TELECOMMUNICATIONS

Economics and Regulation

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PREFACE

"Telecommunication; Any telegraph or telephone communication of signs, signals, writings, images, and sounds of any nature, by wire, radio, or other systems or processes of electric or visual (semaphore) signaling."

This term, derived from the Latin word *communicare*, "to communicate," and the Greek root *tele*, meaning "at a distance," was officially brought into the world at the communication conference of Madrid in 1932. The word and its definition were given legal standing in this country when the United States ratified the Madrid Telecommunication Convention and the General Radio Regulations annexed thereto on May 19, 1934.

The authors in presenting this study of American communications do so with the hope that, although much of the material presented is part of the background and experience of the present-day communication executive, its collection in a single volume will serve to unify and clarify the subject as a whole.

In the development of national economy and in the maintenance of highly complex modes of living, telecommunications have come to play an increasingly important role. Electrical communication systems are now indispensable to the normal conduct of business, to the maintenance of social intercourse, and to national security. These facts are generally appreciated only when the systems are impaired or when some flood or other disaster destroys them. However, new technical developments and new services have done much to arouse public interest in the adequacy and the efficiency of the communication services.

Little attention has been paid previously to the telecommunication services in the literature on the public industries. Most textbooks dealing with the economics and regulation of public utilities devote some attention to the telephone service, but few so much as mention the telegraph, cable, and radio services. This is explained, at least in part, by the fact that the older treatises dealt with utilities, except transportation, which were conceived to be essentially local in character, whereas communication

systems are national or international in scope. Developments which have taken place in the gas and electric utilities, however, have rendered inadequate any purely local approach to the problems of these industries and have forced governmental authorities to assume a broader perspective, which is reflected in the recent literature. Out of it has developed a marked tendency to regard public utility problems from national as well as local viewpoints.

In presenting this volume the authors are appealing to an aroused interest in the communication utilities on the part of those concerned with them from other than technical or engineering viewpoints. The technical aspects of telecommunications are adequately treated in a voluminous literature; the present book deals almost wholly with the economic and public-service aspects of the telecommunication industries. Its central purpose is the evaluation of existing regulatory legislation and machinery in the light of the requirements of sound national policy, and to this end there is presented a fairly comprehensive factual background.

The first four chapters deal with the development of the industries, showing how the services have been adapted to communication needs. These are followed by four chapters on the economics of these industries, dealing with the sources of revenues and the principal factors affecting costs, those affecting the construction of communication rate structures, and the extent of combination in the communication utilities and the factors responsible for it. The remainder of the book is concerned with regulation, presenting the background of Federal regulation of communications before 1934, and an analysis of the Communications Act of 1934. A chapter is devoted to state regulation of communications, since under our dual system of government the intrastate operations of communication companies are subject to the jurisdiction of the state, and effective regulation requires adequate cooperation between state and Federal bodies. The final chapter brings together the various threads of the discussion in an attempt to evaluate what has been done, and what has been left undone, toward the establishment of a sound body of laws and regulations governing telecommunications. The problems involved in the regulation of radio broadcasting are dealt with at considerable length because of the peculiar nature of the public interest in

this service, and a general lack of understanding of the issues involved.

The documentation throughout indicates the sources from which the materials have been derived, but the authors assume full responsibility for the use made of such materials and the interpretation placed upon them. The opinions expressed, except where otherwise noted, represent in all respects the personal views of the authors. They are not presented as the official views of the Federal Communications Commission, nor of any other body with which either of the authors may be associated.

Grateful acknowledgment is made for the help given by the Faculty Research Committee of the University of Pennsylvania, and to the authors' associates, who have collaborated willingly over a period of several years spent in research and in gathering the material contained herein.

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CHAPTER I

GROWTH AND DEVELOPMENT OF THE TELEGRAPH INDUSTRY

The business of sending messages by telegraph had its beginning in the United States with the invention of the first successful magnetic telegraph by Samuel F. B. Morse. His invention was first applied to the transmission of intelligence for the public by the United States Government when, as the result of a Congressional appropriation, a line was built between Washington and Baltimore over which the first public message was sent in 1844. The superintendence of the operation of this line was placed under the Postmaster General, and the proceeds were directed to be placed in the Treasury of the United States for the benefit of the Post Office Department. The close relationship between the postal and the telegraph services was early recognized, and there was considerable sentiment for the retention of control of the telegraph service as a permanent part of the postal service. However, the line between Washington and Baltimore was not self-supporting, and appropriations for its maintenance were made grudgingly by Congress. In 1847, it was sold to private interests.

A period of wildcat development followed. Promoters with rosy dreams of the possibilities of the telegraph organized companies in many sections of the United States for its exploitation, many of them being merely stock-selling enterprises. By 1851, there were 50 telegraph companies operating, most of them licensed by owners of the Morse patents, although a few used other devices, some of which later were adjudged to be infringements. One of the other devices was the House printing telegraph which transmitted messages by printing in plain Roman letters instead of dots and dashes. Lines to utilize the House system between New York and Boston and between New York and Philadelphia were built prior to 1850. In 1851, a group of

men, among whom were Hiram Sibley, Ezra Cornell, Samuel L. Selden and Henry R. Selden, acquired rights to extend the House system throughout the United States and incorporated for this purpose the New York and Mississippi Valley Printing Telegraph Company.

This company constructed a line from Buffalo to Louisville, Ky., but did not extend it to Saint Louis, as planned, because of a lack of funds. It went into debt during the first three years but continued to carry on and, in 1854, purchased the Lake Erie Telegraph Company with lines from Buffalo to Detroit and Cleveland to Pittsburgh. In spite of its difficulties, the new company was in better condition than most of its contemporaries. Thirteen other companies operated in the five states north of the Ohio River, experiencing the disadvantages of duplicated and inharmonious management, disordered rates, and slow and unreliable service. Several of these became insolvent, and the principal owners of certain others approached the New York and Mississippi Valley Company with offers of sale. A consolidation was effected in 1856, under the name of the Western Union Telegraph Company.

The Western Union Company grew rapidly. It was relatively free of competition, and it was in a position to eliminate wasteful duplication among its constituent companies. Moreover, it was free to use the simpler and more economical Morse devices. In 1861, this company built the first telegraph line to the Pacific Coast; and in 1866, it absorbed the two other large companies in the United States—the American Telegraph Company and the United States Telegraph Company. By this time, its wire mileage had grown from the original 550 miles to 75,686 miles, and it had 2,250 offices.

Of considerable significance to the Western Union was the development of news service. Long before 1870, there had developed the system of collecting and distributing news by press associations, the principal one being the Associated Press. Agents of this association would transmit their local news and market reports to the central office in New York and at the same time to points in the immediate vicinities interested in such news. The central office would give the news to the New York papers composing the association and would retransmit it to subscribing papers after it had been assorted with a view to the tastes and interests of the reading public in each particular section, together

with New York and foreign items. For example, full reports of Congressional proceedings were sent each day to the New York office of the Associated Press, where they were boiled down and retransmitted to other cities according to local tastes and interests. By 1870, the Western Union was transmitting nearly all the news published in the United States. It had an exclusive contract with the Associated Press and similar contracts with other press associations. In 1869, the aggregate amount of news delivered to the newspapers of the United States by Western Union lines was 369,503,630 words, for which it received $883,509.[1]

Besides its contracts with the press associations, the Western Union secured contracts with practically all of the important railroads of the United States. This arrangement with the railroads was a mutually beneficial one. The railroads obtained a dispatching service, and the telegraph company right of ways for lines as well as offices.

The Western Union was not alone in the telegraph business, but that it had early taken a position of dominance is shown in a report of the United States Bureau of Census for the year 1880. For this year, the Bureau received reports from 77 companies. Eighteen of these were owned by railroad companies, and the rest, except the Western Union, were very small. Forty companies operated 104,526 miles of the aggregate 110,727 miles of telegraph line then in operation. The Western Union system embraced 77.35 per cent of the total miles of line, 80.19 per cent of the miles of wire, and 72.56 per cent of the total number of stations or offices. It carried 92.15 per cent of the telegraph messages sent during that year and received 88.81 per cent of the gross revenues from messages.[2]

Competition had not disappeared from the telegraph industry, however. Within the next decade or so, the Western Union experienced competition of a very severe sort. The increasing demand for telegraph service which led to increased earnings by the Western Union, the disposition to exploit new devices, and purely speculative motives brought about the establishment of many new telegraph companies, competing with each other and with the Western Union. Of another sort, however, were the motives that led to the establishment during this period

[1] Postal Telegraph in the United States, *H. Rep.* 114, 41st Cong., 2d Sess.
[2] Report of the Bureau of Census, 1880.

of the Postal Telegraph system, which soon became, and is today, the chief competitor of the Western Union.

John W. Mackay and James Gordon Bennett had organized the Commercial Cable Company and had completed the laying of two cables in the Atlantic Ocean. Realizing that the success of a cable system is dependent upon land services to other points than those touched by the cables, these men saw that either they must depend upon the Western Union for collection and delivery services within the United States—in which case they were not in a position to bargain for a favorable contract, since the Western Union was also engaged in the cable business—or they must build their own land telegraph system. They chose the latter alternative. Mr. Mackay came into control of the original Postal Telegraph Company, which had gone into receivership, and which owned only a few hundred miles of scattered telegraph lines. With it as a nucleus he began immediately to construct lines and to purchase others which had become insolvent. The property and franchises of the Michigan Postal Telegraph Company were purchased and also a line between Pittsburgh, Cincinnati, and Indianapolis. Later, the lines of the Pacific Mutual Telegraph Company, the Board of Trade Telegraph Company, the Pacific Telegraph Company, and others were acquired. In 1897, to secure control of these telegraph properties for all time in order to protect its cable interests, the Commercial Cable Company acquired all the Postal Telegraph companies throughout the United States.[1]

Meanwhile the telegraph was beginning to feel the effect of the competition of the growing telephone business. The telegraph companies lost most of the short-distance communication business and, with the development of long-distance telephone communication, found themselves in competition with the telephone companies in this field. In the decade 1900 to 1910, while the population of the United States increased 17.8 per cent, the average daily telephone connections of the Bell System increased 287 per cent, whereas the annual number of telegraph messages increased only 18 per cent.[2]

[1] Statement of C. H. Mackay, Hearings on S. 6, 71st Cong., 2d Sess., Part 13, pp. 1665–1667.

[2] Government Ownership of Electrical Means of Communication, letter of Postmaster General, *Sen. Doc.* 399, 63d Cong., 2d Sess., 1914.

In 1909, the American Telephone and Telegraph Company acquired a substantial interest in the Western Union, and the two companies entered into a contractual relationship providing for the joint use of plant and operating facilities. The next year, Theodore N. Vail became president of both companies. The reasons given for this interrelationship were many. The two services, it was said, were supplementary, not competitive, and through the joint use of facilities the cost of furnishing both services could be reduced materially. However, the coordinated service proposed in this combination, whatever its claimed advantages, was regarded generally as a combination that would restrain competition and would result in a monopoly of wire communications, and this feeling, at a time when monopolies were considered inimical to the public interest, was sufficient to prejudice the combination in the eyes of the public. Moreover, it was opposed by the Postal Telegraph Company as prejudicial to its interests. The matter came to the attention of the Department of Justice, and, in 1913, after three years of association, under an understanding with that Department, the American Telephone and Telegraph Company agreed to dispose of its holdings of Western Union stock.

Telegraph development during the past two decades has been marked by many improvements in plant and technique. One of the principal developments has been the introduction of automatic machine operation. As has been seen, the company from which the Western Union grew started out to develop the use of the House printing telegraph, but development instead proceeded along the lines of the simpler Morse devices. In 1872, duplex operation of telegraph wires, by which two messages, one in each direction, could be sent simultaneously, was put into practice in the United States, and, in 1874, Thomas A. Edison developed a quadruplex system for the Western Union which enabled the sending of four messages over one wire simultaneously—two in each direction. In 1883, a high-speed system, recording Morse dots and dashes on paper tape, was installed between New York and Chicago and rapidly extended between other large centers. In the same year, the first complete and workable multiplex telegraph, by which a number of messages can be sent over one wire at the same time, was produced. In 1900, printing telegraph machines were placed in use which were

improved in 1904; and in 1912, engineers of the Western Union and the Western Electric Company jointly developed a multiplex system which was installed on most of the trunk lines of the Western Union by 1915.

The automatic multiplex telegraph permits the transmission of as many as eight messages simultaneously over one wire, four in each direction, at high speed. Such messages are written by operators using keyboards similar to those of typewriters. As the keys of the instruments are struck, holes are punched in a narrow moving paper tape. Letters of the alphabet and other characters are represented by combinations of five holes in the tape. The tapes pass through transmitters, and the impulses caused by electrical contacts controlled by the holes in the tapes flash out over the wire. Upon reaching the other end of the wire, the impulses are translated back into characters and printed on tapes which the operators gum to message blanks. Four sending and four receiving machines may be attached to each end of a wire connecting two cities. By means of an automatic control device, the sending and receiving operators can instantly signal to each other, should it become necessary during the transmission of a message. In 1922, Western Union engineers developed an important modification of the multiplex system by which several cities can be connected to one wire, and any one of them operated with each of the others. This method enabled a further extension of the multiplex system, with resultant economies in plant and improvement in service.

The multiplex system is not capable of superseding the key transmission of a scattered business to many points on a local line; but on trunk lines where there is a concentration of business between large cities and over long distances, the increased message capacity of wires resulting from its introduction is of immense economic importance. The installation of multiplex apparatus on the main lines of the Western Union at an outlay of about $6,000,000 saved the company an expenditure of many times that amount for wire plant which would have been required to handle the increased traffic.[1]

Another development in machine operation of great practical significance is that of the keyboard printer. This is a compact machine, a trifle larger than an ordinary typewriter. It is

[1] Annual report of the Western Union Telegraph Co., 1930, p. 6.

operated from a keyboard similar to a typewriter keyboard, but unlike the multiplex which employs a perforated tape for transmission, it sends signals direct over the telegraph line to a similar printer at the other end of the wire. The message is printed on a tape and is gummed to a message blank for delivery. Significant in connection with the development of this printer is that many of them have been installed in the offices of customers of the telegraph companies. The printer in the customer's office is connected directly with a similar machine in the city telegraph terminal. Messages are sent back and forth, making deliveries between the two points practically instantaneous. This, in effect, provides a telegraph office on the premises of every patron in which a printer telegraph is installed. In 1926, engineers of the Western Union developed and placed in successful operation a system whereby news dispatches may be simultaneously and speedily transmitted over long circuits to numerous connected stations, each equipped with printing apparatus.

In 1931, the Western Union and Postal Telegraph companies combined to introduce a new form of telegraph service based upon printer apparatus, called timed-wire service. This new service is adapted to lengthy messages, the rates being graduated according to distance and based upon the amount of time consumed in transmission, rather than upon the number of words. The printers had already been installed and were still available for their former uses, thus entailing no additional investment by the telegraph companies. Through coordination of the printer facilities of the two companies and the publication of a common directory of printer patrons, this timed-wire service was made available to over 8,000 patrons.[1] This arrangement between the telegraph companies has been terminated but timed-wire service is furnished by the companies separately.

As a result of these mechanical inventions, the bulk of the telegraph business has changed from manual to machine operation. At present, about 90 per cent of the telegraph traffic is handled by machines, and the number of Morse operators has been considerably reduced. As a consequence of the fact that more than 80 per cent of its business was handled by machines, the Western Union employed only 75 per cent as many operators in 1930 as it employed in 1910, when almost 90 per cent of its

[1] *Ibid.*, 1931, p. 6.

business was handled manually, even though the number of messages had more than doubled.

Another important technical development is that of the "telegraph carrier" system. The "carrier" is a device through the use of which additional circuits are superimposed and made available for the simultaneous transmission of additional messages on existing wires. A carrier developed by the International Communications Laboratories has been successfully operated between New York and Washington by the Postal Company, which has increased the carrying capacity of the four wires on which it was installed between these two points so that 68 messages can be sent simultaneously, as against only 24 formerly.

In 1928, both the Western Union and the Postal entered into important contracts with the American Telephone and Telegraph Company whereby they may obtain from the latter company telegraph facilities over its lines. These contracts contemplate the avoidance, in so far as practicable, of the duplication of outside plant through the use by each party, at agreed rates, of the facilities of the other; the combination of facilities for a photogram and telephotograph service; and the use of certain patented apparatus which provides several telegraph circuits from a single pair of telegraph wires. The American Telephone and Telegraph Company at present controls the manufacture of printing telegraph equipment through its control of the Teletype Corporation, which is operated as a subsidiary of the Western Electric Company, the manufacturing subsidiary of the Bell System. The Teletype Corporation is successor to the Morkrum-Kleinschmidt Corporation, incorporated in 1924, as a consolidation of the Morkrum Company of Chicago and the Kleinschmidt Electric Company of Long Island. It manufactures also high-speed stock-quotation tickers and stock-quotation display boards.

These improvements have so increased the capacity of the telegraph plant that it is capable of handling much more than the present volume of traffic. Other improvements of great significance have been made, which testify to the efficiency of management. Stronger and better pole lines have been built; underground cables have been substituted for aerial lines in congested centers; copper wire has been substituted for iron on many of the circuits; and extensive pneumatic-tube systems connecting main and branch offices have been installed in all the

larger cities. For the Western Union alone, additions and betterments to the plant during the twenty years ended with 1931 aggregated $193,335,000.[1]

The American Telephone and Telegraph Company also engages in the telegraph business in competition with the telegraph companies. While it does practically no commercial message telegraph business, it furnishes a large mileage of telegraph circuits for the private use of individuals, institutions, and governmental departments. In 1929, at the peak of the development, it had in operation over 1,200,000 miles of such circuits. One-third of this amount was used by newspapers and press associations, and the greater part of the remainder by commercial and financial organizations. The extent and importance of this service can well be illustrated by a few examples: Under one special contract to a press association the American Telephone Company leased it 53 circuits totaling 74,400 circuit miles; to one brokerage company it leased 30 circuits, totaling 22,800 miles, with 95 stations.

In the past, the greater part of these circuits were handled by Morse operators; but at present, teletypewriters (keyboard printers) have been applied to about one-third of the mileage. The telegraph circuits originally were obtained as a by-product of the telephone business by compositing or otherwise superimposing them on telephone wires, using direct current for the telegraph circuits. In 1929, about two-thirds were obtained in this way, and the other third by the use of "carrier-current" methods. The carrier-current system on open wires uses frequencies above the voice range and provides 10 duplex telegraph circuits on each pair of wires. The carrier-current system used on cable circuits employs frequencies within the voice range, the currents being transmitted over an ordinary telephone four-wire circuit. This system gives 12 duplex telegraph circuits on each such circuit.[2]

A recent development makes possible further extension of the teletypewriter service of the American Telephone Company through the perfection of a teletypewriter switchboard by the Bell Telephone Laboratories. A teletypewriter subscriber may now be connected with any other such subscriber, whether a

[1] *Ibid.*, 1931, p. 5.

[2] *Cf.* GHERARDI and JEWETT, "Telephone Communication System of the United States," American Telephone and Telegraph Co., pp. 68–71, 1929.

few feet or thousands of miles away. Communication is two-way; that is, both machines can send and receive on the same connection, making inquiry and reply possible. Connections over this system are established for periods as short as minutes. This service is in competition with the timed-wire service of the telegraph companies.

In conjunction with the telegraph companies, who were accredited agents for pickup and delivery, the American Telephone Company formerly furnished a telephotograph service for the transmission of photographs and facsimiles by wire. This service was inaugurated in 1925 between the cities of New York, Chicago, and San Francisco. Later, it was extended to Boston, Cleveland, Atlanta, Saint Louis, and Los Angeles. It has been used by newspapers for the transmission of photographs and by businessmen for the transmission of legal documents, advertising material, and styles. It has been used also for the sending of greetings in the handwriting of the sender and for the transmission of fingerprints of criminals, but facsimile transmission has never realized the hopes of its sponsors. Slowness and cost are the chief handicaps. At its annual meeting in April, 1934, the members of the Associated Press approved the establishment of an Associated Press telephotograph system for such members as should desire the rapid transmission of news pictures. Under this plan, the Associated Press purchases the machines from the American Telephone and Telegraph Company and operates the service itself on a leased-wire basis.

Besides the regular telegraph-message service and the leased-wire services, the telegraph companies have developed a number of supplementary services. These include (1) market quotations and reports, baseball and other news furnished by messenger, private wire or ticker; (2) money-order service; (3) messenger service, at offices where messengers are employed, for the delivery of notes, packages, samples, advertising matter, etc., on a distance or hourly basis, at rates depending on local conditions; (4) photogram service, covering the facsimile transmission by wire of pictures and messages; (5) marine service, including reports of sighting and arrival of incoming steamships; (6) air express and freight services, for handling packages with messenger pickup and delivery door to door; (7) travel-check service, the Western Union handling American Express Company checks and the

Postal handling American Bankers Association checks; (8) the handling of aircraft, bus, and theater tickets; and other miscellaneous services.

The modern stock ticker dates from an invention of E. A. Calahan, introduced in 1867. The ticker has been improved by successive inventions until high-speed tickers capable of printing 500 characters a minute have been placed in operation. "Express" tickers also have been introduced which carry full quotations so long as they can do so without falling behind the market; but when market activity causes the tickers to fall behind, the express tickers begin to omit from their tapes the less active stocks, so that quotations of the more active stocks are printed without delay.

Statistical Summary.—The most complete statistics of telegraph operations within the United States are those furnished by the Bureau of Census, which, beginning in 1902, has made a quinquennial census of the telegraph industry. Some selected statistics from the census reports are presented in Table 1. These statistics cover both telegraph and cable operations, however, since separate financial statistics are not available owing to the fact that the Western Union does not segregate the financial data for its cable business.

The only census of the telegraph industry prior to 1902 was taken in 1880. At this time, 77 telegraph companies, most of them small, reported to the Census Bureau, the bulk of the business, as has been seen, being carried on by the Western Union. Thirteen of the companies reported deficits for 1880. Altogether, the companies reported 110,727 miles of telegraph line, 291,213 miles of wire, and 12,510 telegraph offices. In 1880, they transmitted 31,703,181 messages, for which they received revenues amounting to $13,512,116. By 1902, the miles of pole line had more than doubled, the miles of wire had increased almost fivefold, the number of messages had almost tripled, the number of offices had doubled, and the income from telegraph traffic had increased almost threefold. A significant development during this period was the reduction in the number of companies from 77 to 25, reflecting the degree to which consolidations had been effected by the larger companies.

