldg., Honolulu 1, T. H.
22	322–323 Federal Bldg., San Juan 13, P. R.
23	53 U. S. Post Office and Courthouse Bldg., Anchorage, Alaska; (suboffice) 7–8 Shattuck Bldg., Juneau, Alaska.
24	Briggs Bldg., 22d & E Sts., NW., 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.	Chillicothe, Ohio
Laurel, Md.	Muskogee, Okla.
Livermore, Calif.	Anchorage, Alaska
Portland, Oreg.	Fairbanks, Alaska
Powder Springs, Ga.	
Lanikai, Oahu, T. H.	

COMMON CARRIER BUREAU FIELD OFFICES

Atlanta, Ga., 733 Hurt Bldg.
New York, N. Y., 90 Church St.
St. Louis, Mo., 815 Olive St.
San Francisco, Calif., 180 New Montgomery St.

PUBLICATIONS

The Commission's printed publications are sold by the Superintendent of Documents, Government Printing Office, Washington 25, D. C., and are not distributed by the Commission.

A purchaser of any part of the rules and regulations is furnished with a form by the Superintendent of Documents which, when filled out and forwarded to the Commission, entitles him to receive any subsequent changes or amendments to the part purchased until a complete revision is printed.

A list of printed publications available from the Superintendent of Documents follows:

Title	*Price*
Communications Act of 1934, with Amendments and Index, revised to May 1954	$0.70
Amendments *only* from January 1954 to May 1954	.15

Title	*Price*
Federal Communications Commission reports (bound volumes of decisions and reports exclusive of annual reports):	
Volume 5, November 16, 1937, to June 30, 1938	$1.50
Volume 6, July 1, 1938, to February 28, 1939	1.50
Volume 8, March 1, 1940, to August 1, 1941	1.50
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	.40
Nineteenth Annual Report—Fiscal year 1953	.50
Twentieth Annual Report—Fiscal year 1954	.50
Statistics of the communications industry:	
For the year 1943	.35
For the year 1945	.50
For the year 1946	.55
For the year 1947	.75
For the year 1948:	
Sections A and B	1.00
Section B—Broadcast only	.35
For the year 1949, Sections A and B	1.00
For the year 1950 (Common Carrier only)	.50
For the year 1951 (Common Carrier only)	.40
For the year 1952 (Common Carrier only)	.50
Report on Public Service Responsibility of Broadcast Licensees (Blue Book), 1946	.40
An Economic Study of Standard Broadcasting, 1947	.40
Study Guide and Reference Material for Commercial Radio Operator Examinations	(2)
Digest of Radio Regulations and Instructions for Restricted Radiotelephone Operators	.05
Standards of Good Engineering Practice Concerning Standard Broadcast Stations, revised to October 30, 1947	1.25
Figure M3, Estimated Ground Conductivity in the United States—set of 2 maps	3.50
Rules and Regulations:	
Part 0, Organization, Delegation of Authority, etc	(1)
Part 1, Practice and Procedure	(2)
Part 2, Frequency Allocations and Radio Treaty Matters; General Rules and Regulations, revised to July 30, 1952	.25
Part 3, Radio Broadcast Services, revised to June 30, 1953 (includes FM and TV engineering standards)	.50
Part 4, Experimental and Auxiliary Broadcast Services, revised to October 30, 1950	.15
Part 5, Experimental Radio Services, revised to March 17, 1953	.10
Part 6, Public Radiocommunications Services, revised to April 27, 1949	.10

See footnotes at end of table.