The volume of telegraphic communication increased considerably from 1902 to 1927, the number of telegraph and cable messages

TABLE 1.—COMBINED SUMMARY, LAND AND OCEAN CABLE TELEGRAPH SYSTEMS
(1902–1932)

	1902	1907	1912	1917	1922	1927	1932
Number of companies or systems	25	27	28	28	25	25	23
Miles of pole line[1]	237,990	239,646	247,528	241,128	252,991	256,809	256,661
Miles of single wire owned and leased[2]	1,318,350	1,557,961	1,814,196	1,890,245	1,853,250	2,145,897	2,266,054
Nautical miles of ocean cable	16,677	46,301	67,676	71,251	76,711	99,074	96,468
Number of messages	91,655,287	103,794,076	109,377,698	158,176,456	191,121,333	229,582,433	158,377,660
Number of telegraph offices	27,377	29,110	30,864	28,940	27,354	27,666	26,034
Income, total	$ 40,930,038	$ 51,583,868	$ 64,762,843	$109,703,428	$151,858,086	$182,997,698	$114,655,696
Telegraph traffic	$ 35,300,569	$ 45,255,187	$ 60,403,009	$106,989,743	$146,805,215	$177,589,096	
All other sources	$ 5,629,469	$ 6,328,681	$ 4,359,834	$ 2,713,685	$ 5,052,871	$ 5,408,602	
Expenses, total	$ 30,948,034	$ 41,879,613	$ 58,378,952	$ 91,871,159	$127,990,615	$159,153,244	
General operation and maintenance[3]	$ 24,455,511	$ 34,057,298	$ 46,780,041	$ 74,934,753	$113,139,825	$141,986,544	
Interest and taxes	$ 2,539,008	$ 3,436,690	$ 3,955,381	$ 7,981,786	$ 10,195,036	$ 11,838,520	
All other expenses[4]	$ 3,953,515	$ 4,385,625	$ 7,643,530	$ 8,954,620	$ 4,665,754	$ 5,328,180	
Investment in plant and equipment	$161,679,579	$210,045,959	$222,046,746	$243,358,432	$326,661,860	$426,698,742	$506,445,426
Number of employees	27,627	28,034	44,811	64,723	68,632	81,498	66,723
Salaries and wages	$ 15,039,673	$ 17,808,249	$ 24,964,994	$ 43,764,201	$ 76,161,926	$ 99,520,357	$ 73,948,923

[1] Exclusive of pole line owned and operated wholly by railway companies.
[2] Exclusive of wire owned and operated wholly by railway companies.
[3] Includes salaries and wages and legal expenses; also charges for depreciation for the years 1912 and 1917.
[4] Includes payments for use of leased lines: 1917, 1922, and 1927.
Source: Bureau of Census.

increasing 150 per cent, and the revenues from telegraph traffic, which include revenues from the private leased lines, about 403 per cent. From 1927 to 1932, however, owing to the depression, the number of messages decreased 31 per cent, and the revenues from telegraph traffic about 37 per cent. In 1929, the telegraph and cable companies carried the greatest volume of communications of any year in their history, but the years since then have seen serious declines in the volume of business and revenues from telegraph traffic. In 1931, the total of all land-line telegraph revenues for the United States declined 16 per cent from the total in 1930, the total for 1931 being 24 per cent below the peak in 1929.[1] In 1932, operating revenues of the Western Union (including both land lines and cables) fell to $83,014,000, a decline of 23.7 per cent from those of 1931 and of 43 per cent from those of 1929. The operating revenues of this company reached their lowest ebb for the depression in the early months of 1933; but during the last half of the year, owing to the improvement in general business, the downward trend was checked, and the earnings were 8 per cent greater than those for the corresponding period of the preceding year. The total revenues for 1933 were only slightly less than those for 1932. Similar trends are noted in the revenues of the Postal Telegraph system. Revenues for all companies declined 37.3 per cent from 1927 to 1932. In 1934, gross operating revenues of the Western Union increased 6 per cent over 1933, and land-line telegraph revenues of the Postal about 1.4 per cent.

The physical plant of the telegraph companies has undergone marked changes since 1902. Miles of pole line increased only 8 per cent—from 237,990 miles in 1902 to 256,809 miles in 1927—with a decline to 256,661 miles in 1932, although miles of single wire owned and leased increased about 72 per cent. An outstanding fact, which reflects the significance of technical discoveries and inventions, is that although wire mileage increased only about 18 per cent from 1912 to 1927, the number of messages handled more than doubled. The peak in the number of telegraph offices was reached in 1912, with 30,864 offices opened to the public. This number had declined to 26,034 in 1932. The decline in the number of telegraph offices, like the decline in miles of pole line from 1912 to 1917 and the decline in wire mileage

[1] Annual report of the Postal Telegraph and Cable Corp., 1931, p. 5.

from 1917 to 1922, has been due principally to the fact that many of the offices which were located in railroad stations, where train dispatching as well as public telegraph business was carried on, were converted to strictly railroad offices, and the public telegraph service abandoned.

Significant is the rapid increase in investment in plant and equipment which has taken place since 1917, an increase of about 108 per cent between 1917 and 1932. This reflects, for the most part, the cost of converting the telegraph plant from manual to machine operation, since wire mileage increased only about 20 per cent during this period. Machine telegraphy has saved in operating expense, but it has added materially to fixed charges. Other changes which have added to the investment are the substitution of copper for iron wire and the construction of land-line cables. About 75 per cent of the total land-line wire mileage of the Western Union is now copper wire. Salaries and wages increased 74 per cent between 1917 and 1922 and 30.7 per cent between 1922 and 1927, whereas the corresponding rates of increase in number of employees were only 6 and 18.7 per cent, respectively. From 1927 to 1932 salaries and wages decreased 25.7 per cent, but the number of employees only 18.1 per cent.

A development not shown in the table is the change that has taken place in train dispatching, something that formerly had been done almost altogether by telegraph. In October, 1907, the first successful installation of telephone and selector equipment for train dispatching was completed on the lines of the New York Central railroad. This was closely followed by a number of installations on other roads. The telephone train-dispatching line consists of a metallic circuit to which certain calling apparatus is connected at the dispatcher's office and, to prevent interference, an individual selector at each of the way stations. Telephone train dispatching has proved so successful that it has displaced the telegraph on more than half the railroad mileage of the United States. In 1912, 42 lines and systems reported 56,850 miles of telephone pole line and 129,856 miles of single wire. This grew to 105 lines and systems reporting 95,268 miles of pole line and 201,662 miles of single wire in 1917. The miles of pole line corresponds closely to the miles of track upon which dispatching is done by telephone. In 1917, the proportion of total mileage dispatched by telephone was 43.3 per cent. This proportion

increased to 46.6 per cent in 1922 and to 57.4 per cent in 1927. In 1932, of the 157 Class I railroads which reported to the Bureau of Census trains dispatched over 228,267 miles of road, 112 reported the use of the telegraph (29 using the telegraph only over the entire line), 120 used the telephone (38 using the telephone only over the entire line), and 14 reported the joint use of the telegraph and telephone, 5 using them interchangeably over the entire line. As of Jan. 1, 1935, about 63.7 per cent of the total mileage of Class I railroads was operated by telephone.

The bulk of the domestic telegraph business of the United States is done by two large companies. On Dec. 31, 1932, the Western Union had 218,635 miles of pole line, 1,889,174 miles of wire, and 21,950 telegraph and cable offices, of which 38 were in foreign countries. This compared with 33,969 miles of pole line, 438,970 miles of wire, and 3,475 telegraph and cable offices of the Postal Telegraph system. During 1932, the Western Union transmitted an average of 7,542,300 telegraph and cable revenue messages monthly, as compared with 2,262,864 telegraph and 80,911 cable messages transmitted monthly by the Postal Telegraph-Cable system. In addition to these companies, there are seven small interstate telegraph companies in the United States not controlled by or affiliated with either of the two large systems, and the Canadian Pacific Railway Company owns and operates certain lines in the United States. These are small industrial or railroad-owned telegraph companies doing a local business. Together they own only 0.84 per cent of the total mileage, and in 1932 received only 0.10 per cent of the operating revenues of all telegraph and cable companies reporting to the Interstate Commerce Commission. They have not been profitable ventures, only one having paid dividends during the years 1922 to 1932, inclusive. Four were acquired for the purpose of serving certain industries; two are connected with railroad companies; and only one is a telegraph company in competition with the larger companies.

The telegraph lines of the Western Union are located mostly along railroad right of ways, on highways and city streets. Of its 21,950 offices, on Dec. 31, 1932, 2,562 were main offices, 1,638 branch offices, and 17,750 joint offices with railroad companies. At that time, the Postal Telegraph system had 1,168 main offices, 897 branch offices, 668 joint offices with railroad

companies, 1 joint office with a cable company, and 741 joint offices with telephone companies. The Western Union, thus, has a much more comprehensive system, although the Postal has offices in all the important cities of the United States and competes with the Western Union for about 80 per cent of the total telegraph traffic, of which it obtains about 20 per cent, or about 16 per cent of the traffic for all companies. The Postal, however, has more contacts with the general public than the number of its offices would indicate. Like the Western Union, it has a contract with the American Telephone and Telegraph Company for the collection and delivery of telegrams, and it has pursued a policy of making commission-agency contracts with independent telephone companies. Under this arrangement, Postal service has been extended to cover 1,350 cities and towns in 26 states. Also, a total of 11,105 Standard Oil Company service stations throughout the United States were equipped to accept telegrams for transmission via Postal Telegraph at the end of 1933. The Western Union likewise has made arrangements with many large gasoline-distributing companies for handling telegrams at service stations.

Both companies interchange telegraph traffic with companies in Canada: the Western Union with the Canadian National Telegraphs, and the Postal with the Canadian Pacific Railway Company. The Western Union, in connection with its cable business, had developed a land-line business in Nova Scotia, New Brunswick, and Prince Edward Island, but in 1928, under an arrangement with the Canadian National Telegraphs, the Western Union transferred to the latter company its property and business and retired from the public telegraph business in the provinces named. However, the Western Union retains title to the lines for through connection between its cable stations in Canada and Newfoundland and its system in the United States.

The Western Union also has connections in Mexico. In 1897, an exclusive contract was drawn up between the Mexican Government, the Mexican Telegraph Company (then owned by the Central and South American Telegraph Company, later becoming the All America Cable Company, with cables between the United States and Mexico and land lines to interior points), and the Western Union whereby the Western Union was permitted to interchange traffic with the Mexican Telegraph Company and

to connect with the land lines of the Mexican Government at various points along the international border.[1] In 1925, a new agreement was made with the Mexican Government covering international traffic via the Gulf cables of the Mexican Telegraph Company and several land-line junction points along the international border which permits of direct telegraphic transmission of messages between United States and Mexican points and the introduction of modern telegraph services.[2] In December, 1926, the Western Union acquired a controlling interest in the Mexican Telegraph Company.

A recent development of importance in the domestic telegraph service is the coordination between the wire and radio services. The coordination between the Western Union and R.C.A. Communications, which was first established for the handling of international communications, has been extended to domestic telegraph communication between a limited number of points. To meet this competition, more extensive coordination of the Postal Telegraph system with the domestic system of the Mackay Radio and Telegraph Company, both companies being parts of the system of the International Telephone and Telegraph Corporation, is being developed. The Mackay Radio Company, which formerly had stations only in the larger cities on the Pacific Coast and a transcontinental circuit from San Francisco to New York, has extended its system to Washington, Boston, Chicago, and New Orleans.

In summarizing telegraph development in the United States, the first outstanding fact is that while the telegraph network spread over the entire country during the years of its most rapid growth, it has never approached the universality of the telephone service. At present, there are telegraph offices in about 20,000 different cities and towns, as compared with almost 90,000 places reached directly or indirectly by the lines of the Bell System. Agency contracts with telephone companies have extended the service somewhat, as have contracts with gasoline companies, but, on the other hand, the public telegraph service has been abandoned in many railroad offices where it formerly existed. The principal reason for less widespread development of the telegraph system is the fact that telegraph communications from

[1] Hearings on S. 6, 71st Cong., 1st Sess., Part 8, p. 538.

[2] Annual report of the Western Union Telegraph Co., 1925, p. 5.

small towns are not of sufficient volume to warrant the maintenance of telegraph offices. Technical improvements have been introduced in great number, which, although they have resulted in steady and marked increases in the investment in plant and equipment, have multiplied the capacity of the systems many times. The recent depression has had serious adverse effects upon telegraph revenues, since they experience directly the ups and downs of business activity, but the broadening of the range of activities of both leading companies has tended to render such effects less severe. With the revival of business activity, gross earnings should increase proportionately—a tendency that has been apparent since the low level of 1933—and the increased business should be handled at decreasing costs, owing to the technical improvements which have been made.

CHAPTER II

GROWTH AND DEVELOPMENT OF SUBMARINE TELEGRAPHY

The development of submarine telegraphy presents an interesting story full of romance and technical achievement. It might properly be said to have had its beginning in 1842, when Samuel F. B. Morse sent electrical currents through an insulated wire laid under New York harbor. A few years later, Ezra Cornell laid a 12-mile cable under the Hudson; and in 1851, a cable was laid under the English Channel between Dover and Calais, which proved successful. This success stimulated the laying of other cables between England and the Continent; and within ten years' time, a British company was operating at least half a dozen good cables under the English Channel on a profitable basis. Early cables were short, however, and were laid in relatively shallow water. It was not until 1866, and after repeated failures, that a cable was laid successfully under the Atlantic connecting Europe and America.

The British early assumed leadership in the laying of transoceanic cables, a leadership that they have never relinquished. This early leadership was due to several important factors: In the first place, there was an abundance of capital available in England; in the second place, the British were interested in cable development because of its importance to the conduct of their widespread commercial and shipping enterprises and the possibilities that it presented of bringing into immediate contact the far-flung parts of the British Empire; in the third place, gutta-percha, which came into universal use as insulating material for submarine cables, was early produced by British interests, the bulk of the supply coming from the Malay Archipelago; and in the fourth place, the British early developed an organization for the manufacture and maintenance of submarine cables, the manufacturing companies being responsible for the promotion of many early cable enterprises. American interests came into

the field later, although it was through the ingenuity and perseverance of an American, Cyrus W. Field, that the first transatlantic cable was laid.

Cable Development in the North Atlantic.—About 1852, the Newfoundland Electric Telegraph Company endeavored to lay a cable between New York and Saint John's, Newfoundland, where it was proposed to connect with a line of steamers in order to reduce the time of communication with Europe. This company failed, and Cyrus W. Field and a number of associates took over its assets in the name of the New York, Newfoundland and London Telegraph Company, with the objective of laying a cable from New York to Newfoundland and eventually to England. It laid to Newfoundland, a distance of about 1,700 miles, but did not succeed in interesting American capital sufficiently to continue. In 1856, Field went to England and succeeded in inducing British capitalists to support the enterprise. The Atlantic Telegraph Company was formed, and a cable was laid in 1858. This cable was operated for a time successfully. Its outstanding achievement, which served to demonstrate the value of cable communication between the two continents, was a message sent from London to the Canadian Government canceling the departure of two regiments of troops for India, which represented a saving to the British Government of nearly $250,000. In 1864, the Anglo-American Telegraph Company was formed, which successfully laid a cable between Hearts Content, Newfoundland, and Valentia, Ireland, in 1866, since when Europe and America have never been without cable contact. Later, the Atlantic Telegraph Company was amalgamated with the Anglo-American.

The first American-owned transatlantic cables were two between Canso, Nova Scotia (later diverted to Bay Roberts, Newfoundland), and Penzance, England, laid by the American Telegraph and Cable Company in 1881 and 1882, largely through capital supplied by Jay Gould. These were leased to the Western Union in 1882; this marked the entry of that company into the cable business. At that time, there were in existence several other transatlantic cable systems: the Anglo-American Telegraph Company (British), owning five cables between Valentia, Ireland, and Hearts Content, Newfoundland, three only of which were then in working order, and a sixth between Brest,

France, and Saint Pierre, with a cable from Saint Pierre to Duxbury, Mass., later sold to the French; the Direct United States Cable Company (British), owning one cable between Ballinskelligs Bay, Ireland, and Torbay, Nova Scotia, with a cable from Torbay to Rye Beach, N. H.; La Compagnie Française du Télégraphe de Paris à New York (French), owning a cable between Brest and Saint Pierre, a cable between Saint Pierre and Cape Cod, Mass., a cable between Saint Pierre and Louisburg, certain land lines in the United States and Canada, and the use of a cable between Brest and Penzance.[1]

The Atlantic cables had been laid in anticipation of traffic, and although the volume of business grew rapidly from the beginning, temporary overcapacity led to destructive competition. In 1880, the British and French companies entered into an agreement which established a uniform transatlantic rate and established a cable pool. In 1882, the American Telegraph and Cable Company was taken into this pool, and a second agreement entered into between all these companies and the Western Union and controlled companies governing the interchange of traffic between the cables and the land lines. This latter agreement was necessary because most of the land-line telegraphs in North America, so essential to the success of transoceanic cable service, were under the control of the Western Union. In addition to its own system built up prior to this, the Western Union, in 1881, purchased all the rights, contracts, and properties of the Atlantic and Pacific Telegraph Company and the American Union Telegraph Company. The former company had an operating agreement with the Direct United States Cable Company and operated under lease the lines and property of the Franklin Telegraph Company, which also had an operating agreement with the Direct Company. The American Union Company had an operating agreement with the French Cable Company and operated under lease the lines of the Dominion Telegraph Company of Canada which had an operating agreement with the Direct Company. In addition, in order to cover the whole of Canada, the Western Union had entered into an exclusive working agreement with the Great North Western Telegraph Company of Canada, which controlled all the lines of the Montreal Telegraph and those of the Dominion Telegraph west of the Province of New Brunswick

[1] *Cf.* Hearings on S. 6, 71st Cong., 1st Sess., Part 8, p. 501.

and was further constructing and acquiring additional facilities to connect all points in the western provinces of Canada. The Western Union also had an operating agreement with the Anglo-American Company, the latter having an agreement with the Montreal Telegraph Company.[1]

It was at this time that John W. Mackay and James Gordon Bennett joined forces and entered into the cable business. The latter was editor of the *New York Herald* and probably the largest cable user of the time. His interest was chiefly in lower cable rates. The original rate of $100 for 20 words had by successive reductions been brought down to 50 cents a word, the rate established by the cable pool, but this was still thought to be too high. A partnership was formed in September, 1883, which resulted in the incorporation, in December, 1883, of the Commercial Cable Company. This company immediately ordered the manufacture of two cables, which were laid from Canso, Nova Scotia (later diverted to Saint John's, Newfoundland), to Waterville, Ireland, and opened for traffic in 1884.

Upon completion of the Commercial cables, the transatlantic rate was reduced by the cable pool from 50 to 40 cents a word, and a rate war ensued during which transatlantic rates as low as 12 cents a word were quoted. Such rates were ruinous, however, and in 1888, by agreement of all parties, the transatlantic rate was fixed at 25 cents a word, a figure at which it remained until the development of transoceanic radio communication enforced a further reduction.[2]

The Commercial Cable Company lacked land-line connections, however, and was faced with the necessity either of building a comprehensive land telegraph system or of accepting unfavorable contracts from the Western Union. As we have seen, it chose to develop its own system. In 1886, it entered into an agreement with the Canadian Pacific Railway Company which assured it connections for the collection and delivery of cable messages in Canada.

During this whole period of cable development and until the end of the nineteenth century, Germany had no direct cable connection with the United States, all its cable messages of

[1] *Ibid.*, pp. 501–519.

[2] Statement of Clarence H. Mackay, Hearings on S. 6, 71st Cong., 2d Sess., Part 13, pp. 1665–1666.

necessity transiting British territory. This arrangement ultimately became so unsatisfactory, both for economic and for political reasons, that a German company was formed to lay a cable between Germany and the United States, via the Azores. The Commercial Cable Company was approached, in 1899, to connect with such a cable, and it agreed to operate the cable for the German Company (Deutsch-Atlantische Telegraphengesellschaft) at the New York end and to pick up and deliver messages for it throughout the United States and Canada. A cable was laid in 1900, from Emden, Germany, to the Azores and thence to New York, and a second one in 1904.

At the outbreak of the World War, there were thus six companies owning transatlantic cables: the Commercial Cable Company, five cables; the German Company, two; the French Company, two; the Anglo-American Company, five, leased to the Western Union in 1911; the Direct Company, one cable; and the American Telegraph and Cable Company, two cables, also leased to the Western Union. These cable companies, except the French company, which operated independently of the others, formed two principal groups with about equal cable facilities: the Mackay group, consisting of the Commercial Cable Company and the German Company, operated by the Commercial in close and exclusive physical connection with the Postal Telegraph system; and the Western Union group, consisting of the Anglo-American Company, the Direct Company, and the American Telegraph or Western Union cables. The cables in the Western Union group were operated formerly by their respective companies in close and exclusive traffic arrangements, but not physical connection, with the land lines of the Western Union. For several years, the Western Union conducted negotiations to bring about a more satisfactory operating arrangement, because it was felt that to secure the best service, particularly to interior points, it would be necessary to operate the cables not only in close traffic connection with the land lines but in actual physical connection under a common operating control, a situation that had always existed in the Mackay group and that contributed materially to its success. This was accomplished in 1912.[1]

During the World War the transatlantic cables were operated under strict censorship, and on Nov. 2, 1918, by proclamation, the

[1] Annual report of the Western Union Telegraph Co., 1912.

President assumed possession and control of the cable systems of the United States, this control being terminated May 2, 1919. At the very beginning of the war, both the German cables were cut in the English Channel. Eventually, one of these was landed at Penzance, England, and at Halifax, Nova Scotia, by British authorities, and the other at Brest, France, and New York by the French Government.

Since the World War, cable development in the North Atlantic has been marked by notable improvements which have greatly increased cable capacity, have improved the service, and have lowered operating expenses. The first of these is automatic relay and what is called "direct operation." Prior to 1918, transatlantic cables were worked sectionally by manual relay; that is, cablegrams were recorded and resent at various cable stations between New York and London, this involving transcription by operators in Nova Scotia, Newfoundland, Ireland, or Cornwall and sometimes at all four points. In that year, automatic relay from one long cable section to another was successfully accomplished by an American company. In 1921, regenerators for restoring distorted signals to their original form were developed. By means of this device coupled with the automatic relay, it was possible to operate cable service direct from New York to London without manual relays. This has resulted in labor saving at repeater stations, increased speed of service on the bulk of traffic, and improved accuracy and has met the challenge of radio communication for direct connections.[1] Through operation has been established also between cable and land-line circuits so that it is now possible to operate from many large cities in the United States direct into London or Paris or other European points.

A second development of fundamental importance was the laying of inductively loaded cables. From 1866, when the first successful transatlantic cable was laid, until 1924, no material change in the design of ocean cables had been made. Improvements consisted mostly of changes in size and weight, which, together with the developments in terminal apparatus, measurably increased the capacity of cables. In 1923, the Commercial

[1] *Cf.* COGGESHALL, I. S., Submarine Telegraphy in the Post-war Decade, address at the winter convention of the A.I.E.E., New York, Jan. 27–31, 1930.

Cable Company laid the fastest nonloaded transatlantic cable. The copper conductor of this cable weighed almost 50 per cent more than any other transatlantic cable laid up to that time, and its message capacity was also greater. In 1924, the Western Union laid a cable of entirely new design between Hammels, N. Y., and Horta, Azores. This cable was of the continuously loaded type, applying a separately wound metallic tape composed of a new alloy called "permalloy." The speed of this cable has been regularly established at something more than 1,500 letters per minute. Since the most effective practical utilization of a cable of such high speed involves the splitting up of the total capacity into a number of separate "channels," each of which is capable of being operated as an independent unit, this cable is operated in five printing telegraph channels, the equivalent of five singly worked wires. Since 1924, the Western Union has laid two other permalloy cables: one between New York and Penzance, England, via Bay Roberts, Newfoundland, laid in 1926; and the other between Bay Roberts and Horta, laid in 1928. The New York-Bay Roberts-Penzance cable has developed a speed of 2,400 letters per minute, providing eight channels of 300 letters each. It has been working satisfactorily at this speed since September, 1932, in direct operation between New York and London. One channel has been extended from New York to Montreal, thus providing direct working between Montreal and London, and one channel has been extended from London to provide direct operation between Amsterdam and New York.[1] Since 1932, a number of other through circuits have been established. The Bay Roberts-Horta high-speed cable has been adapted for duplex working. It has been operated at a speed of 1,400 letters per minute in each direction simultaneously, thus establishing by far the highest record of any known cable. Although permalloy is available to all, the Western Union is the only American company that has laid long cables of this design. So much has its use increased the capacity of cables that some of the permalloy cables of the Western Union have a capacity almost as great as the combined capacities of its seven cables of older design.

A third development of the postwar period was the adaptation of the telegraph printer, which had been established on land lines for many years, to cable operation. It has been applied both to

[1] Annual report of the Western Union Telegraph Co., 1932, p. 4.

loaded and to nonloaded cables. Many other devices have contributed to increased speed and accuracy of the cable service.

These technical developments have materially strengthened the cable position in competition with transoceanic radio communication, the most severe competition to which the cable industry has been subject, and have created a surplus of cable facilities. During the war and immediately thereafter, the combined facilities of all transatlantic cable companies were not sufficient adequately to handle all the traffic that was offered. The difficulty in making deep-sea repairs, owing to the necessity of convoying cable ships, and military censorship threw such a burden upon the cables during the war that congestion was sometimes so great that it could not be cleared overnight. Later, the peace negotiations similarly overtaxed the cables. This situation, however, was soon completely changed, for by 1922, the 24-hr. capacity of the 17 transatlantic cables was approximately 550,000 words, allowing 25 per cent for cables temporarily out of service, and the radio had attained a capacity half this great, making a total capacity of about 825,000 words per day, while the demand was not more than 500,000 words per day.[1] In the beginning, the radio obtained most of its business by offering rates about 30 per cent lower than the cable rates; but in 1923, the radio rate was raised, and the cable rate lowered to a uniform rate. Competition has been keen ever since. Both the cable and the radio have increased their facilities until today there is overcapacity in the transatlantic field.

During this period, cable connection direct to Italy was established, and to Germany reestablished. After the war, France was the only continental European country having direct cable service with the United States. Of 17 transatlantic cables (the cable laid in 1923 by the Commercial Cable Company excluded), 14—90 per cent measured in capacity—landed on the shores of England, thus making England the focal point through which passed a large part of the cable traffic destined to continental Europe.[2]

There was an obvious need, in order to keep pace with international requirements, of additional cables direct to the countries of Northern and Southern Europe, and an Italian company (La

[1] *Ibid.*, 1922, p. 13.
[2] *Ibid.*, 1922, pp. 13–14.

Compagnia Italiana dei Cavi Telegrafici Sottomarini) laid a cable from Italy to the Azores, where it connects with the Western Union. This cable has an intermediate station at Malaga, Spain. It was through this connection that the Western Union was enabled to participate in Far Eastern cable traffic. For many years, its position with respect to such traffic had been prejudiced by reason of certain preferential arrangements between the Eastern Telegraph Company of London and the Commercial Cable Company. The Western Union obtained a similar preferential position in Italy through an exclusive arrangement with the Italian Cable Company. In 1925, however, with the consent of the other parties concerned, the Commercial and the Western Union waived, in favor of each other, the exclusive features of their contracts affecting Eastern and Italian traffic, and as a result Western Union is allowed to participate in Eastern Company traffic, and the Commercial in Italian Company traffic.

As we have seen, the prewar German cables had been appropriated, one each by the British and French Governments, thus depriving Germany and the countries of Northern Europe of direct cable communication with the United States. Soon after the close of the war the American cable companies began to negotiate for the reestablishment of direct cable communication with Germany, but due to the unsettled condition of postwar Germany such negotiations lagged for years. Eventually, in 1925, a contract was drawn up between the German Cable Company, on the one hand, and the Commercial and the Western Union, on the other hand, whereby the German Company agreed to lay a cable between Emden, Germany, and the Azores, of such type as to be susceptible of being operated in conjunction at the Azores with the permalloy cable of the Western Union, in through working between Emden and New York. This cable was to be of substantially the same electrical qualities and transmitting capacity as the Western Union cable. By a previous contract, the Western Union had agreed to lease to the Commercial for its exclusive use two of the five channels developed in its cable. The German Company was to interchange traffic with each of the American companies on an agreed basis of division. This cable was laid in 1926 and opened for operation in 1927.

At present, transatlantic cable communication between North America and Europe is carried on by four systems over 21 cables;

the Western Union system, the Commercial Cable system, the British system, and the French system. The Western Union system consists of 10 cables, 5 owned or controlled by the Western Union, and 5 operated under lease from the Anglo-American Company. For the collection and delivery of messages in North America, it has its own extensive land-line telegraph system in the United States, a controlling interest in the Mexican Telegraph Company, and interchange with the Canadian National Telegraphs. In Europe, it has about 25 offices in Great Britain, offices in Paris and Havre, France, and in Holland and Belgium.

The Commercial Cable system (now a part of the International Telephone and Telegraph system) owns and operates six transatlantic cables between New York and England. All of these cables touch at Nova Scotia, Newfoundland, or Ireland, en route to England. Two of them touch also at the Azores before reaching Ireland. The Commercial likewise has two cables between Ireland and France. Thus, it has six routes to Europe, five of them automatically joined through to London or Liverpool, and one to Paris. In addition to these, as has been seen, the Commercial leases from the Western Union two of the five channels in its New York-Azores cable for connection with similar channels in the German cable to the Azores. Its land-line connections consist of the Postal system in the United States, and the Canadian Pacific Railway Company in Canada. It also has offices in England and other European countries.

The British system (now a part of Imperial and International Communications, Ltd., the British cable-radio merger) owns and operates two cables, one the former German-owned cable, and the other purchased from the Direct United States Cable Company. The former runs from Porthcurnow, to Halifax by way of the Azores, and the latter from Porthcurnow to Halifax by way of Harbor Grace, Newfoundland. The French Cable Company owns and operates three transatlantic cables. One, the former German cable, runs from Brest to New York by way of the Azores; a second from Brest to Cape Cod by way of Saint Pierre; and the third from Brest to Cape Cod.

The bulk of transatlantic cable communications is handled by the American companies. During the last nine months of 1929, at the peak of the cable business, of the total transatlantic messages, estimated at 51,000 per day, the Western Union

transmitted 44 per cent; the Commercial, 29.5 per cent; the French cables, 7 per cent; the British cables, 2.9 per cent; the British Radio Beam system between Great Britain and Canada, 1.8 per cent; the Radio Corporation of America and the British Merger Company, 3.5 per cent; and the Radio Corporation, all European business except Great Britain, 10.2 per cent.[1]

Development of Cable Communication with the West Indies and South America.—British interests also were pioneers in the laying of cables in the West Indies. In 1870, the West India and Panama Telegraph Company (a British company, later absorbed by the Cuba Submarine Telegraph Company, the latter now included in Imperial and International Communications, Ltd.) laid a series of cables connecting Jamaica with Cuba, on the one hand, and with Puerto Rico, Saint Thomas, Guadeloupe, the British West Indies, and British Guiana, on the other. This system was connected with the United States and the United Kingdom by a cable from Havana to Florida, owned by the International Ocean Telegraph Company, which was later taken over by the Western Union. The British government was not satisfied, however, with this method of reaching its West Indian possessions through a foreign country, and later, through two subsidized companies (the Halifax and Bermudas Company, organized in 1900; and the Direct West India Company, organized in 1908), cables were laid from Canada to Jamaica, via Bermuda and Turks Islands. Recently these cables have been supplemented, at the expense of the Imperial, Canadian, and West Indian governments, by cables from Turks Islands to Barbados, Trinidad, and British Guiana.[2]

The pioneer company to South America was the Western Telegraph Company (British, now also a part of the British cable-radio merger). Originally, this company laid and operated its cables to South America through Carcavellos, near Lisbon, Portugal, or through Madeira and Saint Vincent, but the route now principally employed is via the Azores, where connection is had with the North Atlantic systems. The Western Company obtained a very important monopoly and laid a complete system

[1] Statement of Newcomb Carlton, Hearings on S. 6, 71st Cong., 2d Sess., Part 11, p. 1464.

[2] *Cf.* BROWN, F. J., "Cable and Wireless Communications of the World," pp. 19–20, Isaac Pitman & Sons, London, 1930.

of cables along the east coast of Uruguay and Brazil. It also provided connections by means of land lines with Valparaiso, on the west coast, and a series of cables running northward to Lima, Peru, and southward to Concepción, Chile.

The man chiefly responsible for the early development of cable communication between the Americas by American interests was James A. Scrymser, of New York. He organized the International Ocean Telegraph Company which laid a cable from Florida to Cuba. This cable proved to be profitable, but the International Company did not extend its lines southward. It had received a number of concessions from the Spanish, Danish, Dutch, French, and British governments; but in 1869, it entered into an arrangement with the West India and Panama Company whereby it assigned these concessions to the latter company. In 1868, William Henry Seward, then Secretary of State, had attempted to obtain from Brazil a concession for Mr. Scrymser to lay a cable directly down the east coast of South America, but this was defeated by Sir Charles Bright and other English gentlemen who were interested in the Brazilian Submarine Company, and who subsequently organized the Western Telegraph Company. The attempt was altogether abandoned in 1873, when the Western Company received from the Brazilian Government an interport cable monopoly for a period of 60 years. By the terms of this concession, no other concession for the laying of submarine cables to connect two or more of the most important political subdivisions of Brazil could legally be granted.

In 1878, Mr. Scrymser severed his connection with the International Ocean Telegraph Company and directed his activities toward the development of communication between the United States and Mexico and Central and South America. At this time, telegraphic communication between the United States and Mexico was conducted over the land lines of the Western Union and those of the Mexican Government, connected by cable under the Rio Grande River from Brownsville, Tex., to Matamoras, Mex. It was unsatisfactory, however, since the river cable was often interrupted, and political conditions in Mexico frequently prevented messages from reaching their destinations. The Central American countries, with the exception of Panama, were telegraphically isolated from the United States, and telegraph

communication with South America could be had only via the Azores and Great Britain.

Two companies were organized: One, the Mexican Cable Company, incorporated in 1878, was organized for the purpose of connecting the United States and Mexico by means of a cable from Texas to Veracruz; and the other, the Central and South American Cable Company, to extend from Veracruz to Central and South America. The names of these companies soon were changed to the Mexican Telegraph Company and the Central and South American Telegraph Company. The former laid its cable and opened it to public communication in 1881. The Central and South American Company followed with lines running from Veracruz to Puerto Mexico, Mex., across the isthmus of Tehuantepec and thence down the west coast of Central America, touching Salvador, Nicaragua, and Panama and continuing as far as Peru, touching at Colombia and Ecuador. These lines were opened in 1882 and formed the nucleus of the system which today is that of All America Cables. The immediate effects of the development of this system were the bringing of countries, formerly isolated, into telegraphic communication with the rest of the world, and substantial reductions in cable rates between the United States and South America. New rates from New York to Panama, Colombia, Ecuador, Peru, Bolivia, Chile, and Argentina, via Galveston, Tex., ranged from one-half to one-fifth of those then in effect via London.

The Central and South American system expanded rapidly, but its progress on the east coast of South America, where the bulk of the traffic originated, was obstructed by the interport monopoly of the Western Telegraph Company. No cable company could have afforded to lay a cable from the United States to Brazil for the business of one city, and connections with the land lines of the Brazilian Government would have been highly unsatisfactory because of the inefficiency of that system. Consequently, the Central and South American Company decided to enter Brazil from the south. It pushed its cable lines farther down on the west coast to Valparaiso, Chile, and purchased the Transandine Telegraph Company, which operated between Chile and Argentina.

The attempt to enter Brazil from the south was also blocked by the British Company, which, in 1893, secured a 20-year

monopoly of submarine cable communication between Brazil and Uruguay and Argentina. The American Company tried to carry messages to and from Brazil over the lines of the British Company, carrying them over its own lines to and from Buenos Aires, but the British blocked this also. On all messages destined to be transmitted to the United States via the Pacific they levied a charge, in addition to the charge for local messages between Brazil and Argentina, high enough to force the Brazilian business to go to the United States via England.

In spite of these drawbacks, however, the business of the Central and South American Company increased tremendously. In 1893, the original Pacific lines were duplicated; and by 1905, the cables across the Gulf of Mexico had been triplicated. In 1907, a cable was completed direct from New York to Panama, via Cuba. This cable provided a faster and more dependable service and, owing to connections in New York, enabled the Central and South American Company to command a larger share of the traffic between Europe and South America. At the expiration of the 20-year monopoly of the British Company, but not until after a long legal case had been decided in favor of the American Company, the latter perfected its right of entry into Brazil. Two cables were laid: one from Argentina to Rio de Janeiro, and the other from Argentina to Santos. These cables, which were opened in 1920, enabled the American Company to compete for 75 per cent of the Brazil-United States business. In the same year, "All America Cables, Inc." was adopted as the corporate name of the company in lieu of "The Central and South American Telegraph Company." The Mexican Telegraph Company retained its own identity and remained a part of the system until 1926, when the controlling interest was sold to the Western Union.

Meanwhile, the Western Union became interested in getting into South America. It sought to buy the Central and South American Company and add it to its system, but the negotiations failed. Later, it made a study of the possibilities of laying direct to South America. A concession was obtained from the Brazilian Government which authorized the Western Union to lay from Rio de Janeiro to Miami or New York, touching at several points in Brazil not then served and at Fernando de Noronha, an island off the coast of Brazil. It was planned also to carry the

cable from Fernando de Noronha to Buenos Aires, which would then be a competing point with the Central and South American Company, and from which it then obtained a large part of its traffic. However, owing to a doubling of the price of cables as a result of war conditions, the Western Union felt that such an investment would not be warranted and decided to connect with the system of the British Company.[1]

The Western Telegraph Company was also interested in a direct route from South America to the United States. It interchanged North America-South America traffic with the Commercial Cable Company at the Azores and, later, London, but this was a roundabout route, and it feared the competition of the direct route of the All America after it had gotten into Brazil. It entered into negotiations with the Western Union, and All America was invited to join them. The situation in South America was this: All America enjoyed a monopoly on the west coast as far down as Lima, Peru, and was well-established on the east coast. It was a cable company only, however, and was dependent upon the Western Union for the collection and delivery of messages in the United States. The Western Company had its monopoly in Brazil, land lines across the Andes, and cables up the west coast as far as Lima. It was proposed that All America withdraw from the east coast, except Argentina, and that the Western Company sell or lease to All America its land lines, excluding Buenos Aires to Valparaiso, and its cables along the west coast. Under the plan, the Western Company was to lay a cable to Barbados, where it was to be met by the Western Union. Thus, the sphere of operations was to be divided between the two companies into exclusive territories, except for certain competing points. The threat to the All America if it should not enter into the agreement was that the Western Union would enter into an exclusive traffic agreement with the Western for the interchange of traffic between North and South America. Nevertheless, the All America refused to join.[2]

Negotiations between the Western Union and the Western were completed, and an agreement arrived at whereby the latter

[1] *Cf.* Statement of Newcomb Carlton, Hearings on S. 4301, 66th Cong., 3d Sess., pp. 101–103.

[2] Letter from Newcomb Carlton to Mr. John L. Merrill, Hearings on S. 4301, 66th Cong., 3d Sess., pp. 68–69.

laid a cable from Brazil to Barbados, and the former from Miami, Fla., to Barbados. Western Union desired to connect with the Western Telegraph Company for two reasons: In the first place, it would secure for Western Union the most comprehensive intercommunication between North and South America at a minimum cost; and, in the second place, it would defeat a plan of the British, long under contemplation, to lay from Rio to Barbados and thence to Bermuda, there connecting with a British cable to Halifax, which would give Canada a direct connection to South America and offer much competition to any proposed Western Union route.[1] A license to land this cable at Miami was withheld by the President for several years, however, because of the monopoly of the Western Company in South America, the precedent having been established not to permit the landing of cables in the United States owned by or in connection with companies having monopolistic concessions in foreign countries which would prevent or prejudice the landing of cables in such countries by American companies. Eventually, permission was granted, and the cable was opened for traffic in August, 1922. Since then, the Western Union has interchanged South American traffic exclusively with the Western Company, except for points reached only by All America. The Western Union also controls the traffic between the United States and Mexico through ownership of the controlling stock of the Mexican Telegraph Company.

Since the World War, All America Cables has constantly increased its range of activities in Central and South America and in the West Indies. Branch lines were run from Cuba to Puerto Rico in 1921, to Santo Domingo in 1924, and to Haiti in 1927. A cable to Limón, in 1922, added Costa Rica to the system. In 1925, to meet the ever increasing demand for faster service and greater capacity, the lines from New York to Colón were triplicated.

In December, 1928, an agreement was signed between Compagnie Française des Cables Télégraphiques, Compagnie Télégraphique des Antilles (both French), and the United States and Haiti Telegraph and Cable Company (American), on the one hand, and All America, on the other, whereby the last named

[1] Statement of Newcomb Carlton, Hearings on S. 535, 67th Cong., 1st Sess., pp. 8–9.

company operates all the cables of the former companies in West Indian waters. These cables connect Cuba, Haiti, Santo Domingo, Puerto Rico, Saint Thomas, Curaçao, and Venezuela, altogether some 3,200 nautical miles of cable. The following year, All America was granted a concession from the Venezuelan Government, the French formerly having had a monopoly in Venezuela, authorizing it to lay cables of its own from La Guaira and Maracaibo to connect with other points of the company's system; and, in 1930, from the Dutch Government to connect the Dutch West Indies. New Cables were laid from Curaçao to La Guaira and from Maracaibo to Baranquilla, thus providing alternate routes by cable to Colombia.

Cable communication between the Americas, like the transatlantic, has been improved greatly. Direct operation, duplex working, and the application of the printer are only a few of the improvements in this sector which have contributed to increased speed and lowered costs and have made possible better service at lower rates. All America, reaching practically all the countries in Central and South America and the islands of West Indies, is the principal system. It is now a part of the International Telephone and Telegraph system, which also includes the Mackay companies. Through coordination of the circuits of the Commercial Cable Company with those of All America at New York, and the resulting speed and economies of operation, All America has been enabled to obtain and hold a large share of the South America-European traffic. Before the World War, most of its business was between the Americas; today, most of it is with Europe. It carries practically all the news that goes by cable between the United States and Central and South America, having contracts with both the Associated Press and the United Press. In addition to its cables and supplementary thereto, All America operates radio stations at several points in Central and South America.

Other American companies operating in this region are the Commercial Cable Company of Cuba, one of the Mackay companies, and the United States and Haiti Telegraph and Cable Company, whose properties now are operated under lease by All America. The former laid a cable between New York and Havana in 1907 and a second, Miami to Havana, in 1921.

The French and Italians also have cable routes to South America. The French South American Cable Company (Com-

pagnie des Cables Sud-Americains) laid a cable in 1892, which runs from Dakar, Senegal, to Fernando de Noronha and thence to Pernambuco. At Dakar, this cable connects with the French Government lines between Senegal and France. The cable of the Italian Cable Company runs from Anzio, near Rome, via Malaga, Spain, to Las Palmas, in the Canary Islands and thence via the Cape Verde Islands to Rio de Janeiro and Buenos Aires.

Before the war, the Germans established an important cable route with South America, running from Emden via Teneriffe to Monrovia, Liberia, and thence to Pernambuco. After the war, the northerly portions of this cable were used by the French to provide cables between Brest and Casablanca and Dakar. The Monrovia-Pernambuco section was assigned by the treaty of Versailles to the five principal allied and associated powers, but it has never been brought back into use.[1]

Cable Development in the Pacific.—No cables were laid under the Pacific Ocean until the beginning of the twentieth century. Prior to that time, telegraphic communication with the Far East was over the lines of the Great Northern Telegraph Company, a Danish corporation, and those of the Eastern Telegraph Company, a British company, through its subsidiary the Eastern Extension, Australasia and China Telegraph Company. About 1871, the Great Northern secured the right to operate a land telegraph system across Russia and Siberia to the Far East. At that time, telegraphic service with China and Japan was unknown, and the Great Northern obtained from the governments of both these countries concessions for the establishment of telegraph and cable service between them and Europe. About the same time, the Eastern Telegraph Company was laying cables through the Mediterranean, the Red Sea, and the Indian Ocean. It extended its lines to China and entered into a close working agreement with the Danish Company. The latter company secured exclusive concessions in China, and the British company in the Philippines.

The need for direct communication between the United States and the Far East had long been felt by American commercial interests when, at the conclusion of the war with Spain, the United States found itself in urgent need of communication facilities to reach its newly acquired possessions in the Pacific.

[1] *Cf.* BROWN, *op. cit.*, pp. 18–19.

Various attempts had been made from time to time to induce some one to lay a cable between the United States and Hawaii but without avail. A number of bills were introduced into Congress from 1899 to 1901 having to do with the laying of a cable to the Philippines, either by the government or by a subsidized private company, but no final action was taken. Eventually, the Commercial Pacific Cable Company was organized by John W. Mackay for the laying of a Pacific cable.

The laying of such a cable was a hazardous enterprise, both because of natural difficulties and because of the uncertainty of sufficient traffic to make it a profitable enterprise. The natural difficulties to be encountered were great distances and great depths. In certain spots, the cable would have to be laid and maintained in water 5 miles deep. As to traffic, it would be necessary to get into both China and Japan, as well as the Philippines, if the enterprise were to be successful, because of the great length of cable and the great stretch of unproductive territory to be traversed between the United States and the Philippines. But it was here that the greatest obstacle lay. The concessions of the Danish and British companies would exclude the new company from China and Japan; and since the proposed cable, if laid, would divert all the American traffic to the Far East from their lines, they were not disposed to give up what advantages they possessed. The Mackay interests, of necessity, therefore, entered into negotiations with the Danish and the British companies.

As a result of these negotiations the British and Danish received a financial interest in the new enterprise. The stock of the Commercial Pacific Cable Company was to be owned 25 per cent by the Mackay interests; 25 per cent by the Great Northern; and 25 per cent each by the Eastern Telegraph Company and the Eastern Extension, its Far Eastern affiliate. The cable was laid from San Francisco to Honolulu, to the Midway islands, to Guam (where a branch was run to Ogasawarajima to connect with a Japanese cable), to the Philippines, and to Shanghai. It was begun in 1902 and completed in 1906.

The benefits, both to the American public and to the United States Government, from the laying of this cable are readily apparent. Prior to its laying, messages from America to the Far East had to transit 15 or 16 foreign cable stations. Afterward,

such messages transited only three American stations to the Philippines and Japan and four American stations to China. Rates were substantially reduced below those of the Atlantic route. The political aspects of cable laying are well-illustrated in connection with this enterprise. Because of the great distances to be covered, it was necessary to relay the cable either at the Marshall Islands, which then belonged to Germany, or at the Midway islands, which belonged to the United States. Commercial considerations pointed to the former route, but the United States Government insisted that it be an all-American cable, and it was accordingly relayed at the Midway islands.

Meanwhile, the Deutsch-Niederlandische Telegraphengesellschaft was engaged in laying a system of cables in the Far East. This was a company formed in Germany but supported largely by Dutch capital and subsidized by the German and Dutch governments for the establishment of communications with and between their Far Eastern colonies. This company laid a cable from Guam to Yap, where it divided, one branch running to China, and the other to the Dutch East Indies. In 1904, an agreement was negotiated between the Commercial Cable Company, the Commercial Pacific Cable Company, and the Deutsch Company for the exchange of certain traffic between Europe and the Far East, especially in the case of interruption of previously existing routes to the Far East, the cables of the Commercial companies, together with the land lines of the Postal Telegraph across the United States, furnishing an alternate route. The cable of the Deutsch Company, from Yap to China, also provided an alternate route to China in case of interruption of the Guam-to-Manila section of the Commercial Pacific Cable. During the World War, the Japanese seized Yap and diverted the northern branch of the Deutsch cable from Shanghai to Japan. After our entry into the war, the United States Government seized the German properties on the island of Guam, and by the Treaty of Versailles Germany renounced the right to them. By Executive order, dated Dec. 24, 1921, the President directed that the Guam end of these cables should be operated by the United States. Later, the Secretary of the Navy made arrangements with the Commercial Pacific Company for the operation at Guam.

The only other cable across the Pacific is that of the Pacific Cable Board, now a part of Imperial and International Com-

munications, laid in 1902, running from Vancouver Island to Australia and New Zealand. It was a joint undertaking divided as follows: England, five-eighteenths; Canada, five-eighteenths; Australia, six-eighteenths; and New Zealand, two-eighteenths. This cable was operated at a deficit for the first 13 years, but profits on war-time traffic were sufficient to pay off the deficit and to accumulate a surplus. Duplication of the southern end of this cable was begun in 1912 and completed in 1926. More recently, the northern section, from Vancouver to Fiji, via Fanning Island, has been duplicated by a cable of the loaded type.