Title	*Price*
Rules and Regulations—Continued	
Part 7, Stations on Land in the Maritime Services, revised to July 20, 1954	$0.25
Part 8, Stations on Shipboard in the Maritime Services, revised to July 20, 1954	.35
Part 9, Aviation Services, revised to July 14, 1953	.10
Part 10, Public Safety Radio Services, revised to December 18, 1953	.15
Part 11, Industrial Radio Services, revised to July 29, 1953	.15
Part 12, Amateur Radio Service, revised to November 20, 1953	.20
Part 13, Commercial Radio Operators, revised to June 27, 1950	.05
Part 14, Radio Stations in Alaska (other than Amateur and Broadcast), revised to November 20, 1953	.05
Part 15, Restricted Radiation Devices, recodified to July 21, 1948	[2]
Part 16, Land Transportation Radio Services, revised to January 7, 1953	.10
Part 17, Construction, Marking, and Lighting of Antenna Structures, revised to June 3, 1953	.05
Part 18, Industrial, Scientific and Medical Service, revised to September 4, 1953	.10
Part 19, Citizens Radio Service	[2]
Part 20, Disaster Communications Service, effective March 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 October 14, 1949	.20
Part 35, Uniform System of Accounts for Wire-Telegraph and Ocean-Cable Carriers, revised to October 14, 1949	.25
Part 41, Telegraph and Telephone Franks, revised to December 4, 1947	.05
Part 43, Reports of Communication Common Carriers and Their Affiliates, revised to September 21, 1953	.05
Part 45, Preservation of Records of Telephone Carriers, effective October 1, 1950	.10
Part 46, Preservation of Records of Wire-Telegraph, Ocean-Cable and Radiotelegraph Carriers, effective October 1, 1950	.10
Part 51, Occupational Classification and Compensation of Employees of Class A and Class B Telephone Companies, effective October 10, 1951	.05
Part 52, Classification of Wire-Telegraph Employees, effective July 11, 1944	[2]
Part 61, Tariffs, Rules Governing the Construction, Filing, and Posting of Schedules of Charges for Interstate and Foreign Communications Service, revised to August 1, 1946	.10
Part 62, Applications Under Section 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 December 30, 1946	[3]
Part 64, Miscellaneous Rules Relating to Common Carriers, revised to July 16, 1948	.10

[1] In the process of printing—available at Government Printing Office at a later date.
[2] Being revised—not available at present.
[3] Obtainable temporarily from the Federal Communications Commission without charge.

The Commission is unable to furnish lists of radio stations but, upon request, will supply a fact sheet about commercial sources of such lists, also one on communications publications and services.

Also available from the Commission are the following nonprinted information primers concerning the FCC and its various fields of activity:

"An ABC of the FCC."
"A Short History of Electrical Communication."
"Regulation of Wire and Radio Communication."
"Radio Broadcast Primer."
"Safety and Special Radio Services Primer."
"Common Carrier Primer."
"Use of Broadcast Facilities by Candidates for Public Office."

Though none of these can be supplied in quantity, a single copy of any of the above-listed subjects may be obtained upon individual request to the "Secretary, Federal Communications Commission, Washington 25, D. C."

TREATIES AND OTHER INTERNATIONAL AGREEMENTS

For informational purposes, the applicable Federal laws, international treaties, agreements, and arrangements in force relating to radio, and to which the United States is a party, are here listed. Under "Series", the abbreviation "T. S." means Treaty Series; "E. A. S.", Executive Agreement Series; and "TIAS", Treaties and Other International Acts Series.

Unless otherwise indicated, copies of these documents may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Date	Series	Subject
1910		Ship Act of 1910, as amended July 23, 1912, relating to radiocommunication for ships navigating the Great Lakes. (Not available at the Government Printing Office.)
1925	T. S. 724-A	Arrangements with Great Britain, Canada, and Newfoundland for the prevention of radio interference by ships. Entered into force Oct. 1, 1925. (Not available at the Government Printing Office.)
1928 and 1929	T. S. 767-A	*Arrangements with Canada governing radio communication* between private experimental stations. Entered into force Jan. 1, 1929.
1929	T. S. 777-A	Arrangement with Canada, Cuba, and Newfoundland relating to assignment of high frequencies on the North American continent. Entered into force Mar. 1, 1929. Cuba ceased to be a party on Oct. 5, 1933. Arrangement still in force with respect to the others. (Not available at the Government Printing Office.)
1934		Communications Act of 1934.
1934	E. A. S. 62	Arrangement with Canada relative to radio communication between private experimental stations and between amateur stations. Entered into force May 4, 1934. (Not available at the Government Printing Office.)
1934	E. A. S. 66	Arrangement with Peru concerning radio communication between amateur stations on behalf of third parties. Entered into force May 23, 1934.
1934	E. A. S. 72	Arrangement with Chile relative to radio communication between amateur stations on behalf of third parties. Entered into force Aug. 17, 1934.
1937	E. A. S. 109	Agreement with Canada relating to the exchange of information concerning issuance of radio licenses. Largely superseded by notification procedure established in NARBA (T. S. 777-A, T. S. 962, E. A. S. 227, and TIAS 1553) and Inter-American Radio Communications Convention (T. S. 938). (Not available at the Government Printing Office.)