The United States Government also has a cable in the Pacific from the United States to Alaska, but with the development of radio communication it has practically fallen into disuse. The territory of Alaska for a long time remained relatively unoccupied except by natives, but there was a great influx of settlers following the Klondike gold rush in 1900. Settlements sprang up, and United States Army garrisons were established in the principal occupied regions to preserve law and order. The activities of the territorial government soon were greatly expanded, and two important industries developed—mining and fishing. Such activities created a demand for communication facilities, not only within Alaska but between that territory and the United States.

The Army Signal Corps built land telegraph lines through trackless wildernesses connecting the garrisons with each other, and Congress made appropriations for two short cables, but there was no connection with the outside world except over the Canadian telegraph lines. In 1903, however, Congress appropriated funds for the laying of a cable from Seattle to Sitka and thence to Juneau, a total distance of 1,360 miles. It was completed in 1904, and the next year an extension was laid from Valdez to Seward at the head of Resurrection Bay, the southern terminus of the Alaskan Central Railway. Originally built for military and governmental purposes, this cable throughout its life has been much used by commercial interests.

System of the Eastern and Associated Companies.—Although we are here concerned primarily with the American companies, no story of cable development would be complete without some mention of the system of the Eastern Telegraph and its associated companies—in terms of mileage, the greatest of all. This system

is now included in the British cable-radio merger, of which mention has already been made, known as Cables and Wireless, Ltd., the holding company, and Imperial and International Communications, Ltd., the operating company. It consists of seven cables from Porthcurnow to Portugal, Spain, and Gibraltar; five between Gibraltar and Malta; and six between Malta and Alexandria. The cables in the western Mediterranean are supplemented by connections between Malta and France and Italy; and those in the eastern Mediterranean by cables to Greece, the Greek islands, and Istanbul. The Mediterranean cables are continued to Port Said and underground lines parallel the Suez Canal to Suez. From Suez, five cables run through the Red Sea to Aden, most of them touching at Port Sudan and Perim on the way. From Aden, two principal lines diverge—one down the east coast of Africa to Zanzibar, British East Africa, Portuguese East Africa, and Durban; the other across the Indian Ocean to Bombay and Colombo. The latter comprises four cables to Bombay and one to Ceylon. These two routes are supplemented by a new cable from Aden to Seychelles, which in turn is connected with Colombo, Zanzibar, and Durban, via Mauritius.

The Bombay cables are continued eastward by land lines to Madras, whence three cables run to Penang and Singapore, and the Colombo cables are prolonged by two cables to the same places. At Singapore two principal routes again diverge: one to Hong Kong, comprising three cables; and the other to the Dutch East Indies, Australia, and New Zealand, comprising two principal cables and connecting with land lines across Australia. Northward from Hong Kong the Eastern and associated companies have laid a number of cables which connect with cables of the Great Northern Company coming southward from Siberia and Japan, via Shanghai.

The system to South Africa runs from Porthcurnow to Madeira, to Saint Vincent, to Ascension, to Saint Helena, and to Cape Town. It is connected by land lines with Durban, on the east coast of Africa, and connects with the Far Eastern system through Mauritius and Cocos Island. From Durban, a cable runs to Mauritius (already mentioned) to Cocos Island via Rodriguez and to Perth in Western Australia. At Saint Vincent and Ascension this system connects with the South American system. It

also connects, by means of cables from Saint Vincent and Ascension, with a system of cables along the west coast of Africa owned by the Western Telegraph Company.[1]

Statistical Summary.—The volume of business and earnings of American cable companies, as well as their facilities, have increased commensurately with the growth in foreign trade of the United States and social and diplomatic intercourse with foreign nations. In 1902, American cable companies reported to the Bureau of Census a total of 16,677 nautical miles of cable owned and leased and 820,498 cable messages carried during that year. By 1927, this had grown to 105,893 nautical miles of cable, with 13,986,939 cable messages carried. The volume of business handled by the American cable companies continued to expand in 1928 and 1929 but declined precipitously during the depression years. In 1928, cable revenues of the Western Union increased 5.7 per cent over those of 1927; paid words handled over the Commercial Cable system increased 13 per cent; and the number of messages of All America Cables increased 7.4 per cent. In 1929, the cable companies reported the greatest volume of business for any one year. This volume would have been even greater had it not been for the fact that a severe and unprecedented earthquake in the Atlantic Ocean south of Newfoundland, in November of that year, caused 24 breaks in 12 cables. In spite of this, cable revenues of the Western Union increased 9.6 per cent over 1928; paid words of the Commercial Cable system, slightly less than 19 per cent; and messages of All America Cables, about 14 per cent.

The years 1930, 1931, and 1932 saw a rapid decline in cable traffic, owing to the fact that the dollar volume of the foreign trade of the United States reached the lowest level in three decades. Telegraph revenues of the Western Union, including both telegraph and cable, in 1932, were 43 per cent below the peak of 1929; revenues of the Commercial Cable system, which declined measurably in 1930, declined 19.4 per cent in 1931 and more than 25 per cent in 1932; the number of revenue messages of All America Cables declined only 4 per cent in 1930 but declined 15.7 per cent in 1931 and 21.6 per cent in 1932; and revenues of the Commercial Pacific Cable Company declined about 25 per cent from 1930 to 1932. During 1933, the decline in cable

[1] *Cf. ibid.*, pp. 11–18.

revenues was halted, and there was some indication that cable business reflected more quickly than the land telegraph business the general improvement in business conditions. Telegraph and cable revenues of the Western Union were only slightly lower than in 1932, while cable-operating revenues of the Commercial Cable Company increased approximately 11 per cent in 1933.

An important development in cable traffic, which has been accentuated by the depression, is the growth in relative importance of the so-called deferred services. In 1911, in order to bring about fuller use of cable facilities, half-rate deferred service and low-rate night letter and week-end letter services were introduced by American cable companies. At that time, the only reduced-rate service was for the press, the rate on press messages between the United States and Great Britain being 10 cents per word, as against a full rate of 25 cents a word. In 1912, the rate for press messages was further reduced to 7 cents per word during the hours of maximum demand and 5 cents per word during other hours. In the same year, the rate for deferred messages between the United States and Great Britain was reduced from 12½ to 9 cents per word; the rate for cable letters was reduced to 75 cents for 12 words and $1.15 for 24 words in week-end letters. Corresponding reductions were made to other points. The press rate was later reduced to 5 cents per word; and in 1928, the rate for night letters was reduced to $1 for 25 words and 4 cents for each additional word and, for week-end letters, to 75 cents for 25 words and 3 cents for each additional word.

The cable-letter service introduced by the American companies has not been so widely accepted by other countries as the deferred service, the latter being universally accepted. England accepted it at once, followed by Holland, Belgium, Germany, and Italy. France refused until recently to accept it. Cable-letter service has also been introduced into the service to Central and South America and in the Pacific. The week-end letter, which was less widely accepted than the night letter, was abolished Apr. 1, 1933.

The effect of the deferred services upon cable traffic and revenues has been pronounced. In 1911, before these services were instituted, the average rate per word over the Western Union cables was slightly under 25 cents, the rate for the fully paid service. In 1930, it averaged only about 9 cents per word,

although the volume of business had increased enormously.[1] Today, the volume of deferred business is growing at the expense of that of the full-rate business. The cable traffic of the Western Union was distributed about as follows: 50 per cent full-rate, 25 per cent deferred, and 25 per cent letter service in 1934. Similar changes have taken place in the traffic of both Commercial Cable and All America Cables. The decline in number of messages during the depression has been especially marked in the full-rate service, this causing serious declines in cable revenues. For example, in 1932, the number of paid words transmitted by the Commercial Cable Company was only 16.3 per cent less than in 1931, but the revenues declined more than 25 per cent.

On Dec. 31, 1932, the Western Union owned and operated 30,782 nautical miles of cable and had 38 offices in foreign countries. All America Cables, together with its subsidiary Cuban All America Cables, operated 2,742 miles of pole line, 30,701 nautical miles of submarine cable, and 39,256 miles of wire, had 71 cable offices, and during 1932 transmitted an average of 157,514 messages monthly. The Commercial Cable Company operated 24,713 nautical miles of submarine cable, 34,839 miles of wire, and had 38 cable offices. In addition, it leased two channels in the New York-Azores cable owned by the Western Union, 2,329 miles long. During 1932, it transmitted an average of 254,698 messages monthly. The Commercial Pacific Cable Company operated 10,055 miles of submarine cable, 10,240 miles of wire, and had 7 cable offices. During 1932, it transmitted an average of 34,123 messages monthly. The Mexican Telegraph Company, owned 60 per cent by Western Union and 40 per cent by All America Cables, had 1,562 nautical miles of cable, 2,948 miles of telegraph wire, and had 5 telegraph and cable offices. The telegraph and cable industry of the United States, thus, is dominated by the Western Union Telegraph Company and the International Telephone and Telegraph Corporation, the former carrying by far a larger volume of traffic. Of total operating revenues of all telegraph and cable companies reporting to the Interstate Commerce Commission for 1932, Western Union received 75.26 per cent; the International Telephone and Telegraph Corporation 24.63 per cent; and the independent telegraph

[1] Statement of Newcomb Carlton, Hearings on S. 6, 71st Cong., 2d Sess., Part 11, p. 1461.

TABLE 2.—SUMMARY, OCEAN CABLE TELEGRAPH SYSTEMS: 1932, 1927, AND 1922
(Percentage not shown when base is less than 100)

Item	1932	1927	1922	Per cent increase or decrease (−)		
				1927–1932	1922–1927	1922–1932
Number of companies or systems	6	7	6			
Nautical miles of ocean cable[1]	96,468	99,074	76,711	− 2.6	29.2	25.8
Cable offices	146	136	140	7.4	− 2.9	4.3
Messages sent	10,436,613	13,986,939	9,602,559	−25.4	45.7	8.7
Employees	5,790	6,595	6,333	−12.2	4.1	− 8.6
Salaries and wages	$ 6,961,254	$ 9,536,382	$ 7,425,163	−27.0	28.4	− 6.2
Revenue (operating)	$16,926,536	$17,906,677	$18,174,356	− 5.5	− 1.5	− 6.9
Taxes assignable to operations during the year	$ 393,177	$ 882,740	$ 1,321,290	−55.5	−33.2	−70.2
Investment in plant and equipment	$90,750,968	$88,555,596	$72,631,927	2.5	21.9	24.9

[1] In addition, the cable companies reported 5,923 miles of single wire on land and underground for 1932; 7,638 miles of such wire for 1927; and 8,013 miles for 1922. (Miles of pole line owned by ocean cable systems, 1932, 446; 1927, 2,089.)

companies 0.11 per cent.[1] Bureau of Census figures for ocean cable systems for the years 1922, 1927, and 1932 are presented in Table 2.

The development of cable communication by American companies is a notable achievement. Cable communication across the Atlantic began as a British enterprise, American capital finding such lucrative employment in the development of domestic industry that little could be found for such speculative enterprise. It was not long, however, before American capital began to flow into cable enterprises, and American companies by laying cables and leasing others came to handle all but a small proportion of the cable communications to and from the United States. In the development of cable communication between the Americas, American companies were faced with similar difficulties and, in addition, the competition of foreign companies, many of them subsidized by their governments or possessed of monopolistic concessions. In the Pacific, foreign concessions in the Orient were so controlling that American interests were compelled to surrender a large share of ownership in the one cable laid in order to contact the only points from which sufficient communications would flow to ensure successful operation. That the international communications of the United States have been developed by, and controlled by, American companies has been of vital importance to national security. The cable industry has frequently been called unprogressive, but technological improvements have been introduced in great number, those since the World War being almost revolutionary in scope and importance. Outstanding in cable development has been the coordination of this service with the land telegraph services, especially the direct operation of cable circuits with automatic relay from inland points. At present, the speed and dependability of cable communication are remarkable. The competition of radiotelegraphy has no doubt been of value as a spur to technical advancement in cable progress.

[1] Preliminary report on communication companies, H.R. 1273, 73d Cong., 2d Sess., pp. 93–95.

CHAPTER III

GROWTH AND DEVELOPMENT OF THE TELEPHONE INDUSTRY

The growth and development of the telephone industry hold more of interest and importance to students of communications than that of almost any other industry. Next to the mail, it is the most important medium of communication, the volume of its transactions far exceeding those of all other telecommunications combined. In the United States, this development has been the work largely of the Bell System, although, as will be seen later, important telephone services have been developed outside that system.

The telephone that Alexander Graham Bell had invented was exhibited at the Centennial Exhibition in Philadelphia in 1876, but it aroused little more than curiosity. For quite some time, it was regarded generally as a mere scientific toy, and there is no occasion to wonder at this when we consider the crudity of the early instruments. So many foreign noises appeared to plague the users that telephone conversation could be carried on only under great difficulty and with slight satisfaction. The early activities of Bell and his associates were concentrated, therefore, upon technical development. Other problems were those of raising the necessary capital and fighting patent-infringement suits. The most serious of the latter involved the Western Union Telegraph Company. This company at first was skeptical of the commercial value of the telephone, but with its rapid growth and the threatened loss of the short-haul business of the telegraph company, the Western Union decided either to crush or to absorb it. The Western Union backed rival claimants, and a lengthy patent suit ensued, which, however, was won by the struggling Bell Company. Following the suit, an agreement was made whereby the Western Union agreed to admit the originality of Bell's invention and the validity of his patents and to retire from the telephone business. The Bell Company, in turn,

agreed to buy the telephone system which the Western Union had established and not to engage in the telegraph business. This agreement remained in force for about 17 years, thus removing a serious threat to the Bell interests. Other claimants arose, and in 11 years of patent war the Bell Company engaged in some 600 lawsuits. However, the Bell telephone patents were completely substantiated.

Development of Exchange Service.—Exchange service is local telephone service. Generally, it includes service within a large metropolitan area, a city with its surrounding suburbs, or a town or village. This was the class of service that was first developed, telephoning over greater distances having to wait for many improvements and inventions. Early attempts to improve the telephone service centered upon the instruments themselves. At first, all Bell apparatus was manufactured by Bell's associate Watson in a small shop in Boston, but the business soon grew too large for such small enterprise, and licenses were given to four other manufacturers to make instruments. About this time, the Western Electric Manufacturing Company of Chicago also began to make apparatus based upon patents claimed to be infringing. The result was that many different types of instruments appeared with no degree of standardization. The obvious thing to do in the interest of better service, and to prevent destructive warfare between rival inventors, was to consolidate the manufacture of telephone apparatus. This consolidation was effected, in 1882, by the Bell interests' securing control of the Western Electric Company, and from that time until the present it has been the principal manufacturer of Bell telephone apparatus.[1]

A second improvement introduced early in telephone history was the use of metallic circuits. Some of Bell's earliest experiments were performed on telegraph wires, and when separate telephone lines were constructed they consisted of a single wire with the ground as a return circuit. A grounded circuit, even with modern transmitters and receivers, is subject to many noises which interfere with conversation, but with crude instruments it was scarcely usable. The solution was seen to lie in the use of metallic circuits, but doubling the cost of wire plant

[1] CASSON, H. N., "The History of the Telephone," pp. 110–111, A. C. McClurg, Chicago, 1910.

seemed to be prohibitive. Not until 1883 were two-wire circuits introduced, but since then they have become standard for practically all telephone service.

A third most important development was the discovery by Thomas B. Doolittle of a method of producing hard-drawn copper wire for telephone lines. First wires were of galvanized iron, then of steel which was stronger but less durable. Neither served the purpose of the telephone well, both being noisy and poor conductors of electricity. Telephone men saw that wires to provide good service would have to be made either of silver or of copper; but silver was too costly, and copper too soft. Hard-drawn copper wire solved the problem.

Meanwhile, improvement after improvement was being made in the switchboard. Switchboards had been used in the telegraph industry before the advent of the telephone, and such instruments were adapted to the problems of connecting one telephone subscriber with another, although the capacity for interconnection was extremely limited. Interconnection was for a time limited also by the fact that many of the telephone lines were subscriber owned. Demands of subscribers for broader service, however, led to the construction of company-owned lines and the development of the switchboard. The first city to have a commercial telephone exchange was New Haven, Conn. It was installed in 1878 and provided interconnection between eight lines, on which 21 telephones were served. In the same year, the American District Telegraph Company opened a telephone exchange in Chicago.[1]

With instruments, lines, and switchboards the foundations of exchange telephone service had been laid. Improvements to the instruments followed each other in rapid succession. From 1877 to 1914, for example, there were designed, constructed, and installed 53 improved types of telephone receivers and 73 types of transmitters. The most recent type of instrument, the hand set having both receiver and transmitter in the same instrument, has been widely installed.

The growth of exchange service in metropolitan areas created problems in the construction and maintenance of wire plant which for a time threatened to limit the expansion of the service, the

[1] RHODES, F. L., "Beginnings of Telephony," p. 149, Harper & Brothers, New York, 1929.

capacity of streets and pole lines for open wires having been reached in some of the larger cities. Early experiments had been made with cables, but service was unsatisfactory owing to cross talk and limitations upon conductance. Experimental cables were laid for a short distance along a railroad track in Massachusetts in 1882; and within a year or so after that, the first underground cables for commercial use were laid in Boston and Brooklyn, but the subscribers using such cables could not talk satisfactorily farther than the suburbs. On Jan. 1, 1886, there were only 3,417 miles of wire underground in the Bell System out of a total wire mileage of 155,791.[1] However, the introduction of the twisted-pair, underground conductor in 1887 and the application of the loading coil in 1902 so improved the efficiency of cables that cable construction proceeded rapidly. By the end of 1905, all except 20 per cent of the exchange wire in the Bell System was in cables of which 54.1 per cent was in cables underground; and at present, considerably more than 90 per cent of the exchange wire is in cables with about three-fourths underground. The number of conductors per cable has increased from 30 to 60 pairs originally to 1,200 pairs in the cables commonly used in the larger cities. In 1928, a 1,818-pair exchange cable was developed for use in the most concentrated districts. The use of cables represents an economy in copper, since much smaller wires are used; it economizes in plant construction and maintenance; and it relieves congestion. A 2,400-wire cable, less than 3 in. in diameter, corresponds in open wire to 12 huge pole lines, each carrying 20 ten-pin crossarms.

The switchboard has grown from the simple "jackknife" boards first introduced to an instrument the complexity of which beggars description. Magneto switching arrangements, still used in small places and scattered rural areas, were soon displaced by the common battery system in the larger places. The trend in development in manual switchboards has been toward more and more automatic performance of the necessary switching and signaling operations by means of complicated circuit and equipment arrangements, thus saving the time of operators and improving the service. The most recent, and in many respects the most significant, development in the switchboard is the introduction

[1] "Things Worth Knowing about the Telephone," p. 34, American Telephone and Telegraph Co.

of automatic switching. Coming after the telephone service had reached extensive development, it was necessary not only to design and construct satisfactory equipment but to work out a complete interconnecting arrangement such that manual and dial systems could operate together during the transition period without unduly burdening subscribers with special procedures. With millions of stations in a single metropolitan area, it would have been impracticable as well as prohibitive in cost to have made a complete change from manual to dial operation at one time. The first dial office was installed in the Bell System in 1921. Since then, the number of telephones switched automatically has increased year by year, until on Dec. 31, 1932, 5,856,238 telephones, or 42.5 per cent of the total of the Bell System, operated under the dial system. The dial is more accurate than the manual system and is quicker and cheaper where fully installed, the improvement being especially notable in the larger cities. Furthermore, with the dial there is less variation in the speed of connection, and full operating facilities are available at all times—at night and on Sundays and holidays when manual boards must be operated with largely reduced forces. It allows a concentration of the manual effort on that part of the service which requires personal attention, such as the handling of toll calls, special services, and manual operations supplementing the dial.

A most significant development in the exchange service in adapting it to the needs of large telephone users is that of the private branch-exchange service. Such an exchange is located on the premises of the subscriber and is usually operated by an employee or by employees of the subscriber. It provides connection with the whole telephone system for each telephone connected with the private branch exchange and permits one extension to call another without going through the central office. These private branch exchanges range from the small, cordless ones with a few extensions to huge ones with hundreds of extensions, employing as many operators as many of the smaller telephone systems. At present, the private branch-exchange installations of the Bell System include about one-fifth of its total number of telephones, in the operation of which subscribers employ approximately 100,000 operators. The telephone companies carry on a number of activities which are designed to

assist subscribers with private branch boards in obtaining satisfactory service, such as maintaining specially trained groups for rendering assistance, supplying competent operators either for permanent or for temporary employment, and providing school facilities for training and retraining subscribers' employees.

Many other devices and service improvements have been developed which adapt the exchange service to those who have special communication needs. In the residence service, for example, are extension telephones and elaborate wiring plans for large residences, portable telephones with cord and plug, and receivers with amplifying units for the hard of hearing. In the business service, besides private branch exchanges, are code-calling equipment, order turret service, mechanical interconnecting systems which do not require a switchboard or an attendant, private lines not connected with the general telephone system, and many others.

Important as have been the mechanical improvements in the exchange service, there are other improvements in operation and in the organization of the service worthy of special mention. The worth of telephone service to the public is dependent, among others, upon the following considerations: (1) that a new subscriber, or one who has moved, be provided with a telephone at the earliest possible moment and usually on an appointed date; (2) that the subscriber be enabled to make immediate connection with those whom he wishes to call; and (3) that his telephone be seldom out of order and, when out of order, that repair be made promptly. To meet these requirements, not only must adequate and efficient equipment be furnished, but a body of workers must be properly trained and organized. That the Bell System has made remarkable progress in these respects is shown by the facts that, in 1935, for the whole system 83.1 per cent of local calls were completed on first attempt, almost all those not completed being due to the fact that the line was busy or the party did not answer; 95 per cent of the installations were made on an appointment basis; the average number of times a telephone was out of order had been reduced to once in 23.6 months; and 96 per cent of the troubles were cleared on the day reported.[1]

Development of Long-distance Service.—The telephone service was first developed as a local service. In 1880, when the Ameri-

[1] Annual report of the American Telephone and Telegraph Co., p. 3, 1935.

can Bell Telephone Company was organized, there were in service in the United States less than 30,000 telephones, scattered in 138 cities and towns and unconnected with each other by telephone lines.[1] It was Bell's dream to establish telephone service between cities and eventually on a national scale, but the fulfillment of this dream came only after a multitude of problems, both technical and financial, had been solved. One of the first problems concerned the financing of the construction of long-distance lines, whether they should be financed by the local licensees of the Bell Company or by the central organization. The latter policy was adopted and followed throughout, so that the network of telephone lines which tie together the properties of the local companies into a national telephone system represents largely the work of the American Bell Telephone Company and its successor the American Telephone and Telegraph Company.

The first intercity line was built between Boston and Lowell in 1879. It was a success from the beginning and was followed, in 1880, by a line from Boston to Providence. The latter was a failure at first; but with the introduction of a metallic circuit, conversation was so much improved that its use increased rapidly. The practicability of long-distance telephony having been demonstrated, projects were launched for other and longer lines, and for the next decade or so the major interest of the American Bell Company was the extension of the long-distance service. An experimental circuit was established between Boston and New York, a distance of 235 miles, in 1884, which by the following year had proved entirely successful. Soon thereafter, New York and Philadelphia were connected, and the long-distance lines spread out in many directions. Significant from a financial standpoint was the fact that with the growth in demand for additional facilities, more circuits could be placed on the pole lines, thus decreasing the plant cost per message. The number of miles of toll wire per mile of pole line for the Bell system increased from 5.6 on Jan. 1, 1900, to 9.4 on Jan. 1, 1907.

Two inventions which contributed more than any others to the development of long-distance telephony were the loading coil

[1] THAYER, H. B., Development of a National Telephone Service, in H. B. Dorau, "Materials for the Study of Public Utility Economics," p. 34, The Macmillan Company, New York, 1930.

and the repeater, the latter based on the invention of the three-element vacuum tube by DeForest. As a result of their application, telephone communication from New York to Chicago was possible by 1892, to Denver by 1911, and to San Francisco by 1915. A second transcontinental line, New York to Los Angeles, was completed in 1923; and a third, New York to Seattle, in 1926. In 1921, three cables were laid from Key West to Havana, which established telephone communication with Cuba; and a fourth was added in 1931. In 1927, commercial telephone service was begun between the United States and Mexico City, Tampico, and a number of other points in Mexico. Telephone communication with Canada has long been established. At present, practically all the telephones in Canada have connection with the system in the United States, there being about 100 long-distance circuits from the United States to important Canadian centers, from which other points are reached.

The growth in volume of long-distance telephone business in the United States has been so rapid, especially since 1923, that it would be difficult to provide with open wires the circuits necessary. Cables have come to fill the need but only after many improvements and inventions. When cables were first introduced, less than half a mile of cable in a circuit was enough to interfere seriously with conversation between city and suburbs; but by 1920, conversation was possible through 2,000 miles of cable. Also, the size of wire used in cables was materially reduced. As late as 1916, cables contained circuits for long distance having 320 lb. of copper per mile of circuit; but by 1919, this was reduced to 80 lb. With the application of the loading coil and the repeater to cables, a single, standard, full-size cable is capable of providing 250 to 300 long-distance circuits. The first long-distance toll cables in the United States were placed in service, in 1906, between New York and Philadelphia and between Chicago and Milwaukee, both underground. In 1914, an underground toll-cable route was completed between Boston, New York, Philadelphia, and Washington. A cable running west was completed to Chicago in 1925 and to St. Louis in 1926. The cable network has been extended southward to Atlanta and to intermediate points in many directions. By the end of 1930, 75 per cent of the cities of 50,000 population and over were connected with the toll-cable network. At that time, 77 per cent

of the toll wires were in cables. Cables not only provide a great number of circuits, but they are less subject to interruption than open wires and provide better transmission.

The carrying capacity of open-wire toll lines has been greatly increased during the past decade or so by the application of the "phantom" and the "carrier-current" principles. A phantom circuit is a circuit superimposed upon two wire circuits by so connecting the two wires, or "sides," of each ordinary circuit that they can be used as one side of the phantom circuit. In this way, three practical talking circuits can be obtained from four wires. Both open-wire and cable circuits are, in general, phantomed. Carrier-current systems provide additional telephone channels by currents above the voice range of frequencies. Two types of carrier systems are standard for use in the Bell System. One of these, designed for longer hauls, provides on one pair of wires three telephone circuits in addition to the voice-frequency circuit. They form a part of some of the longest toll circuits. For example, the direct circuits between New York and Los Angeles are made up of cable circuits from New York to Pittsburgh connected permanently to a Pittsburgh-Saint Louis carrier system and a Saint Louis-Los Angeles carrier system, the two carrier systems totaling 2,730 miles. The longest carrier system is between Chicago and Sacramento, Calif., a distance of 2,280 miles. These with the short-haul systems now form a network covering the entire country. In some areas, a large proportion of the circuit growth on open-wire lines is taken care of by carrier systems.

The short-haul carrier is similar in general characteristics but is simplified and provides a single carrier circuit for each pair of wires. Some of these are not more than 40 or 50 miles in length. In addition, telegraph circuits may be superimposed upon telephone circuits, and the wires used partly for the one and partly for the other. Thus, a pole line with four 10-pin crossarms may be used to provide 70 telephone and 80 telegraph circuits.[1]

Many improvements in operating methods also have contributed to speed and efficiency of the long-distance service. This service is a part of the toll service, which includes all calls between exchanges, and for a long time most of the short-haul toll calls

[1] GHERARDI and JEWETT, "Telephone Communication in the United States," American Telephone and Telegraph Co., pp. 45–50.

were handled in the same manner as the long-haul calls. At present, however, about 70 per cent of the toll business of the Bell System, including large volumes of short-haul traffic around metropolitan centers, is handled at local switchboards along with exchange calls. Service on the long-haul traffic, mostly messages over 60 miles, is handled at toll boards. Improvements in methods of operation have reduced the average time necessary to complete a long-distance connection to about 1½ min., as compared with more than 9 min. a decade ago. About 90 per cent of the toll-board calls are handled while the calling party remains at the telephone.[1]

The total number of messages transmitted over the long-distance lines of the American Telephone and Telegraph Company grew steadily year by year from a few million in 1900 to more than 50,000,000 in 1930, since when there has been a considerable decline. Striking features of the growth of the long-distance service are the rapidity of the growth since 1923, due to increased facilities, better transmission, and improved methods of operation, as well as reduced rates, and the more rapid growth of very long haul business than that of moderate length. During the years 1923–1928, inclusive, the toll business as a whole increased 67 per cent, and the New York-Boston business 62 per cent. During the same period, however, the New York-Chicago business increased 194 per cent, and the transcontinental business 430 per cent.[2]

An interesting development of the long-distance service in connection with the marketing of products is the so-called "key-town" selling plan. Key-town maps showing the location of key towns and the rates for calls to near-by points have been prepared and made available for salesmen. Under such a plan, the salesman visits the key town and then covers the neighboring territory by telephone. Or, under a modified plan—the "skip-stop" plan—he visits alternate towns on his route, covering intermediate towns by telephone. The program is varied so that on the next trip he visits towns covered on the former trip by telephone. Telephone companies provide facilities for the comfort and convenience of salesmen, even to the extent of charg-

[1] FRENCH, M. B., Improvements in Telephone Service, *Bell Tel. Q.*, vol. 12, pp. 16–18, 1933.

[2] GHERARDI and JEWETT, *op. cit.*, pp. 42–43.

ing the calls to the account of the home office for accredited sales representatives. The key-town plan of selling has been of service in the marketing of standardized products of various kinds and the sale of perishables and special lots of goods. It has also been useful in distributing price information; in subscription renewals, recharges, and refills; and in general sales follow-up, the handling of complaints, the making of adjustments, and the answering of questions.[1]

The Bell System provides private telephone service over the long-distance lines. Such service gives the subscriber exclusive use of a circuit during the business day or for such portion of the day as he may desire. Users of the service have complete control of its operation and may devise special operating practices to meet individual needs. A subscriber can connect his offices, plants, and the various other units of his business and have voice communication available at all times for officers, department heads, superintendents, sales managers, and other executives. The American Telephone and Telegraph Company furnishes about 1,000 private-wire telephone services, of which more than 250 are used by financial houses. The circuits radiate from a score or more of the chief cities, there being nearly 200 private telephone circuits between New York and Philadelphia and over 100 between New York and Boston. Many circuits are long ones, among them being those between New York and Chicago and between New York and the Pacific Coast. The long-distance lines, as has been seen, are used also for private-wire telegraph service.

With the development of chain broadcasting, the Bell System has found a new and enlarged use for its facilities. Chain broadcasting is accomplished by the use of wire lines to carry the same program material to the transmitting apparatus of a large number of stations simultaneously. The lines for these circuits are obtained principally from the American Telephone and Telegraph Company. During the year 1931, this company furnished program-transmission circuits, measuring more than 44,000 miles, to 12 networks throughout the United States. In addition to the program circuits, it furnished 34,000 miles of telegraph and teletypewriter circuits for use in connection with

[1] Coe, R. S., Some Auxiliary Services and Facilities of the Bell System, *Bell Tel. Q.*, vol. 10, pp. 150–163, 1931.

the coordination of program circuits.[1] At the end of 1933, the wire plant used for network broadcasting totaled about 53,000 miles of open wire and approximately 59,000 miles of wire in cables. The revenue from program-transmission service in 1933 amounted to about $3,500,000. A recent development of importance in the utilization of the long-distance lines is that of Wide World Photos, a subsidiary of the *New York Times*, which involves the transmission of pictures over ordinary long-distance circuits with portable transmitting equipment and greatly simplified receiving apparatus. This service is similar to that of the Associated Press Wirephoto and Hearst Telepicture systems.

Organization of the Bell System.—The bulk of the telephone service in the United States is furnished by the Bell System, consisting of the American Telephone and Telegraph Company and its 23 associated telephone companies. The establishment of the validity of the Bell patents left the original Bell companies with almost complete control over the use of telephone apparatus within the United States until the expiration of the basic patents in 1893 and 1894. In the beginning, the small group of Boston merchants who undertook to develop the telephone granted short-term licenses to individuals and corporations to use telephone apparatus in different territories, the parent company furnishing the telephones on rental. These contracts were made for limited periods of 5 or 10 years and contained clauses whereby at the expiration of the contracts the Bell organization would be permitted to take over the property of the licensees at a fair valuation; thus control was retained in the central organization. In 1880, the American Bell Telephone Company was organized with considerably more resources than the Bell organization had had previously; but instead of setting out to purchase the properties of the licensees and establish a system on a national scale, which would have required a great deal more capital than was in sight, it decided to continue the policy of licensing. The temporary licenses were superseded by permanent ones, and thus was created a group of telephone companies operating under patents owned and controlled by the parent company in territories clearly defined and covering the whole country. In 1880, a contract

[1] Commercial Radio Advertising, *Sen. Doc.* 137, 72d Cong., 1st Sess., pp. 28, 29.

was made with the Western Electric Company which provided for the manufacture of standard equipment for the Bell companies; and a little later the parent company established a central headquarters staff to advise its licensees as to apparatus and operating methods and to study, develop, and standardize such apparatus and methods. Within ten years of the first public exhibition of the telephone, the working organization of the Bell System was established substantially in the form in which it is today.

Local telephone service of the Bell System, as well as a large part of the toll service, is furnished by the associated companies which operate in the different sections of the United States. At first, there was a large and increasing number of Bell companies, the licenses being granted for small territories under restricted terms; but gradually, in order to bring about closer coordination, to eliminate duplication of organization, and to effect many other economies, local companies were combined into larger units. At present, there are 24 local companies, operating in territories bounded as shown in Fig. 1. At first, the local companies were independently owned; but soon, in order to effect a more perfect control of their activities and to prevent rival interests from obtaining control of parts of the telephone system, the central organization began to acquire the voting stock of these companies. At present, the American Telephone and Telegraph Company owns directly or indirectly about nine-tenths of the voting stock of the associated companies.

The American Telephone and Telegraph Company is the central and controlling company of the Bell System. It is mostly a holding company, although it operates a Long Lines Department. It was organized in 1885 largely to overcome some of the obstacles which the American Bell Telephone Company was experiencing in raising capital to construct long-distance lines. It was licensed by the latter company, and its principal function was to develop the long-distance service, which by the terms of the licenses given the local companies was to be reserved to the central company, except that the local companies were to be permitted to construct long-distance lines in their territories, provided that where such service should not be satisfactory, the parent company would be permitted to establish its own lines. In 1899, it acquired all the assets of the American Bell Telephone

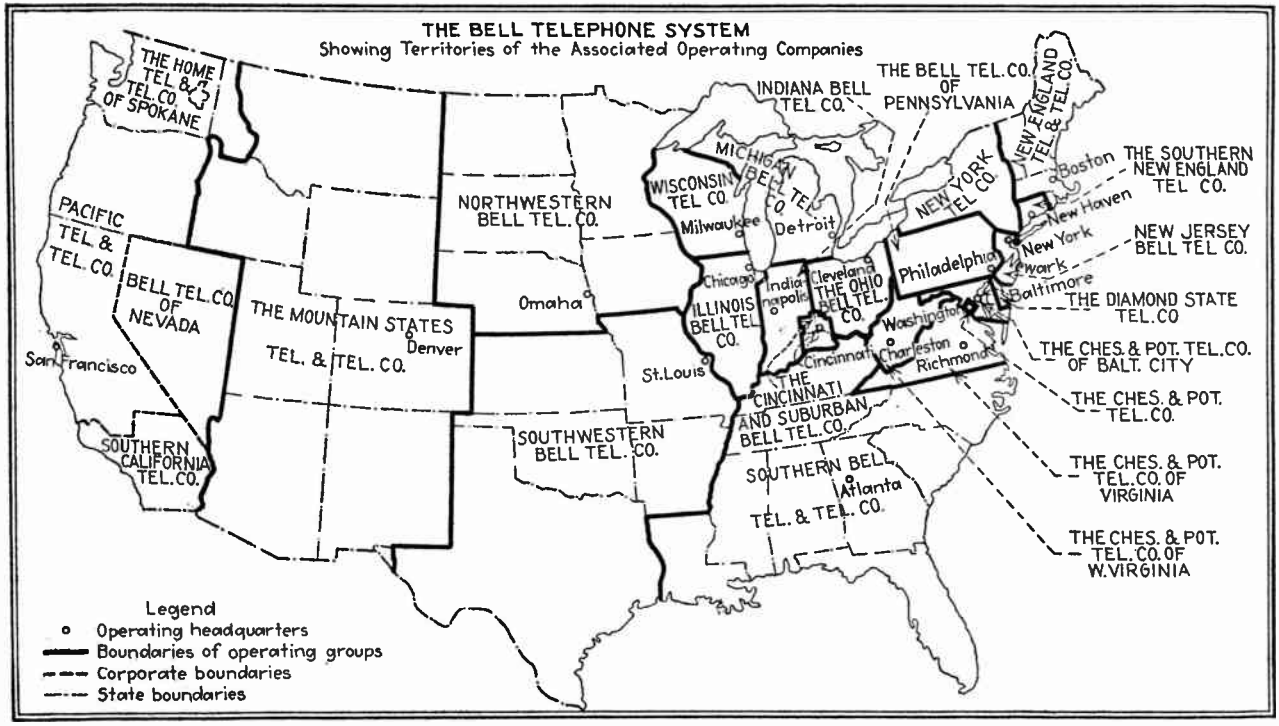


FIG. 1.

Company, since which time it has been the headquarters company of the Bell System.

Although primarily a holding company, the American Telephone and Telegraph Company owns and operates the long-distance lines which interconnect the territories of the local companies. Until 1927, it owned and maintained all telephones in the Bell System, but in that year they were sold to the associated companies. From the beginning, it has been chiefly instrumental in the development and introduction of new ideas and inventions, the improvement of traffic methods, and the remedying of troubles for the Bell System. It purchases and perfects inventions, gives to the local companies rights to the use of all inventions owned or controlled by it, and guarantees freedom from royalties, damages, and expenses on account of suits arising out of the use of recommended apparatus, methods, and systems. It studies all construction, present and future development or extension schemes, makes plans and specifications for these, and gives to the local companies, when desired, general supervision and advice. It has a corps of experts which is at all times at the service of the local companies to give advice and assistance in general engineering, plant, traffic, operating, commercial, accounting, patent, legal, administrative, and other matters involved in the efficient and economical conduct of the telephone service. It also gives assistance in financing.

The Bell System is one of local, autonomous operation and centralized administration. The former has enabled telephone development to conform to local operating and legal requirements, while the latter has been instrumental in the development of a uniform, standardized service, without which a satisfactory national telephone system could scarcely have been established. The American Telephone and Telegraph Company also controls the Western Electric Company, which, as has been said, is the manufacturing subsidiary for the Bell System, and Bell Telephone Laboratories, a research subsidiary. Thus, the Bell System is completely organized for research, manufacture, and operation.

Telephone Development by Independent Telephone Companies.—The discussion so far has been concerned mostly with the development of the Bell System, but it is not to be implied that this system would present a complete picture of the telephone

system of the United States. Of the telephones served by the Bell companies, about two-thirds are located in cities of more than 50,000 population. Outside such cities, the Bell companies serve only about as many telephones as are served by companies independent of Bell control. There are more than 6,000 independent companies which furnish the only telephone exchanges in some 14,000 communities. In normal times, they serve about 4,500,000 telephones. Most of these are in smaller towns and cities, although there are a few large independent exchanges. There are independent companies in every state except Delaware, although independent companies have almost disappeared in some of the mountain and the Eastern states. The greatest numbers are found in the Midwestern states. Table 3 presents a list of the number of independent telephone companies in each of the states.[1] In addition to these companies, there are many thousand mutual companies and farmer lines.

During the life of the basic Bell patents, the Bell interests had a practical monopoly of the telephone service; but with the expiration of those patents in 1893 and 1894, other parties were enabled to manufacture and use telephone equipment. By this time, the industry was well-established and prosperous, and the feeling was general that there was great profit in the telephone service. Independent manufacturers began extensive operations and furthered the construction and operation of telephone exchanges. Within a short time, in almost every city in which Bell exchanges existed, rival exchanges were established by independent companies. Some of these expected to profit from a certain amount of dissatisfaction with Bell service and rates, while others were mere promoters' schemes built upon the hopes of taking away the telephone business from the Bell companies by the offer of lower rates. Many, however, were established in towns not then served by the Bell companies, especially in the agricultural states, there to become powerful competitors of the expanding Bell System. Others were mutual companies, organized not for profit but primarily for the purpose of furnishing service to the members of the associations. In addition, many farmer-owned, or rural, lines were established in sparsely settled districts.

[1] Statement of F. B. MacKinnon, Hearings on S. 2910, 73d Cong., 2d Sess., p. 136.

TABLE 3.—INDEPENDENT TELEPHONE COMPANIES

State	Number of companies	State	Number of companies
Alabama	91	New Hampshire	31
Arizona	5	New Jersey	5
Arkansas	83	New Mexico	13
California	90	New York	222
Colorado	57	North Carolina	90
Connecticut	4	North Dakota	254
Florida	26	Ohio	270
Georgia	93	Oklahoma	224
Idaho	33	Oregon	110
Illinois	384	Pennsylvania	239
Indiana	352	Rhode Island	1
Iowa	466	South Carolina	65
Kansas	390	South Dakota	201
Kentucky	96	Tennessee	115
Louisiana	18	Texas	389
Maine	84	Utah	17
Maryland	4	Vermont	34
Massachusetts	5	Virginia	130
Michigan	147	Washington	102
Minnesota	302	West Virginia	85
Mississippi	8	Wisconsin	536
Missouri	300	Wyoming	42
Montana	57		
Nebraska	160	Total	6,441
Nevada	11		

Although most of the mutual companies and the farmer lines were not actual, or potential, competitors of the Bell companies, the larger independent companies were set up in direct competition with them. The competition was severe and lasted for several decades. Even today, it has not wholly disappeared. On the side of the Bell companies were financial strength and the most extensive service then available, the latter being of particular significance, since in the telephone industry the value of the service is proportional to the number of subscribers connected. New companies with only a few subscribers, and with no long-distance service, found it difficult to obtain subscribers. Their principal fighting policy was the offer of lower rates, but in many instances it was a disastrous policy. It was responsible for under-maintenance and resulting poor service and often for bankruptcy.

Many of the independents were strong companies. In some instances, they offered a newer and better service at comparable or lower rates than the Bell companies and prospered. In other cases, the independent companies had preceded the Bell development with the result that the Bell companies in expanding their systems found themselves in the position of newcomers competing with established systems. The competitive position of the independents had one great weakness, however; they lacked long-distance facilities comparable with those of the Bell System. Cognizant of this weakness and feeling the need of securing mutual assistance in fighting the Bell companies, the independents, in 1897, organized a national association called the National Association of Independent Telephone Exchanges (now the United States Independent Telephone Association). Among the objectives which the association was created to attain were (1) the union of all independent companies in the country for mutual protection and development; (2) the establishment of long-distance toll lines by the connection of independent exchanges at convenient points; (3) an independent long-distance service connecting the great commercial centers; and (4) cooperation for resisting the Bell interests in the courts.[1]

The Bell companies first met the competition by improved service and by reduced rates. In the matter of reducing rates, they possessed a distinct advantage. They were larger, consisting of a number of exchanges, and where rates were lowered in one exchange area to meet competition, losses could be met in exchanges where no competition existed. Many of the independent companies, on the other hand, were single exchange organizations. The Bell companies early made some sporadic attempts to purchase competing exchanges, but it was not long before this became an established policy. The carrying out of such a policy was often prevented, however, by the fact that many of the franchises which the too eager promoters of independent companies accepted contained clauses which provided that they might not sell their properties to the Bell companies under any circumstances.

One rival organization was set up among the Bell licensees. Owing to the fact that at that time stock control of all licensees

[1] STEHMAN, J. W., "Financial History of the American Telephone and Telegraph Company," p. 56, Houghton Mifflin Company, Boston, 1925.

had not been obtained by the central company, the Erie Telegraph and Telephone Company obtained control of the Cleveland Telephone Company, the Northwestern Telephone Exchange Company, the Southwestern Telegraph and Telephone Company, the Michigan Telephone Company, and the Wisconsin Telephone Company, five licensees of the Bell System, operating about 15 per cent of the total number of lines. Such an organization had possibilities of becoming a real competitor of the system controlled by the American Telephone and Telegraph Company, but it came upon evil days. A reorganization was necessary, and, in 1902, it was succeeded by the Western Telephone and Telegraph Company, of which, by 1905, the American Telephone and Telegraph Company obtained control.

The competition between the independents and the Bell companies continued actively until 1914. In the meantime, the Bell policy of purchasing competing exchanges aroused criticism from the independents, who felt that a monopoly of the telephone service was being created. There was very little jurisdiction of telephone companies, franchise regulation consisting mostly of stipulations regarding maximum rates and certain aspects of service; and when after 1907 this was rapidly superseded by commission regulation, the commissions which were set up were given only limited powers. In 1910, largely as a result of agitation by the independents, telephone and telegraph companies engaged in interstate communication were placed under the regulation of the Interstate Commerce Commission, but its powers also were limited. It undertook little regulation of telephone companies except to institute a uniform system of accounts and to require reports. Eventually, the independent companies brought their complaints against the policy of the Bell System to the attention of the Attorney General's office.

The independents complained that the American Company had not contented itself with the normal extension of its system but that it had purchased competing lines in such manner as to destroy competition which otherwise would have tended to provide the public with better service at lower rates. In the second place, it had refused, either directly or through competitive and originally independent lines acquired by it, to make connections with local lines not owned and controlled by it and its long-distance lines, having in many instances terminated con-

tracts and arrangements for the interchange of business. In the third place, where it granted such connections and interchanged business with independent companies, it did so in such manner as, in effect, to prevent a satisfactory interchange, thereby intending to discourage the patrons of the independent companies and to drive them into the Bell System. The independents also contended that the Bell System rates for local and long-distance service were unduly high where no competition existed. A further compaint lodged against the American Company concerned its alliance with the Western Union Telegraph Company.[1]

The policy of the Bell companies of not granting toll connections to competing companies was a fighting policy, based upon economic, not physical, considerations, since these companies had for a long time connected with noncompeting exchanges. The complaints of the independents were called to the attention of the Interstate Commerce Commission by Attorney General Wickersham in a letter dated Jan. 7, 1913, suggesting that that body was clothed with ample powers and should make a thorough investigation. At a general session of this Commission, Jan. 13, 1913, an investigation was ordered. Meanwhile, a series of interviews and negotiations between the American Telephone and Telegraph Company and the Attorney General culminated in the adoption of a policy by the American Telephone and Telegraph Company that for the time served to silence most of the criticism. The main features of this policy were: (1) The American Telephone and Telegraph Company would promptly dispose of its holdings of stock of the Western Union Telegraph Company; (2) it would discontinue the policy of purchasing control of competing exchanges and companies; and (3) it would make arrangements promptly under which all other telephone companies might secure for their subscribers toll service over the lines of the Bell System.[2] Legal action against the policy of purchasing competing exchanges was taken by the Department of Justice; and a United States district court in Port-

[1] Letter of Attorney General G. W. Wickersham to the chairman of the Interstate Commerce Commission, Jan. 7, 1913, reprinted in the annual report of the American Telephone and Telegraph Co., 1912.