Date	Series	Subject
1937	T. S. 938	Inter-American Radio Communications Convention between the United States and other powers. Signed Dec. 13, 1937 (First Inter-American Conference). (Not available at the Government Printing Office.)
1937	T. S. 962	North American Regional Broadcast Agreement (NARBA) between the United States, Cuba, Dominican Republic, Haiti, and Mexico. Signed Dec. 13, 1937. E. A. S. 227 and TIAS 1553 supplement this agreement. (Not available at the Government Printing Office.)
1938	T. S. 949	Regional Radio Convention between the United States (in behalf of the Canal Zone) and other powers. Signed Dec. 8, 1938. (Not available at the Government Printing Office.)
1938	E. A. S. 136	Arrangement with Canada relative to broadcasting. Effected by exchange of notes signed Oct. 28, and Dec. 10, 1938. (Not available at the Government Printing Office.)
1938	E. A. S. 142	Agreement with Canada concerning radio communication. Effected by exchange of notes signed in June–Dec. 1938.
1939	E. A. S. 143	Arrangement with Canada concerning use of radio for civil aeronautical services. Effected by exchange of notes signed Feb. 20, 1939. (Not available at the Government Printing Office.)
1940	E. A. S. 196	Agreement with Mexico regarding broadcasting. Entered into force Mar. 29, 1941. (Not available at the Government Printing Office.)
1941	E. A. S. 227	Supplementary North American Regional Broadcasting Agreement signed Jan. 30, 1941. Entered into force Mar. 29, 1941. (See T. S. 962 and TIAS 1553.) (Not available at the Government Printing Office.)
1944	E. A. S. 400	Agreement with Canada regarding broadcasting stations in Northwestern Canada. Effected by exchange of notes signed Nov. 5 and 25, 1943, and Jan. 17, 1944. Agreement to "cease with termination of war". (Not available at the Government Printing Office.)
1946	TIAS 1527	Agreement with the U. S. S. R. on commercial radio teletype communication channels. Entered into force May 24, 1946.
1946	TIAS 1553	North American Regional Broadcasting Interim Agreement (Modus Vivendi). Entered into force Mar. 29, 1946. (See T. S. 962 and E. A. S. 227.) Amended by an arrangement between the United States and Canada concerning engineering standards.
1947	TIAS 1652	Agreement with the United Kingdom of Great Britain and Northern Ireland concerning standardization of distance measuring equipment. Entered into force Oct. 13, 1947.
1947	TIAS 1670	Interim arrangement with Canada with respect to mobile radio stations. Entered into force Aug. 20, 1947.
1947	TIAS 1676	Agreement with the United Nations. Entered into force Nov. 21, 1947. Its provisions were also made Public Law 357, 80th Cong., approved Aug. 4, 1947.
1947	TIAS 1726	Agreement with Canada concerning frequency modulation broadcasting. Entered into force Oct. 15, 1947. (Not available at the Government Printing Office.)
1947	TIAS 1901	International Telecommunication Convention, Final Protocol and Radio Regulations. Signed at Atlantic City, Oct. 2, 1947, superseding International Telecommunication Convention, Madrid, 1932. Radio regulations entered into force Jan. 1, 1949. The effective date for effecting art. 47 has been superseded by the agreement signed at the Extraordinary Administrative Radio Conference, Geneva, 1951. (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 Conference, which include the additional radio regulations, are available only from the International Telecommunication Union, Geneva, Switzerland.)
1948	TIAS 1802	Arrangement with Canada concerning broadcasting engineering standards. Entered into force Apr. 1, 1948. (Not available at the Government Printing Office.)
1948	TIAS 2495	International Convention for the Safety of Life at Sea and Annexed Regulations. Entered into force Nov. 19, 1952.
1949	TIAS 1995	Agreement with Mexico concerning weather stations cooperative program. Entered into force Oct. 20, 1949.
1949	TIAS 2175	Telegraph Regulations (Paris Revision, 1949), annexed to the International Telecommunication Convention (Atlantic City, 1947) and Final Protocol to the Telegraph Regulations. Entered into force with respect to the United States Sept. 26, 1950. (Not available at the Government Printing Office.)
1949	TIAS 2435	Agreement with certain British Commonwealth Governments regarding telecommunications. Entered into force Feb. 24, 1950.
1949	TIAS 2489	Inter-American Radio Agreement with Canada and other American republics. (Fourth Inter-American Radio Conference.) Entered into force Apr. 13, 1952.
1950	TIAS 2433	Arrangement with Ecuador concerning radio communication between amateur stations on behalf of third parties. Entered into force Mar. 17, 1950.
1951	TIAS 2223	Agreement with Liberia regarding radio communication between amateur stations on behalf of third parties. Entered into force Jan. 11, 1951.
1951	TIAS 2259	Agreement with Ceylon concerning the use of facilities of Radio Ceylon. Entered into force May 14, 1951.
1951	TIAS 2366	Agreement with Mexico concerning television frequency channel assignments within 250 miles of the border. Entered into force Sept. 26, 1951. (TIAS 2654, an amendment, entered into force June 25, 1952.)
1951	TIAS 2459	Agreement with Cuba concerning control of electromagnetic radiation. Entered into force Dec. 18, 1951.

Date	Series	Subject
1951	TIAS 2753	Agreement signed at the Extraordinary Administrative Radio Conference to effect the table of frequency allocations and other provisions of the radio regulations (Atlantic City, 1947). Entered into force Mar. 1, 1952. (Available only from the International Telecommunication Union, Geneva, Switzerland.)
1952	TIAS 2508	Treaty with Canada relating to mutual recognition of certain radio station and operator licenses issued in either country. Entered into force May 15, 1952.
1952	TIAS 2520	Agreement with Cuba regarding radio communication between amateur stations on behalf of third parties. Entered into force Feb. 27, 1952.
1952	TIAS 2548	Agreement with Denmark regarding registration of frequencies used in Greenland by United States authorities. Entered into force Apr. 4, 1952.
1952	TIAS 2594	Agreement with Canada concerning assignment of television frequency channels within 250 miles of the border. Entered into force June 23, 1952. (Not available at the Government Printing Office.)
1952	TIAS 2654	Amendment to TIAS 2366. Amends the agreement with Mexico on the allocation of television channels along the border. Must be used with TIAS 2654 as TIAS 2654 is an amendment only. Entered into force June 25, 1952.
1952		Communications Act of 1934, as amended by Public Law 554, 82d Cong., approved July 16, 1952.
1952	TIAS 2695	Agreement with Mexico concerning weather stations cooperative program. Extends the agreement of 1949. Entered into force Aug. 22, 1952, retroactive to July 1, 1951.
1952	TIAS 2701	Agreement with Haiti regarding short range aid to navigation. Entered into force Aug. 29, 1952.
1952	TIAS 2705	Revision of the London Telecommunication Agreement (1949) between the United States and Canada and certain British Commonwealth Governments. Entered into force Oct. 1, 1952. (Not available at the Government Printing Office.)

In addition, the United States is bound by certain treaties and agreements which are generally considered as superseded because some 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 these particular countries. These include the following:

Date	Series	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, D. C., Nov. 25, 1927.
1932	T. S. 867	International Telecommunication Convention, General Radio Regulations annexed to the International Telecommunication Convention. Signed at Madrid Dec. 9, 1932. (Not available at the Government Office.)
1937	E. A. S. 200	Inter-American Arrangement concerning Radiocommunications and Annex. Signed at Habana Dec. 13, 1937. This arrangement was replaced by the 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: 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 the 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 of America, Canada, and Other American Republics. (Second Inter-American Radio Conference.) Signed at Santiago Jan. 26, 1940.