[2] Letter of N. C. Kingsbury, vice-president, American Telephone and Telegraph Co., to the Attorney General, reprinted in the annual report of that company for 1913.

land, Ore., Mar. 26, 1914, ruled that such activities on the part of two Bell companies were in violation of the Sherman antitrust law.

The Bell companies began immediately putting into effect the policy above outlined, but it still left the competitive situation unsatisfactory from the standpoint of both the Bell companies and the independents. In many cases, duplicate telephone service existed, and such duplication was uneconomic and wasteful. Two exchanges each having the same list of subscribers could not exist together, since subscribers would be paying twice for the same service. Competitive exchanges had different subscribers, except for a few common to both, and those having larger business and social connections were placed under the necessity of installing two telephones in order that they might have a complete service. This tended to raise the cost of service to subscribers and to hamper development. Both parties realized that something had to be done, and a period followed in which many of the duplicate situations were adjusted by exchanges of property between the Bell companies and the independents. In one city, the Bell company would acquire the property of the independent company, while in another the independent would acquire the property of the Bell company. The Department of Justice was not wholly in sympathy with this procedure, but acquiescence was usually given in the cases submitted to it. In 1920, to remove doubt of the legality of such combinations, Congress amended the Interstate Commerce Act to provide that if a telephone company engaged in interstate communication should desire to acquire control of another, it might submit the matter to the Interstate Commerce Commission, which might grant or deny a certificate of public convenience and necessity depending upon whether or not the public interest would be served. Since that time, most of the duplications have been eliminated satisfactorily from the standpoint both of the companies and of the public.[1]

Today, practically all telephones in the United States are interconnected; the total on Dec. 31, 1934, was 16,800,000. Of these, the Bell companies operated 13,378,103, the remaining 3,421,897 being operated by 6,700 connecting companies and 25,300 con-

[1] Statement of F. B. MacKinnon, Hearings on S. 6, 71st Cong., 2d Sess., Part 15, pp. 2114, 2130.

necting rural lines.[1] A comparison of the Bell System with all other systems and lines by census years is shown in Table 4.

TABLE 4.—SYSTEMS AND LINES, MILES OF WIRE, AND TELEPHONES, THE BELL SYSTEM AND ALL OTHER SYSTEMS AND LINES (1902–1932)[1]

	Census year	Number of systems and lines	Miles of wire	Number of telephones
All systems and lines	1932	44,828	87,677,586	17,424,406
	1927	60,148	63,836,182	18,522,767
	1922	57,253	37,265,958	14,347,395
	1917	53,234	28,827,188	11,716,520
	1912	32,233	20,248,326	8,729,592
	1907	22,971	12,999,364	6,118,578
	1902	9,136	4,900,451	2,371,044
Bell System	1932	25[2]	80,585,879	13,793,229
	1927	25[2]	56,819,036	13,726,056
	1922	26[2]	30,613,687	9,514,813
	1917	145	23,133,718	7,326,858
	1912	176	15,133,186	5,087,027
	1907	175	8,947,266	3,132,063
	1902	44	3,387,924	1,317,178
All other systems and lines	1932	44,803	7,091,707	3,631,177
	1927	60,123	7,017,146	4,796,711
	1922	57,227	6,652,271	4,832,582
	1917	53,089	5,693,470	4,389,662
	1912	32,057	5,115,140	3,642,565
	1907	22,796	4,052,098	2,986,515
	1902	9,092	1,512,527	1,053,866

[1] Census of Electrical Industries; Telephones and Telegraphs, 1932, p. 24.

[2] Not including Bell-controlled companies. The earlier figures included Bell-controlled companies. The 145 Bell companies shown for 1917 comprised 37 constituent companies and 108 controlled companies. As a result of reorganization and changes in ownership, the number of constituent companies was reduced to 25 in 1927, while the number of controlled companies was reduced to 65. The controlled companies outnumber the constituent companies but are much smaller. The investment in plant and equipment reported by the controlled companies for 1927 was equal to only 1.7 per cent of the investment reported by the Bell System; and the corresponding percentages for number of telephones and total operating revenues were only 2.4 and 1.5 per cent, respectively.

There are many smaller integrated, or partly integrated, units in the telephone industry among the so-called independent companies not owned or controlled by the Bell System. The largest independent integrated system is that of the Associated

[1] Annual report of the American Telephone and Telegraph Company, 1934, p. 18.

Telephone Utilities Company, incorporated in Delaware, in 1926. From 1926 to 1932, it acquired control of some 340 companies that either operated telephones or controlled companies that did. These companies or properties were consolidated or merged into 42 operating companies, 8 subsidiary holding companies, and 1 company engaged in the telephone-directory business. On Dec. 31, 1930, the companies of this system operated nearly 500,000 telephones in 25 states. Other independent integrated systems besides the Associated Telephone Utilities Company, are Theodore Gary and Company, Mid-West States Utilities, and others controlled by pure holding companies of management or investment types.

Statistical Summary.—The telephone industry of the United States has grown rapidly and, until 1931, consistently. In 1890, there were some 53 systems with annual incomes of $5,000 or more. These systems owned 240,412 miles of wire, 233,678 telephones, and had $72,341,736 invested in plant and equipment. In 1902, the first year in which the Census Bureau made a census of electrical industries, the number of such systems had grown to 4,151, with 4,850,486 miles of wire, 2,315,297 telephones, and $398,967,723 invested in plant and equipment. From 1902 to 1917, the miles of wire owned by systems with annual incomes of $5,000 or more increased more than five times, the number of telephones more than four times, the number of calls originated nearly four times, and the investment in plant and equipment nearly four times. Principal statistics for all systems and lines reporting to the Census Bureau are shown in Table 5.

The vast majority of telephone systems and lines are farmer, or rural, lines and lines operating in small towns or villages. Important as they are to the communities that they serve, they do in the aggregate a very small proportion of the total telephone business. In 1932, there were 43,910 systems and lines with annual incomes of less than $10,000. These systems, which constituted 97.9 per cent of the total number in the United States, owned only 1.4 per cent of the total miles of wire and 6.5 per cent of the total number of telephones, originated 3.2 per cent of the total number of calls, earned 1.4 per cent of the total operating revenues, and had invested in plant and equipment 1.2 per cent of the total for all telephone companies.[1]

[1] Census of Electrical Industries; Telephones and Telegraphs, 1932, p. 2.

TABLE 5.—SUMMARY, PRINCIPAL STATISTICS, ALL SYSTEMS AND LINES: 1932, 1927, AND 1922

	1932	1927	1922	Percentage of increase; — denotes decrease		
				1927–1932	1922–1927	1922–1932
Number of systems and lines	44,828	60,148	57,253	−25.5	5.1	−21.7
Total miles of wire	87,677,586	63,836,182	37,265,958	37.3	71.3	135.3
Number of telephones	17,424,406	18,522,767	14,347,395	− 5.9	29.1	21.4
Residence	11,089,946	12,128,617	[1]	− 8.6		
Business	6,334,460	6,394,150	[1]	− 0.9		
Number of calls originating with systems reporting	30,048,165,513	31,614,172,621	24,647,560,860	− 5.0	28.3	21.9
Number of central offices	19,228	20,227	19,260	− 4.9	5.0	− 0.2
Revenues, operating	$1,061,530,140	$1,023,573,567	$ 665,568,279	3.7	53.8	59.5
Exchange	$ 752,338,774	$ 701,381,400	$ 467,231,512	7.3	50.1	61.0
Toll	$ 281,047,593	$ 294,625,256	$ 180,069,891	− 4.6	63.6	56.1
Number of employees	334,085	375,272	312,015	−11.0	20.3	7.1
Male	128,677	131,802	104,433	− 2.4	26.2	23.2
Female	205,408	243,470	207,582	−15.6	17.3	− 1.0
Salaries and wages	$ 458,116,677	$ 486,597,070	$ 352,925,570	− 5.9	37.9	29.8
Investment in plant and equipment	$4,791,902,525	$3,548,874,716	$2,205,183,150	35.0	60.9	117.3

[1] Not called for on schedule.

Source: Census of Electrical Industries; Telephones and Telegraphs, 1932, p. 9.

Telephone development in the United States reached its peak in the year 1930. At the end of that year, there were 15,682,059 telephones in the Bell System, which, together with 4,416,000 telephones of connecting companies and lines, made a total of 20,098,059 interconnected telephones. Average daily exchange conversations for the year were 62,365,000; and average daily toll conversations, 2,933,000. The number of Bell System telephones decreased a little less than 2 per cent in 1931 and 10 per cent in 1932. The number in service at the end of 1933 was 16 per cent below the maximum development reached in 1930, but the declining trend in number of telephones, which had been consistent since the latter part of 1931, was interrupted in the last 4 months of 1933, with a net gain of 85,000 telephones for that period. Local telephone conversations declined 1 per cent in 1931, 5½ per cent in 1932, and 6 per cent in 1933; and toll and long-distance conversations declined 6 per cent in 1931, 17 per cent in 1932, and 9 per cent in 1933. Toll and long-distance conversations increased materially during the last 6 months of 1933, but the total for the year was 30 per cent below that for 1930, the year of maximum toll and long-distance use. Total operating revenues for the system decreased 2.6 per cent in 1931, 11 per cent in 1932, and 7.7 per cent in 1933. Similar trends are noted in the volume of business and earnings of the independent telephone companies. During the depression, the number of telephones in service of these companies has decreased about one-fourth, and the gross revenues about one-fifth. In 1934, the business of the Bell System showed marked improvement over the 1933 volume. There was a net gain of 298,000, as compared with a net loss of 630,000, telephones in 1933; local calls increased 2.6, and toll calls 4.6, per cent over 1933. In 1935, the number of telephones increased 466,500; local calls increased 4.1, and toll and long-distance calls 4.6, per cent.

Comparative Telephone Development.—When the telephone development of the United States is compared with that of other countries, several striking facts appear. In the first place, there are in the United States more telephones than in all the rest of the world combined, according to statistics compiled by the Chief Statistician's Division of the American Telephone and Telegraph Company. Of 32,495,855 telephones in the world, as of Jan. 1, 1934, there were in the United States 16,710,858, or

51.4 per cent of the world's total. Europe had 11,306,955 telephones, representing about 34 per cent of the total, and the remaining 4,478,042 telephones, or about 14 per cent, were distributed among the countries of Asia, Africa, Oceania, and the Western Hemisphere outside the United States. The United States had a development of 13.29 telephones per 100 inhabitants, which was the highest of any country, and Canada was second with a development of 11.15. New Zealand ranked third with a development of 10.01, Denmark fourth with 9.99, and Sweden fifth with 9.51 telephones per 100 inhabitants. Of the major European countries, Great Britain, with a development of 4.78, was tenth on the list; Germany was eleventh, with 4.48; and France was sixteenth, with 3.19 telephones per 100 population. In Asia, the bulk of the telephones were concentrated in Japan, but the development in that country was only 1.5 telephones per 100 inhabitants. In South America, the development of Argentina—2.64 telephones per 100 inhabitants—was considerably higher than that of any other country, the next being Uruguay, with 2.14 telephones per 100 inhabitants.

As regards telephone development in larger cities, 9 of the 12 leading cities were located in the United States. Washington headed the list with 35.31 telephones per 100 inhabitants; then followed San Francisco, with 35.00; Stockholm, with 31.95; Denver, with 28.60; Vancouver, with 27.51; Los Angeles, with 25.75; Omaha, with 24.88; Seattle, with 24.49; Toronto, with 24.44; and Minneapolis, with 23.14. The superiority of telephone development in the large cities of the United States was still further shown by the fact that 35 cities of 200,000 population and over had an average development which exceeded that of any single large foreign city, with the exception of Stockholm, Sweden, and the Canadian cities Toronto and Vancouver.

A further outstanding fact is the much higher degree of development in the smaller cities and towns in the United States as compared with other countries. Telephone development in communities of less than 50,000 population in the United States, Jan. 1, 1934, was 9.76 telephones per 100 inhabitants, a development considerably higher than the total development of all other countries with the exception of Canada, New Zealand, and Denmark. This compared with 3.18 in Great Britain, 2.69 in Germany, and 1.84 in France for communities of less than 50,000

population. Telephone facilities in Europe, the statistics showed, were concentrated mainly in the larger cities. London had 37 per cent of all the telephones in Great Britain, Paris over 30 per cent of all those in France, and Berlin more than 15 per cent of all those in Germany. In the United States, New York had less than 9 per cent, and Chicago less than 5 per cent, of the total number of telephones.[1]

Development of a World-wide Telephone Service.—Until 1927, telephone service between the United States and foreign countries was limited to Canada, Mexico, and Cuba; but in that year, radiotelephone service was inaugurated between the United States and Europe. Radiotelephony had its inception before the World War in the invention of the vacuum tube. As early as 1915, engineers had transmitted speech by wire from New York to Arlington, Va., and thence by radio to Mare Island, Calif., and in the same year to the Eiffel Tower in Paris and to the Hawaiian Islands in the Pacific Ocean. In 1916, in conjunction with a mobilization intended primarily to test the efficiency of the wire system in time of war, a conversation was carried on between the Secretary of the Navy in Washington and the battleship *New Hampshire* on the Atlantic; also between the Mare Island Navy Yard on the Pacific Coast and the *New Hampshire*, the latter speech being transmitted over the transcontinental telephone-wire circuit from California to Arlington and there transferred automatically by radio to the ship at sea, the return conversation taking the opposite course. Progress in radiotelephony continued during the war, especially in the development of equipment for airplanes and ships. In 1920, a radiotelephone circuit was established to Catalina Island, 30 miles off the coast of California. This was the only instance up to that time of the use of the radio as part of a commercial telephone system. The circuit was established under war conditions, time not permitting the manufacture and laying of a cable.

After the war, research in radiotelephony was continued and expanded, especially in the transoceanic field. Atmospheric disturbances and interference from other radio stations, in the absence of effective regulation, seemed to create insurmountable obstacles, and it was generally felt that the special field of

[1] World's Telephone Statistics, *Bell Tel. Q.*, vol. XIV, pp. 218–228, 1935.

radiotelephony was limited to communication with mobile units. However, both the range and the dependability of radio circuits were increased rapidly. Speech was transmitted to England during test periods at weekly intervals throughout 1923, and by the end of 1926 such success had been attained that the decision was made to install regular commercial radiotelephone service. Such service between New York and London was inaugurated Jan. 7, 1927.

Transoceanic radiotelephone service has been successful from the beginning. The original long-wave circuit to England has been supplemented by short-wave circuits, and the service extended to practically all the nations of Europe. Service has been established in the Pacific and in cooperation with the International Telephone and Telegraph Company to several countries in South America. In all, 67 different countries may be reached from Bell System telephones. By the end of 1935, all countries with more than 100,000 telephones, except New Zealand, China, and Russia, could be reached by telephone from the United States, and more than 92 per cent of the telephones in the world were interconnected. Radiotelephone terminals established near Miami, Fla., in 1932, are used for connections to the Central American countries of Nicaragua, Costa Rica, Panama, and Guatemala, to Colombia and Venezuela in South America, and to the Bahama Islands. The Western Electric Company also supplies radiotelephone equipment to ground stations and airplanes in the aviation service. Radiotelephone service to ships at sea, which was inaugurated in 1929 by service to the *Leviathan*, has been extended to 19 additional transatlantic liners. Radio stations also have been installed in Boston, New York, Seattle, San Francisco, and Los Angeles for ship-to-shore telephone service with tugboats, other harbor craft, and liners in dock.

The overseas telephone service has shown a consistent growth in volume. In the beginning, the transatlantic service was limited to 4½ hr. a day by the restriction of the hours for telephone use of the Rugby transmitting station in England; but the next year, the time of operation was increased to 10½ hr.; and in Sept., 1929, the service was made available on a 24-hr. basis. The number of messages increased annually until 1932, the transatlantic calls having increased sixfold in the first four years and 21 per cent in 1931 over 1930, owing to the lowering of the rates, improve-

ments in the speed of completing connections and in transmission, an increase in the number of points reached, and the extension of service hours. In 1932, owing to the general depression, overseas telephone messages declined about 10 per cent. In 1933, the volume of traffic again increased, nearly reaching the peak of 1931, but declined slightly in 1934.

Social calls make up a large percentage of the transatlantic telephone traffic. An analysis made a few years ago classified the calls as follows: social, 48 per cent; bankers and brokers, 27 per cent; merchants, 4 per cent; and miscellaneous, 21 per cent.[1] The principal business users are bankers and brokers, the press, government officials, merchants, and professional people. The greatest demand for service comes during those periods of the day in which the business hours in America and Europe overlap, a large part of the calls being to England, with France next. In 1934, of a total number of 19,333 calls, 12,067 were transatlantic; 2,972 were to South and Central America, Bermuda, and the Bahama Islands; 1,452 were transpacific; and 2,842 were ship to shore. A limited number of calls are made to the Far East, time differences presenting a handicap to development. For example, daylight hours of nine to six overlap only one hour in San Francisco and Hong Kong, and the business days in New York and Tokyo do not overlap at all, nor do those in Chicago and Calcutta.

No other development in the field of electrical communications compares with that of the telephone in universality and technical achievement. Next to the mail, it is by far our most important means of social communication, and its business uses are legion. The extent of the development is epitomized by the fact that all but a few of the telephones in the United States, located in almost 90,000 places, are interconnected and that from Bell System telephones more than 92 per cent of all the telephones in the world may be reached. The technological improvements which have been introduced are too numerous to permit even enumeration. These have improved the efficiency of telephone service and have adapted it to a multitude of communication needs. The bulk of this development has been the work of the Bell System, but

[1] MILLER, T. G., "Transoceanic Telephone Service," American Telephone and Telegraph Co., p. 10.

much has been due to enterprising individuals outside this system who have contributed technical improvements and have developed and now maintain telephone service in numerous small communities not served by the Bell companies. The universality of telephone service is markedly greater in the United States than in practically all foreign countries.

CHAPTER IV

THE DEVELOPMENT OF RADIO COMMUNICATION AND BROADCASTING

Radio communication had its first practical demonstration when Marconi showed that an intelligible signal could be sent through space without the aid of wires and received by an instrument properly attuned. In 1896, he demonstrated successfully before Sir W. H. Preece, chief electrical engineer of the General Post Office in England, over a distance of 100 yd.; and later, before post-office officials and naval officers on Salisbury Plain over a distance of 1¾ miles. The following year, he communicated by wireless over a distance of 4 miles; and on New Year's Day, 1898, signals were received from a transmitter 18 miles away. That same year, wireless communication passed one of its most important tests. At the Kingston, Ireland, yachting regatta Marconi fitted up a small ship as a transmitting station with which he followed the races and sent messages of their progress to a receiving station at Kingston. From the receiving station they were relayed by telephone to the *Dublin Daily Express*, which was enabled to print accounts of the races while they were still in progress. Eventually, the range of transmission was increased to 85 and to 196 miles, and finally, on Dec. 14, 1901, a special signal, the letter S, was sent from a transmitter located at Poldhu, England, to a receiver located at Saint Johns, N. F., thus spanning the Atlantic.

Radio Development Prior to and during the World War.—During the early years of radio development, its principal use was found in the field of marine communication; and by 1912, it was given world-wide recognition as an indispensable aid to navigation. The early experiments of Marconi aroused interest in this development, since before the advent of radio no knowledge could be had of a ship at sea except when it came near the land or near enough to another ship for visual communication. Soon after Marconi's demonstrations, a number of transatlantic

vessels were equipped with radio apparatus, and companies were formed for the purpose, among others, of providing news service to ships.

The first company organized in England was the Wireless Telegraph and Signal Company, established in 1897. The name was changed, in 1900, to Marconi's Wireless Telegraph Company, Ltd. (commonly called the British Marconi), its purpose from the very beginning being to establish world-wide communication as well as news service to ships at sea. The first radio-communication company in the United States was the Marconi Wireless and Telegraph Company of America, owned and controlled by the British Marconi, organized as a New Jersey corporation, on Nov. 22, 1899. Until 1912, the American Marconi did not operate any high-power stations for the transmission of commercial transoceanic messages, its principal business being the supplying of radio service to ships. For this purpose, it built and operated about 60 land stations on the Atlantic and Pacific coasts for communicating with ships. Its most powerful station was a high-power station at Cape Cod, Mass., erected originally for transoceanic communication. Through this station, a message was transmitted from President Roosevelt to King Edward VII as early as Jan. 19, 1903. Later, the first transatlantic press dispatch by radio was sent over this station. The Cape Cod station, however, was not powerful enough to insure reliable transoceanic service, and it was devoted to the marine service. As part of its marine business, the American Marconi Company leased radio apparatus to the ships using its service; and by Dec. 31, 1915, it owned and operated the radio apparatus on over 400 ships of the merchant marine.

Until the outbreak of the World War, the American Marconi Company held an important position in marine radio communication from the shores of the United States, although other companies had been organized to engage in this service. The De Forest Wireless Telegraph Company of America, organized in 1903, erected a number of stations along the Atlantic and the Gulf coasts, and later on the shores of the Great Lakes, for communication with ships. In 1905, it became the American De Forest Wireless Telegraph Company; and in 1907, it was absorbed by the United Wireless Telegraph Company. The United Wireless Company immediately laid down a program on a

scale larger than any hitherto adopted, having as its objective the popularization of radio communication on vessels of all kinds. It established additional stations on the Atlantic Coast and stations on the Pacific Coast. Between 1907 and 1912, it equipped about 250 vessels of American registry with radio.[1]

Other companies were the Federal Telegraph Company of California, organized under the laws of that state in 1911; and the Tropical Radio Telegraph Company, a subsidiary of the United Fruit Company, organized in 1913. The Federal Telegraph Company was organized for the purpose, among others, of operating a radiotelegraph system in ship-to-shore and ship-to-ship radio communication on the Pacific. The Tropical Radio Telegraph Company was organized by the United Fruit Company for the purpose of providing communication to aid in the conduct of its business of producing, transporting, and distributing tropical fruit, in connection with which it owned and operated a fleet of ships. It erected land stations at New Orleans and Boston and at a few points in Central America. It installed radio apparatus on board the ships of the United Fruit Company and maintained a radio service with them in the Gulf of Mexico and the Caribbean Sea. As its system became more efficient, its stations were opened to the public for the transmission of commercial messages within the territory served by it.

Commercial development of marine radio communication was given considerable impetus, in 1912, by the leading maritime nations in the form of an international convention. This convention contained regulations concerning the installation of radio apparatus upon various classes of ships. The United States Government participated in the London Conference, at which the convention was adopted, but did not ratify the convention until later. However, in 1910, Congress had enacted a law requiring that all passenger ships leaving the United States ports, whether of American or of foreign registry, carrying 50 or more persons, including passengers and crew, and plying between ports 200 miles or more apart should be equipped with radio apparatus capable of transmitting and receiving messages over distances of at least 100 miles. This Act was amended, in

[1] Adapted from BUCHER, E. E., Early Radio Development, a chapter in "The Radio Industry," p. 32, A. W. Shaw Company, Chicago, 1928.

1912, to include all vessels of American registry navigating the ocean or Great Lakes, carrying, or licensed to carry, 50 or more persons, including passengers or crew or both.

Transoceanic radiotelegraph communication before the World War developed only slightly, owing primarily to the undeveloped state of the art. The spark sets, then in use, which generated what are termed "damped" waves, were not capable of sending messages over the distances involved with sufficient reliability or speed. The American Marconi Company, as we have seen, erected a high-power station at Cape Cod, Mass., as early as 1903, and a few messages were sent across the ocean by it, but it was not powerful enough to insure reliable communication, and it was transferred to the marine service of that company. The British Marconi Company, with its Canadian affiliate, established a radiotelegraph circuit between Nova Scotia and Ireland, which was in continuous operation for several years, carrying mostly news for New York papers. The German Telefunken Company established a station at Sayville, Long Island, N. Y., which furnished Germany a contact with the outside world after her cables were cut in the early days of the war. But all of these attempts to span the ocean met with more or less failure. The need existed for some machine which would generate continuous, or undamped, waves. During the period from 1912 to 1917, several systems were developed which would do this, among them the Poulson arc, the Marconi timed-spark discharger, and the Alexanderson high-frequency alternator. Elaborate plans were underway for the exploitation of these systems when the war interfered, and research was directed to serve military purposes.

Communication by radio over land reached only a slight development before the war, the principal company to experiment with it being the American De Forest Wireless Company, later absorbed by the United Wireless Company. The object of these experiments was to determine by practical working whether or not radio could be employed as a competitor with land lines. Land stations were erected at Chicago, Cleveland, Kansas City, Buffalo, Port Huron, in several cities in Colorado, and along the Atlantic and Gulf coasts. In 1905, overland communication was established in daylight between Cleveland and St. Louis, a distance of about 550 miles, and night communication between

Cleveland and New Orleans and between Cleveland and Key West. This commercial development was insignificant, but the research and experimentation served to disclose many important facts concerning day and night transmission under differing conditions.[1]

During the war, notable contributions were made to radio communication, among these being communication with aircraft developed by both the United States Navy and the Army. Naval communication services were of immense importance to the United States at a time when cables were overtaxed, and there was constant threat of their being cut. Before the war, the United States Navy had constructed a network, using the arc-type transmitter, which included Arlington, Va.; San Diego, Calif.; Darien, C. Z.; Pearl Harbor, Hawaii; Guam; and Cavite in the Philippines. In addition, it had constructed a number of coast stations and had installed radio on its fighting ships and on lightships. To these were added the stations that were taken over from the American Marconi Company, the Telefunken Company, and the station established by a French Company at Tuckerton, N. J. The navy also constructed two high-power arc stations for direct communication with France.

Postwar Development of Radiotelegraph Communication.—During the period of the World War, much progress was made in the development of radiotelegraph apparatus to span the oceans. Of the devices previously mentioned, the alternator perfected by Dr. E. F. W. Alexanderson, an engineer in the employ of the General Electric Company, in 1915, was the most satisfactory. A 50-kw. alternator was installed by this company at its station in New Brunswick, N. J., in 1917, and a year later, a 200-kw. alternator at the same station. These were successful; and with the return of peace and renewed interest in transoceanic radio communication, world-wide interest was aroused in the alternator, especially the interest of the British Marconi Company, which had witnessed a demonstration in 1915 and had negotiated for the purchase of alternators for its own use and that of the American Marconi Company. The early negotiations were discontinued, however, largely owing to the exigencies of the war.

In 1919, representatives of the British Marconi Company were again sent over to negotiate with the General Electric Company

[1] BUCHER, *ibid.*, p. 35.

for exclusive rights to the use of the alternator. Negotiations were about concluded, when officers of the General Electric Company were visited by Rear-Adm. William H. G Bullard, director of naval communications, and Com. S. C. Hooper, of the Bureau of Engineering of the Navy Department. It was pointed out by these two men that the Alexanderson alternator and its accessories had been demonstrated to be the best system then in existence for reliable transoceanic radio service and that if the General Electric Company should sell these devices to the Marconi interests, it would result in a British monopoly of world-wide communication for an indefinite future. The officers of the General Electric Company pointed out, however, that it was the business of this company to develop and sell electrical apparatus and that the principal customers for the alternators were the Marconi companies. Nevertheless, following these conferences with Rear-Admiral Bullard and Commander Hooper, the General Electric Company ceased negotiations with the British Marconi Company and proceeded to develop plans for the establishment of a new radio company for the exploitation of these patents, controlled wholly by American interests.[1]

The first step taken by the General Electric Company in anticipation of the formation of a new radio company was to negotiate for the purchase of the stock of the American Marconi Company owned by the British Marconi Company. On Oct. 17, 1919, the General Electric Company caused to be organized the Radio Corporation of America; and on Nov. 20, 1919, the new corporation entered into an agreement with the American Marconi Company whereby the latter transferred to the Radio Corporation all its tangible physical assets and, in addition, certain valuable patents. On the same date, the Radio Corporation entered into a contract with the General Electric Company whereby in addition to securing rights under the patents owned or controlled by the General Electric Company, the latter company agreed to manufacture radio equipment exclusively for the Radio Corporation, and the Radio Corporation agreed to purchase from the General Electric Company exclusively all radio apparatus and devices required by it. As a result of these agreements, the Radio Corporation obtained control of practically all the

[1] "The Radio Industry," Federal Trade Commission, pp. 14–16, 1923.

high-power radio stations in the United States, together with a number of important radio patents.[1]

In addition to the patents that it acquired from the American Marconi Company, within two years the Radio Corporation acquired the patent rights, by license agreements, to the radio patents owned or controlled by the General Electric Company, the American Telephone and Telegraph Company, the Westinghouse Electric and Manufacturing Company, the Wireless Specialty Apparatus Company (a subsidiary of the United Fruit Company), and the Radio Engineering Company of New York. The patents involved in these cross-licensing agreements totaled more than 1,000 patents, with almost 200 applications for patents pending. These agreements effected what has repeatedly been called a monopoly of the manufacture of radio equipment, and they were later attacked in the courts on the grounds that they resulted in unlawful restraints of trade and free competition. They were defended on the ground that only by pooling these patents could radio be fully and effectively developed, since no company alone controlled a sufficient number of patents to take full advantage of the technical progress made in the art.

The Radio Corporation began immediately negotiating contracts with foreign companies and administrations and reestablished the marine service which had been suspended owing to the sale of coastal stations to the United States Government. On Mar. 1, 1920, the date upon which the Federal Government returned the high-power stations which had been taken over to their private owners, service was inaugurated with England, Hawaii, and Japan. Later in the same year, service was established with Norway, Germany, and France; and in 1923, with Italy and Poland. The international system of the Radio Corporation grew steadily year after year.

An interesting development in which the Radio Corporation took part was that in South America. At first, the Radio Corporation and the British Marconi Company attempted to agree upon a plan of joint development of this territory, and a corporation called the South American Radio Corporation was actually organized. But the two parties failed to agree, and since French and German companies had already obtained valuable concessions, attempt was made to bring all four together.

[1] *Ibid.*, pp. 18–22.

Subsequently, in 1921, representatives of these four companies—the Radio Corporation of America; Marconi's Wireless Telegraph Company (British); Compagnie Générale de Télégraphie sans Fil (French); and Gesellschaft für Drahtlose Telegraphie (German)—met in Paris and signed what has been called the "Monroe Doctrine of Radio Communication in the Western Hemisphere." These rival companies were brought together by the realization of the fact that the erection of individual stations by the different companies would mean expensive duplication of investment where the prospects of business seemed to be meager, that the wave lengths suitable for long-distance international radio communication were so few that they should be utilized to full capacity, and that national feelings would run too high for successful competitive development. Hence, they agreed to develop this field together.

By the agreement, the four parties granted all their external wireless communication rights in the South American republics to a board of trustees, known as the Commercial Radio International Committee, or the A.E.F.G. Consortium, to be held for the four parties in equal shares. There were to be nine trustees in all: two to be elected by each party; and the ninth, who was to act as chairman, with power to break a tie vote or to veto any action of the majority of the trustees, was to be appointed by the American company. Thus, no effective action could be taken without approval of the Radio Corporation. It was proposed that under the trusteeship, national companies would be formed in each of the South American countries for the conduct of international communication service. Each station so erected was to be under the direct control of an operating committee composed of one member from each of the four companies, the purpose being to insure against discrimination between the nationals in the freedom of communication. This arrangement is still in effect, and under it companies have been formed in the various countries of South America. Through it, the Radio Corporation has communication with most of the important countries in South America.

The Radio Corporation also established radio communication with the West Indies, with stations in Puerto Rico, the Dutch West Indies, and Cuba. However, the most important company for the transmission of radio messages to and from points around

the Caribbean Sea and the Gulf of Mexico was the Tropical Radio Telegraph Company. Its business was mostly concerned with the operation of the ships of the United Fruit Company, although its stations had been opened to general correspondence. By an agreement, concluded in 1921, under which the Tropical Radio Telegraph Company was permitted to use radio apparatus controlled under patents by the Radio Corporation, messages of that company destined to points in the United States as well as those from the United States to points reached by the Tropical Radio Telegraph Company, were to be transmitted only through the facilities of the Radio Corporation. In addition, the Radio Corporation established direct radio communication with certain of the Central American countries.

Transpacific radio communication had its beginning before the World War. In 1912, the Federal Telegraph Company of California established a commercial radio service to Hawaii, the first to that point, setting up a radio rate lower than the cable rate. This circuit was later extended to Honolulu. In 1914, the American Marconi Company also established commercial radio service to Hawaii. In 1917, upon our entrance into the war, these stations were taken over by the Navy Department; and after the war, the Federal Telegraph Company did not reestablish its San Francisco-Honolulu circuit but, in 1927, sold its communication properties to the Mackay Radio and Telegraph Company (now a subsidiary of the International Telephone and Telegraph Company).

In 1920, through its purchase of the assets of the American Marconi Company, the Radio Corporation came into possession of high-powered stations at San Francisco and on the Island of Oahu, Hawaii. At the same time, there was an assignment to the Radio Corporation of an agreement between the American Marconi Company and the Japanese Government, dated Aug. 22, 1916, whereby the Radio Corporation was given connection with the station at Funabashi, near Tokyo, Japan, owned and operated by the Japanese Government. This arrangement provided that each party should hand over to the other party all transpacific radiotelegraph traffic within its control, unless otherwise ordered by the senders. The facilities of the Radio Corporation soon were extended to the Philippines and expanded rapidly. By 1927, service was maintained from the United States with

Hawaii and the British Colony at Hong Kong, and local, feeder connections established with the Dutch East Indies, French Indo-China, and Japan. In 1928, the service between the United States and Japan, which formerly had been relayed through the Philippines, was made direct, and service established with Shanghai, via the Philippines. In 1929, service was established to the Fiji Islands. The Radio Corporation also established service with Australia via Montreal; and through its transpacific, transcontinental, and transatlantic circuits, it now can give a complete service from the Dutch East Indies to the mother country in Europe.

For a long time, the Radio Corporation had not been able to expand its radio activities in China, except for the services to Hong Kong and Shanghai, the British and Danish cable interests having a virtual monopoly in China so far as international communications were concerned. On Dec. 6, 1930, however, direct communication was established between the United States and China by the opening of a circuit from the San Francisco to the Shanghai stations of the Radio Corporation. This new circuit is one of the longest in existence, being 6,121 miles from station to station.

In this way, the international network of the Radio Corporation grew until at the end of 1934, it consisted of 57 circuits linking the United States and its insular possessions and the Philippines with 47 countries. The international circuits of the radio corporation are used also to carry broadcasting programs to and from the United States. During 1934, this company handled 715 international programs for American broadcasting companies. The Radio Corporation also participates in the operation of the transpacific telephone service which links Honolulu and the Philippines with the United States and Canada via San Francisco and in radiotelephone circuits connecting the Philippines with Java, Siam, and with Europe via Berlin. It has a domestic radiotelegraph system between Boston, New York, Philadelphia, Baltimore, Washington, Detroit, Chicago, New Orleans, Los Angeles, San Francisco, and Seattle, which handles domestic messages between these points as well as messages originating in or destined to them and transmitted over the international circuits. On the domestic circuits, the Radio Corporation has introduced multiplex transmission, by which

three different messages may be sent simultaneously over the same wave length. In addition, it proposes to introduce high-speed facsimile radio communication service, the first circuit to be between New York and Philadelphia. Facsimile communication is the method of obtaining at the receiving end an exact reproduction of the message, photograph, or document sent at the transmitting end. It now has facsimile circuits in operation on the international circuits. In addition, multiple radio transmission, by which two automatic printer channels in each direction between New York and London are operated simultaneously on a single wave length, was introduced into commercial practice in 1934.

While the Radio Corporation was developing its transoceanic service, it was also improving and extending marine radiotelegraph service. Soon after its organization, in 1919, it established a marine service, which has been extended until today, from 16 stations located along the east, west, and gulf coasts of the United States and the shores of the Great Lakes, it maintains radiotelegraph communication with ships plying the oceans and the Great Lakes. The Radio Corporation, through its marine subsidiary, leases and sells, inspects and repairs radiotelegraph equipment for use on ships. It also leases and sells radio direction finders, apparatus by which ships at sea can determine their exact positions from radio beacons on the shore and relative to the positions of other ships at sea. Besides messages for ships and passengers, news matter is transmitted to subscribing vessels for the publication of newspapers and news bulletins on shipboard and information and broadcast entertainment for travelers, all on a commercial basis. The regular radiogram marine service of this company has recently been supplemented by the "sea letter telegram" and the "marine gift service." The former enables a person on board ship to send a message which will be forwarded from the coastal station to the addressee by first-class or special-delivery mail, and the latter enables persons ashore to radio gifts to friends at sea, or vice versa.

The international and domestic radiotelegraph services of the Radio Corporation are performed by its subsidiary, R.C.A. Communications, Inc.; and the marine service by another subsidiary, Radiomarine Corporation of America. In the

development of its transoceanic service, as will be shown in a subsequent chapter, the Radio Corporation was from the beginning handicapped by lack of pickup and delivery facilities at inland points in the United States. It established offices in New York and, later, Boston, Washington, Chicago, and San Francisco and obtained a contract with the Western Union by which that company would receive and deliver its transpacific messages to and from points other than those in which it had offices and would cooperate in furnishing terminal facilities for the marine service; but not until 1931 did the Radio Corporation obtain a contract from the Western Union for pickup and delivery service on its transatlantic business. Prior to that time, the Radio Corporation had such a contract with the Postal Telegraph, but it was an unsatisfactory one. The obvious reason for the reluctance of the telegraph companies to cooperate with the Radio Corporation was the fact that they were engaged in competitive cable communication. Recently, the working agreements with the Western Union Company have been extended to the domestic service of the Radio Corporation, with the result that the Western Union will accept at, or deliver from, any of its offices in the cities to which the R.C.A. service extends messages marked "via RCA."

Of the other American companies now engaged in transoceanic radiotelegraph communication, the most important is the Mackay Radio and Telegraph companies, owned and controlled by the Postal Telegraph and Cable Corporation, which in turn is controlled by the International Telephone and Telegraph Corporation. These companies were organized in 1927 to purchase the stations on the Pacific Coast of the Federal Telegraph Company of California. The San Francisco-Honolulu circuit of that company was reestablished; and in 1928, the old German station at Sayville, Long Island, was leased from the United States Navy to begin operations over the Atlantic. The principal handicap to the development of transatlantic communication by the Mackay companies has been the exclusive contracts negotiated by the Radio Corporation with foreign companies and administrations, although it has made considerable progress in other parts of the world. At the end of 1934, the Mackay Radio companies had established radiotelegraph communication with Argentina, Austria, Chile, China, Colombia, Cuba, Denmark, Hawaii,

Hungary, Japan, Peru, Philippine Islands, and Vatican City. In addition, they had domestic circuits connecting New York, Chicago, New Orleans, San Francisco, Seattle, Tacoma, Portland, Los Angeles, Oakland, San Diego, Boston, and Washington.

In the marine service, the Mackay Company has more than 260 ships under contract for radio repairs, radio servicing, and supplying radio operators; it maintains stations for servicing ships at all important United States and foreign ports; and it is contracting regularly for the supply of modern radio apparatus and radio compasses to a growing number of vessels. The Federal Telegraph Company, now an affiliated manufacturing company, makes the apparatus supplied to vessels and Kolster radio compasses which are leased or sold by the Mackay Company. Through the combined efforts of the manufacturing, communications, and sales divisions and affiliates and their relationship with other companies in the International Telephone and Telegraph system, the Mackay Companies cover the complete range of operations in the commercial radio field.

Other companies engaged in commercial transoceanic radiotelegraph communication are Globe Wireless, Ltd., subsidiary of the Robert Dollar Steamship Company; U. S. Liberia Radio Corporation, a subsidiary of the Firestone Tire and Rubber Company; and the Southern Radio Corporation, a subsidiary of the Standard Oil Company of New Jersey. These companies perform only a limited public service. Their radio services were installed in the beginning to facilitate the conduct of business operations by the parent corporations, but in order to retain the frequencies that they use, they have been compelled to open their stations to the public service.

Transoceanic Radiotelegraph Communications of the American Press.—With the demonstration of the practicability of radiotelegraph communication, American newspapers and press associations began to take interest in it from the viewpoint of saving transmission expense as well as more expeditious handling of news. Soon after the early experiments, the *New York Herald* set up a radio station in New York harbor for the purposes of getting news from ships at sea and of sending out daily press summaries. This station continued in operation until the World War. After the war, the *New York Times* established its own station to communicate with European stations, and soon there-

after the Associated Press, the International News Service, and the *Chicago Tribune* established stations.

In 1920, Norman Davis, Undersecretary of State, invited to a conference in Washington representatives of the various newspapers of the United States that were interested in foreign communications to discuss the matter of press communications. No program was adopted at this meeting, but a few days later, in New York, there was formed the American Publishers' Committee for the purpose of handling common problems in an organized manner. For a time, this committee hesitated about setting up a separate press-communication system, but in Dec., 1921, three newspapers (the *New York Times*, the *Philadelphia Public Ledger*, and the *Chicago Tribune*) decided to establish a radio station for communication with the British post-office stations in England. A station was set up at Halifax, N. S., at the terminus of the British Government cables and on Feb. 22, 1922, began receiving messages destined for the three newspapers.

The Halifax station of the press proved to be a success; and in the fall of 1922, the three newspaper sponsors invited all the other members[1] of the American Publishers' Committee to participate in its operation, which they did. The service also was opened to all other newspapers. In 1924, the American Publishers' Committee, by arrangement with the French telegraph ministry, opened a circuit with the French Government station at Sadoua, near Lyons, France. Later, a circuit was established with an Italian station. Up to this time, the committee had established no station in the United States; consequently, it used the land wires of the Western Union Telegraph Company for the purpose of relaying press dispatches from Halifax to Boston, New York, Philadelphia, and Chicago. Later, because of the fact that the Western Union Company raised the rates on all traffic of the Halifax station to the American Publishers' Committee, this traffic was carried by the Canadian Pacific Telegraph Company, allied with the Postal Telegraph Company. In 1927, the committee organized a corporation, under a Dominion of Canada charter, called the News Traffic

[1] The other members were The United Press Association, Universal Service Wireless, International News Service, the *Christian Science Monitor*, the *New York World*, and the *New York Herald-Tribune*.

Board, Ltd., which owned and operated its radio properties in the Halifax district.[1]

As the importance of international radio communication for press purposes came to be more and more fully appreciated, individual newspapers and news associations desired to set up their own facilities. In 1927, however, Congress had established the Federal Radio Commission with power to allocate the limited number of transoceanic channels available for the United States; and beginning in 1928, the Commission held hearings to determine the advisability of setting up a separate class of radio stations for transmission of press communications. From the testimony adduced, the Commission favored the formation of a single public service corporation to handle radio communications for all the press, owing to the limited number of frequencies available for the large group of applicants. On Aug. 1, 1928, it awarded to Joseph Pierson, as trustee for the American Publishers' Committee, construction permits for stations to be completed by Jan. 31, 1929, on the 20 transoceanic, short-wave channels allocated to the press as a whole. Applications for individual assignments were withheld. Later, as will be seen in Chap. XI, a public utility corporation for the American Press, known as Press Wireless, Inc., was organized, which for a time carried the bulk of radio press traffic between the United States and foreign countries. Subsequently, a competitive organization, known as American Radio News Corporation, Inc., was organized by the Hearst interests. This corporation was first organized to furnish a multiple-address press service. Its scope was later enlarged to cover other services, including point-to-point press service, and the name of the corporation was changed to Hearst Radio, Inc.

Amateur Radio.—In the early days of radio communication, many practitioners were amateur, in the sense that their experimental activities were not commercially sponsored. However, when success attended these experiments, commercial adaptation followed, and the amateur status was superseded by professionalism. The true amateur as he exists today was derived partially from the class of useful electrical experimenters and scientific novices of the late nineteenth century and partially

[1] Statement of Joseph Pierson, Hearings before U. S. Senate Committee on Interstate Commerce, S. 6, 71st Cong., 2d Sess., Part 13, pp. 1646*ff*.

from the world of ordinary laymen. There were a few of these amateurs before the turn of the century, but they were insurmountably handicapped by lack of both apparatus and knowledge. It was the wide-flung publicity that followed Marconi's first transatlantic transmissions in 1901 that lent the early major impetus to the amateur movement, attracting converts in great numbers.

For the first few years, these amateurs were, in the main, solitary experimenters. Occasionally, they used their apparatus for communication; but mostly, they were not even aware of each other's existence. "Attic experimenters" and "basement laboratorians" were phrases aptly descriptive of this period. Beginning about 1906 to 1908, however, there occurred a change in their character. Apparatus and technique had improved sufficiently to enable communication over distances of a few miles. Acquaintanceships among experimenters in the metropolitan areas widened in ever increasing circles. Radio clubs sprang up in many of the large cities, beginning in 1909. These and other influences caused the art of amateur radio to assume an increasingly social tinge. Communication, as well as experimentation, soon became the watchword of the amateur movement.

Increasing numbers and activity on the part of amateurs inevitably brought conflict with governmental and commercial services, particularly in view of the fact that in the early days many amateurs had superior equipment. This situation was one of the contributing causes leading to the numerous attempts at radio regulation between 1909 and 1912, when a comprehensive Federal radio law was first passed. Although unorganized, the several thousand amateurs of that time had sufficient strength to insure their preservation under the terms of the new law but not strength enough to prevent their banishment to what was then regarded as the useless wave length of 200 m.

The defect in organization was remedied by the foundation in 1914 by the late Hiram Percy Maxim and his associates of the American Radio Relay League. Enforcement of the Act of 1912 was not rigid during the first few years, and amateurs, interpreting the regulations liberally, were able to survive. Indeed, so successful was their work that when the World War broke out, amateur radio was able to provide something like 4,000 trained radio operators to the military services, the most effective radio

corps possessed by any of the combatant nations and an important factor in the winning of the war.

Returning to their barren 200-m. region following the war, amateurs adapted the fruits of compressed wartime research so successfully that they were able to make this wave length perform astoundingly well, spanning transcontinental and transoceanic distances at times with their transmissions. However, it was not until a blend of overcongestion and individual curiosity caused a few amateurs to investigate the practically unexplored short-wave lengths below 200 m. that amateur radio entered its true domain. In 1923, the first two-way amateur communication across the Atlantic Ocean was accomplished on 100 m. An interesting milestone of amateur communication occurred in this same year, when for a continuous period of 5 hours the ocean was spanned by a chess match carried on by amateur radio between Oxford University in England and Haverford College in the United States. By the end of 1924, the Antipodes had been linked by amateur radio; and a year later, amateurs the world over were in communication with other amateurs in all continents. Wave lengths as low as 20 m. were being used reliably. An entire new domain of the air, far more vast and valuable than that already known, had been opened up.

The results of government and commercial adaptation of this exploration are well-known. Not so well-known is the fact that amateurs, growing constantly meanwhile in numbers and political status, have continued their contributions to radio science. Most of these contributions have been more specific and less spectacular than the opening up of the so-called short waves; they have been the product largely of increasing congestion due to smaller frequency assignments and their spectacular growth in numbers, which brought the total of United States licensed amateur stations from 5,719 in 1920 to 16,829 in 1929, rising to a maximum of 46,390 in 1934.

In the International Radiotelegraph Conference held in Washington, in 1927, the very existence of the amateurs was threatened. Most of the foreign nations were opposed to amateurs and had done all that they could to discourage them. The United States, on the contrary, had come to appreciate the contributions made by these experimenters and stood for their recognition. The American delegation, by the aid of the delega-

tions from Canada, Australia, Italy, and New Zealand, finally was able to carry through a provision which saved for the amateurs a few narrow bands of frequencies. In 1927, a survey of the membership of the American Radio Relay League showed that many of them possessed a high degree of technical skill. A considerable number were employed in the radio industry, including 45 presidents, 16 vice-presidents, 5 general managers, 69 managers, 37 owners, 324 engineers, 19 announcers, 11 directors, and many operators.[1] Directly or indirectly, it may be said, from the fruit of this embryo amateur research have sprung many important developments in the radio art.