The following treaties, agreements, and arrangements have been signed by the United States and are included for informational purposes because of their importance, or for the imminence of their effective dates:

Date	Series	Subject
1950		New North American Regional Broadcasting Agreement. Subject to ratification procedure in the United States. (Available only from the Department of State Telecommunications Policy Staff, Washington 25, D. C.)
1952	TIAS 2666	Agreement with Canada promoting safety on the Great Lakes by means of radio. Applies to vessels of all countries. Enters into force Nov. 13, 1954.
1952		Buenos Aires International Telecommunication Convention. A revision of the Atlantic City Convention of 1947. Subject to ratification procedure in the United States. (Available only from the International Telecommunication Union, Geneva, Switzerland.)

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 [available only from the Secretary General of ICAO, International Aviation Building, 1080 University St., Montreal, Canada]:

Date	Series	Subject
1944	TIAS 1591	International Civil Aviation Convention. Signed at Chicago, Dec. 7, 1944. Entered into force April 4, 1947.
1946 to present		ICAO Regional Air Navigation Meetings, Communications Committee Final Reports.
1946		ICAO Communication Division, 2d Session, Montreal.
1949		ICAO Communication Division, 3d Session, Montreal.
1951		ICAO Communication Division, 4th Session, Montreal.
1954		ICAO Communication Division, 5th Session, Montreal.

PAST AND PRESENT COMMISSIONERS

Past and present members of the Federal Communications Commission, and their terms of service, are listed below:

Commissioners	*Terms of service*
*Eugene O. Sykes	July 11, 1934–Apr. 5, 1939
Thad H. Brown	July 11, 1934–June 30, 1940
*Paul A. Walker	July 11, 1934–June 30, 1953
Norman S. Case	July 11, 1934–June 30, 1945
Irvin Stewart	July 11, 1934–June 30, 1937
George Henry Payne	July 11, 1934–June 30, 1943
Hampson Gary	July 11, 1934–Dec. 24, 1934
*Anning S. Prall	Jan. 17, 1935–July 23, 1937
T. A. M. Craven	Aug. 25, 1937–June 30, 1944
*Frank R. McNinch	Oct. 1, 1937–Sept. 1, 1939
Frederick I. Thompson	Apr. 13, 1939–June 30, 1941
*James Lawrence Fly	Sept. 1, 1939–Nov. 13, 1944
Ray C. Wakefield	Mar. 22, 1941–June 30, 1947
Clifford J. Durr	Nov. 1, 1941–June 30, 1948
**Ewell K. Jett	Feb. 15, 1944–Dec. 31, 1947
*Paul A. Porter	Dec. 21, 1944–Feb. 25, 1946
*Charles R. Denny	Mar. 30, 1945–Oct. 31, 1947
William H. Wills	July 23, 1945–Mar. 6, 1946

See footnotes at end of table.

Commissioners	*Terms of service*
*Rosel H. Hyde	Apr. 17, 1946–
Edward M. Webster	Apr. 10, 1947–
Robert F. Jones	Sept. 5, 1947–Sept. 19, 1952
*Wayne Coy	Dec. 29, 1947–Feb. 21, 1952
George E. Sterling	Jan. 2, 1948–Sept. 30, 1954
Frieda B. Hennock	July 6, 1948–
Robert T. Bartley	Mar. 6, 1952–
Eugene H. Merrill	Oct. 6, 1952–Apr. 14, 1953
John C. Doerfer	Apr. 15, 1953–
Robert E. Lee	Oct. 6, 1953–
*George C. McConnaughey	Oct. 4, 1954–

*Served as Chairman.
**Served as Interim Chairman.

As of its 20th anniversary, four of the then commissioners were associated with the original Commission. Chairman Hyde transferred from the Federal Radio Commission as an attorney. Commissioner Webster who, as a lieutenant commander in the Coast Guard was a member of the interdepartmental committee which recommended unification of electrical communication regulation, joined the Commission as a member of its engineering staff. Commissioner Sterling came from the Federal Radio Commission as an engineer. Commissioner Bartley was director of the Commission's first Telegraph Division.

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