On a par with the original development of the short waves in basic importance to civilization is the exploration of the ultra-short-wave region, for which amateurs have been largely responsible. In this region will be performed most of the wide variety of new radio services in the future. Amateurs were first to develop simple and reliable equipment for operation in the ultra-high-frequency region, first to occupy this territory in large numbers, and first comprehensively to record and evaluate its fundamental characteristics, which depart widely from those of the lower frequencies.

Amateurs satisfy the public service requirement of their federal licenses by performances of even more direct benefit to humanity than technical advance. They provide a great emergency communications system, with nation-wide facilities, which functions under all circumstances. In nearly 50 major and many minor disasters during the last 25 years, amateurs have been the first and in many cases the only means of communication with a stricken area. They also perform many other valuable communications services.

At the present time, the status of amateur radio is that of a world-wide institution, recognized by international treaty and Federal law, the largest body in radio and the one to which the art owes much of its progress. It is a hobby pursued by upward of 60,000 individuals, bonded together by powerful and prosperous national and international organizations. Upon it, reliance is placed by public and military (the latter through the Naval Communications Reserve and the Army-amateur Radio

[1] Statement of H. P. Maxim, Hearings on S. 6, 71st Cong., 2d Sess., Part 14, pp. 2061*ff*.

System) for effective, invaluable aid in either peace or wartime emergency; it is an indispensable element of the basic radio-communications system.

The coming of transoceanic radiotelegraph communication had a marked effect upon the rates charged by the cable companies. In 1914, when the American Marconi Company opened its radio circuit to Hawaii in competition with the Commercial Pacific Cable Company, it charged a rate of 25 as compared with a cable rate of 35 cents per word. It also offered special night and week-end rates. Later, the cable company reduced its rate to meet the radio rate, but it did not institute night and week-end rates. In 1916, the radio service was extended to Japan, also in competition with the Commercial Pacific Cable Company, and a rate of 80 cents per word established as against a cable rate of $1.21 per word. Deferred radio service was offered at one-half the regular rate. Some time later, the cable company reduced its Japan rate to 96 cents per word, and the American Marconi Company to 72 cents per word.

In 1920, when service was established to England, radio messages were charged a rate of 17 cents per word, which was increased on Jan. 1, 1921, to 18 cents per word. On Apr. 15, 1923, the radio rate was again increased to 20 cents per word. For more than 30 years, the cable rate to Great Britain had remained unchanged at 25 cents per word; but on Apr. 20, 1923, cable companies reduced this rate to 20 cents per word to meet radio competition. When direct radio service was established with Norway, Germany, and France, in 1920, the radio rates were generally lower. To Norway, the radio rate was fixed at 24 cents per word as compared to a cable rate of 35 cents per word. The radio rate to Germany was fixed at 36 cents per word, equal to the cable rate; but later the radio rate was reduced to 25, and the cable rate to 30, cents per word. To France, the radio rate was established at 20 cents per word, whereas the cable rate for many years had been 25 cents per word. In April, 1923, the radio rate to France was increased to 22 cents per word, and the cable rate was reduced to the same figure. In 1923, radio communication was established with Italy with a rate of 26 cents per word, the cable rate being 31 cents per word.[1]

[1] "The Radio Industry," Federal Trade Commission, pp. 35–36.

The volume of radiotelegraph communications grew rapidly during the first decade of operations, although the volume has declined during the depression. The average number of messages transmitted monthly by the Radio Corporation in the international service grew from 61,604 in 1922 to 120,379 in 1929, but declined to 107,990 in 1932. The average number of domestic messages of this company, which was 3,830 in 1929, increased to 7,592 in 1930, but declined to 6,551 in 1932. The average number of messages transmitted in the marine service by the Radio Corporation increased from 15,893 monthly in 1923, to 44,514 in 1929, but declined to 26,579 in 1932. The average number of messages transmitted monthly by the Mackay Radio and Telegraph Company of California, which was 58,271 in 1928, declined to 45,400 in 1932; and the average monthly number of the Mackay Radio and Telegraph Company of Delaware increased from 4,408 in 1929, to 22,325 in 1931, but declined to 21,854 in 1932.[1] Since 1932, revenues from radiotelegraph communications, like telegraph and cable revenues, have reflected the increasing volume of business and market activity. The Radio Corporation reported marked improvement in its radiotelegraph business in 1933, and a substantial increase in 1934 over the previous year. Revenue messages transmitted by the Mackay Radio companies increased 69 per cent in 1934 over 1933.

Special Uses of Radio.—In addition to its use for general communication purposes the radio has been adapted to many special communication needs. One of the most important of these is its use in aviation. As we have seen, communication between radio stations on the ground and stations on aircraft was developed during the war, but today such communication is an indispensable adjunct of commercial, as well as military, aviation. Radio's service to aviation may be summarized, as follows: (1) communication between aircraft and ground stations, (2) direction finding, and (3) meteorological reports. Both the radiotelegraph and the radiotelephone have been adapted to this service, each having particular advantages under certain conditions. Point-to-point radiotelegraph communication is used between ground stations in the aviation service, although the

[1] Preliminary report on communication companies, H.R. 1273, 73d Cong., 2d Sess, pp. 144–147.

teletypewriter is much used for this purpose, especially in transmitting meteorological reports.

Radio communication for air-transport companies is provided by stations organized by those companies and operating under a plan promulgated by the Federal Communications Commission. This plan provides for the establishment of aeronautical ground stations operated as chains to carry on two-way radio communication with aircraft so that constant contact may be maintained over the various routes. Aeronautical stations licensed under this plan are required to provide service, without discrimination, for all and any aircraft, the owners of which enter into cooperation in the formation of the chains, and to provide reasonable and fair service to itinerant aircraft on frequencies designated for that purpose.

Direction finding is accomplished by the use of radiobeacon stations on the ground which send out a relatively narrow radio beam along the airway, the signal being received in the plane by an aural or a visual receiver. In conjunction with the radiobeacon stations, radiotelephone transmitters are operated for the purpose of sending out weather reports and other information. Also, marker beacons, with distinctive code signals, are established to serve as "milestones" along air routes. Meteorological reports are furnished by the United States Weather Bureau directly through the Department of Commerce radiobeacon stations or to the air-transport companies themselves.

A second important special use of radio communication is in the police service. The demonstration of the quickness and reliability of radio communication stimulated experimentation in its adaptation to police uses. In the larger cities for a long time, the value of rapid, multidirectional communication had long been appreciated; and by the time that radio had developed sufficiently for a trial in this field, printing telegraph systems had been established in many cities. The New York system, for example, enabled an operator at headquarters to send signals from a keyboard to any one precinct, to any group, or simultaneously to all precincts, the messages being printed automatically on receiving machines, and facilities being provided so that receipt of the message might be acknowledged by each station. The radio came to duplicate this multidirectional service and to

add another feature, that of communication with cruising police cars, equipped with suitable receiving apparatus.

The pioneer city in the development of police radio was Detroit, Mich., this city, on Apr. 7, 1928, having installed a system with two cruising police cars. The system met with immediate success, arrests being made within less than a minute from the time of reporting the call, burglars often being apprehended in the very act of committing crimes. This service has been adopted by many municipalities, and, in addition, several states have organized state-wide police radio services.

A third use is in the petroleum industry. As early as 1923, petroleum companies had established radio services to aid in the conduct of their business. Radio is of peculiar importance in this industry. In the first place, it provides the most economical means of communication both with exploration parties in the field and with fields already in operation, since much waste would be involved in laying wire facilities for such short operation. The local character of oil deposits, their geological uncertainty, the continual shifting of the field of operation, and the vast amount of capital required for long advance exploration necessitate the application of the most effective and most economical means of communication available. Radio also is multidirectional; it permits the simultaneous reception of signals by several parties in the field. In the second place, radio has proved to be of direct service in exploration. A charge of dynamite is set off, and simultaneously the exact time is flashed by radio and picked up by other groups, perhaps miles distant. By minute computations, it is possible for scientists to determine whether or not oil exists in the ground, owing to the fact that through variations in speed with which signals travel through strata of different qualities, salt domes, near which oil is usually found, may be located.

Other important special uses of radio are in the motion-picture industry for contact with field units; in the electric light and power industry, when other forms of communication fail; and in many others. Many industries which could make use of radio for special communication purposes cannot do so because there are not enough frequencies to supply them. In fact, the demand for radio facilities has come wherever there has existed a considerable, constant volume of traffic. It has been the difficult

task of regulation to parcel out the limited number of frequencies available in such a manner as to accomplish the greatest possible, and the most widespread, use of radio communication.

The Development of Broadcasting.—Radio broadcasting is almost altogether a postwar development, although before the war some demonstrations were made. As early as 1906, Reginald A. Fessenden of the De Forest Company broadcast a Christmas Eve program of music and speech. In 1913, radio amateurs in the United States heard music broadcast from the yacht of the Prince of Monaco, near our shores; in 1914, music from phonograph records was broadcast by the Wanamaker, New York, radio station to government departments, commercial radio companies, and amateurs, the only possessors then of receiving sets; and in 1915, voices sent out from the Naval Radio Station at Arlington, Va., were picked up in San Francisco and in Honolulu. During the war, several instances were reported of successful music broadcasts; and in 1919, when President Wilson was returning from France on the *George Washington*, his Memorial Day message to the crew was sent through a microphone and successfully received on land, although in a broken and distorted fashion. These were sporadic experimental attempts to broadcast, but they paved the way for one of the most astounding developments in the history of communication. The first stations for organized broadcasting were established in 1921.

Early programs consisted mostly of phonograph records, interspersed with news and talks, but from the beginning the programs were announced in representative papers, and the regularity of the scheduled service together with the novelty of picking programs out of the air made up for deficiencies in the quality of the programs themselves. The station owners soon realized, however, that interest in broadcasting could be fostered only by improving the quality of programs, once the novelty had worn off.

The number of stations increased rapidly from a few at the beginning of 1922 to 382 at the end of that year. They were operated by electrical companies, newspapers, department stores, educational institutions, and municipal governments. Year by year, new stations came on the "air" in considerable number until there were more stations than properly could be accommodated on the limited number of wave lengths available. On Feb. 23,

1927, when the Federal Radio Commission took over the regulation of radio, there were in operation in the United States 733 broadcasting stations, although the number has decreased to some 630 odd at present. Meanwhile, the radio audience has grown to huge proportions. In 1922, not more than 100,000 receiving sets were in use in the United States; but today, the number is more than 22,000,000.

Network Broadcasting.—Network broadcasting developed from the incessant pressure to expand the size of radio audiences so as to increase the coverage for advertisers, especially national advertisers, and from listener demands for programs originated in population centers, especially in New York. Two fundamental problems were presented: first, to move the studio to the artist, speaker, or concert hall in order to make use of talent which could not be brought to the studio; and, second, to interconnect stations for simultaneous broadcasting. Most of the technical problems had been solved, since before the World War engineers of the Bell Telephone System had interconnected wire lines with radio transmitters and receivers, and the huge network of lines of this system were available for such interconnection.[1]

Network broadcasting was first introduced by the American Telephone and Telegraph Company, in 1924, with station WEAF as the "key" station, linked with station WJAR, Providence. This system soon covered New England, and to it were added stations in Philadelphia, Washington, Buffalo, Pittsburgh, Cleveland, Detroit, Cincinnati, Chicago, St. Louis, Davenport, Minneapolis, and Kansas City. The first broadcast on a national scale was the Victor program, New Year's night, 1925. By 1926, when the National Broadcasting Company was organized, the network comprised about 3,000 circuit miles of special telephone lines, many of the stations being already linked to station WEAF by permanent lines.[2]

The networks grew rapidly until most of the larger broadcasting stations became affiliated with the networks of two companies the National Broadcasting Company and the Columbia Broadcasting System. The National Broadcasting Company was organized Nov. 1, 1926, by the General Electric Company, the

[1] STOSKOPF, L. N., *Bell Tel. Q.*, VII, p. 5, 1928.
[2] "The Radio Industry," *op. cit.*, Chap. VII.

Westinghouse Electric and Manufacturing Company, and the Radio Corporation of America, three corporations directly interested in the development of broadcasting, "with the two-fold purpose of sustaining interest in broadcasting and of insuring the permanence of the infant radio industry."[1] It took over, as has been seen, the network of WEAF (called the Red Network) and, early in 1927, assumed the management and operation of stations WJZ, New York, and WRC, Washington, owned by the Radio Corporation of America, together with a network (called the Blue Network) built around WJZ as the key station, connected by approximately 1,200 miles of wire. In January of the same year, a southern group of stations, located in Louisville, Nashville, Memphis, and Atlanta, with 800 circuit miles of wire, was added on a temporary basis for use in connection with either the Red or the Blue network; and in February, stations in Tulsa, Okla., and Dallas, Tex., with 580 miles of temporary wire facilities, were added.[2] In April, 1927, the Pacific Coast Network, including six permanent outlets connected by 1,700 miles of permanent line, was added to the system. Thus, within six months of the date of organization of the National Broadcasting Company, its system of associated stations spread from coast to coast.

The networks of the National Broadcasting Company continued to grow year by year. Today, the basic Red Network consists of 21 stations, located in as many different cities; and the basic Blue Network, of 18 stations, located in as many different cities. In addition, there are various supplementary groups available for use with the Red or the Blue network. These include the Canadian group, consisting of 2 stations; the Southeastern group, 9 stations; the South Central group, 7 stations; the Southwestern group, 7 stations; the Northwestern group, 6 stations; the Mountain group, 2 stations; the basic Pacific Coast Network, 5 stations; and supplemental groups available for use with the basic Pacific Coast Network, totaling 4 stations in the United States, and 1 in Hawaii. Two other stations are available on special arrangement, making a total of 65 outlets for the Red Network and 62 outlets for the Blue Network. On

[1] AYLESWORTH, M. H., *ibid.*, p. 235.

[2] GOLDSMITH and LESCARBOURA, "This Thing Called Broadcasting," pp. 167–168, Henry Holt & Company, New York, 1930.

Jan. 1, 1936, the National Broadcasting Company placed in operation a second Pacific Coast Network of 5 stations. At the beginning of 1936, the two National Broadcasting Company networks consisted of 94 stations in 72 key cities, linked together by 21,635 miles of special wires in service 18 hr. a day.[1] Of these, the National Broadcasting Company owns or operates 14 stations.

The Columbia Broadcasting System was established in September, 1927, in the belief that the popularity of chain broadcasting was such as to warrant the establishment of a second national network. It began as a basic chain of 16 stations reaching from the Atlantic seaboard to the Mississippi River, using for its key stations WABC, New York, and WOR, Newark, N. J., both independently owned, from which time was bought for the chain programs. In December, 1928, station WABC was purchased from its owners the Atlantic Broadcasting Corporation and was made the sole key station.[2] This system also has expanded rapidly until it covers every section of the United States. Today, it consists of a basic network of 25 stations and 59 supplementary stations, which together with the 12 affiliated Don Lee stations on the Pacific Coast make a total of 96 stations comprised in the system. Of these, the Columbia Broadcasting System owns and operates 7 stations.

Other networks have been established from time to time, some of them consisting of stations affiliated with the National Broadcasting Company or the Columbia Broadcasting System. Among these are the Southwestern Broadcasting System; the New England Network, affiliated with the National Broadcasting Company; the Don Lee Broadcasting System, and the Yankee Network, affiliated with the Columbia Broadcasting System; the American Broadcasting Company; and the Mutual Broadcasting System.

The importance of the major networks in broadcasting in the United States is indicated not alone by the number of stations owned or controlled by, or affiliated with, them but by the rank and power of those stations themselves. The Federal Radio Commission, from its survey on commercial radio advertising for the period Nov. 8 to 14, 1931, reported that there were charged to stations owned, controlled, and/or operated by the

[1] Annual report of the Radio Corp., 1935, p. 9.

[2] GOLDSMITH and LESCARBOURA, *op cit.*, p. 169.

National Broadcasting Company 44.27 units and to other stations used by this company 140.63 units, a total of 184.90 units. There were charged to stations owned, controlled, and/or operated by the Columbia Broadcasting System 29.07 units and to the other stations used by this system 85.03 units, a total of 114.10 units.[1] Since there were charged to all stations operating in the United States on Dec. 3, 1931, a total of 434.19 units, the stations used by the National Broadcasting Company represented 42.6 per cent, and those used by the Columbia Broadcasting System 26.3 per cent, together 68.9 per cent, of all the facilities assigned to broadcasting stations. Of the 40 clear channels in the United States, only 2 were not used by these chains, as of that date.

Commercial Broadcasting.—Broadcasting in the United States has never been a public function, although there have been, and still are, local governmental units which own and operate broadcasting stations. Neither has it been a philanthropic enterprise. From the beginning, educational institutions, churches, societies, and orders of various kinds have engaged in broadcasting, either from conceptions of the public interest or with a view to the dissemination of propaganda; but the bulk of the broadcasting service is furnished today, as it always has been, by individuals or companies engaged in the business for profit. The revenues come from advertisers who are willing to pay for the privilege of broadcasting messages to the general public. Broadcasting is thus a unique industry in that the revenues which support it do not come directly from the users of the service. Many have looked upon radio advertising as an unnatural development, but a brief glance at the record is sufficient to show that it grew quite naturally and that the virtues of broadcasting as an advertising medium are such that its support on this basis is an assured one.

During the early days of broadcasting, little attention was paid to the costs of broadcasting. Those who owned and operated stations had products and services of their own to exploit. While the novelty lasted, almost any kind of program satisfied the listeners, kilocycle or station hunting presenting in itself sufficient sport, and the marketers of radio receiving apparatus reaped a harvest. So did the marketers of broadcasting equipment with

[1] Commercial Radio Advertising, *Sen. Doc.* 137, 72d Cong., 1st Sess., p. 65.

the flood of new stations. But the situation soon changed. The demands of listeners became more exacting as the novelty wore off, talent began to demand more than publicity for their services, and many of the stations found broadcasting too expensive. The result was inevitable. A number of stations ceased broadcasting altogether, while others sold their equipment to those interested in broadcasting exclusively, not as a hobby. From Sept., 1921, to June 30, 1924, a total of 1,076 stations were licensed, of which 541 discontinued.

It happened early, however, that certain stations by the quality of their broadcasts developed considerable followings and were in a position to offer far larger audiences to those interested in broadcasting messages than they could expect by establishing new stations of their own. Such a station, for example, was WEAF, New York, which from the time of its establishment by the American Telephone and Telegraph Company had enjoyed an excellent reputation for the efficiency of its broadcasts and the quality of its programs. The owners sensed the opportunity and offered to sell "time" on WEAF programs to those who desired to advertise themselves or their products. In such a manner, commercial broadcasting was born. The first sponsored programs consisted of talks under the auspices of the sponsoring individuals or companies, but it was soon realized that such talks unaccompanied by music or other entertainment features were poor broadcasting material. Gradually, the emphasis in sponsored programs came to be placed upon the educational or entertainment features, with the advertising matter as a part of the program.

In the early years, as we have seen, a large proportion of the broadcasting stations were owned and operated by those interested in exploiting their own wares. Among these were electrical or radio stores, department stores and dry-goods establishments, music stores, garages, banks, theaters, and newspapers. Advertising was local in nature and consisted mostly of attempts to attract attention to the products or services of the owners. But as the costs of broadcasting increased, and stations were forced off the air, in their place came individuals and companies devoting their time exclusively to the broadcasting business. These local stations in search of revenues sold advertising time to an ever widening group of local enterprises until practically all important

local retailing groups were enlisted for the support of radio broadcasting. Such advertising remains today the principal and, in some cases, the sole means of support for local stations. Some stations became powerful and attracted advertisers interested in more than local coverage, but only with the development of network broadcasting did regional and national advertisers come to play an important role in the broadcasting picture.

Network broadcasting was peculiarly the appropriate vehicle for national radio advertising, since only companies with adequate resources at their command could afford the facilities necessary to connect up station with station so as to appeal to those desiring a broad coverage. On the other hand, only national advertisers could afford to pay advertising rates sufficient to cover the cost of such facilities, as well as the costs of talent able to command large audiences. This mutually interdependent relationship of national advertisers and network broadcasting companies has been of immense importance to the development of broadcasting, for the charges paid by the advertisers provide the support for all broadcasting, sponsored and unsponsored.

Network advertising revenues grew apace, those for the combined National Broadcasting Company and Columbia Broadcasting System networks increasing from $3,760,010 in 1927, to $10,252,497 in 1928, to $18,729,571 in 1929, to $26,815,746 in 1930, to $35,791,199 in 1931, and to $39,106,776 in 1932. In 1933, there was a decline to $31,516,298, but revenues rose to $42,659,461 in 1934 and to $48,786,735 in 1935.[1] The number of companies using the networks for advertising purposes has grown rapidly also, although in some cases this use has been sporadic, or it has been discontinued when the results have not seemed to warrant the expenditures. Similarly, the products advertised have increased in variety. The relative importance of various classes of products advertised over the networks of the National Broadcasting Company and the Columbia Broadcasting System can be seen in Table 6. The classification used is the standard one adopted by National Advertising Records for all advertising mediums, including broadcasting.

Broadcasting and the Press.—As soon as commercial broadcasting began to assume national prominence, it aroused the antagonism of a substantial portion of the American press,

[1] *Broadcasting*, vol. 10, No. 2, p. 8, 1936.

TABLE 6.—GROSS EXPENDITURES FOR NETWORK RADIO BY INDUSTRIES
(NBC and CBS)

Industries	1928	1929	1930	1931	1932	1933	1934	Jan.–Oct. 1935
Drugs and toilet goods	$ 977,552	$1,940,562	$3,239,753	$6,106,667	$ 8,526,268	$7,999,873	$13,982,287	$13,211,390
Foods and food beverages	733,476	2,025,176	5,264,116	8,957,021	11,297,227	9,489,963	11,747,601	10,788,785
Automotive	1,249,000	1,720,803	1,355,414	1,313,923	1,939,014	2,318,309	3,772.486	3,481,632
Lubricants and petroleum	311,279	961,439	1,495,338	1,183,346	2,663,857	3,589,148	2,956,347	2,925,868
Cigars, cigarettes, tobacco	387,030	1,348,502	2,076,114	5,371,117	6,245,223	2,909,632	3,181,988	2,741,553
Soaps and housekeepers' supplies	182,148	238,372	532,998	1,419,883	1,119,592	1,001,082	1,957,116	1,959,985
Confectionery and soft drinks	701,164	563,984	839,070	1,359,919	1,635,096	1,227,634	1,187,179	1,018,245
Radios, phonographs	2,081,775	3,740,762	2,402,508	909,957	167,757	593,455	656,090	835,979
House furniture and furnishings	409,589	581,326	629,283	795,841	867,440	440,796	417,065	458,918
Financial and insurance	656,147	923,377	1,209,644	1,493,351	1,251,977	669,495	611,822	360,036
Stationery and publishers	602,478	886,044	1,421,922	1,359,001	750,298	198,296	409,112	383,540
Clothing and dry goods	61,787	315,179	581,051	575,139	395,144	405,054	338,612	281,279
Wines, beers, and liquors	.....	.....	.....	.....	.....	.....	466,479	225,805
Building materials	42,144	233,704	683,065	387,749	18,296	79,557	205,811	201,157
Miscellaneous	1,407,023	1,118,566	997,670	1,096,038	1,325,870	138,627	163,444	182,998
Paints and hardwood	28,092	143,054	198,696	727,243	435,955	150,984	212,153	164,010
Office equipment	22,760	43,626	77,053	83,522	35,653	151,125	150,315	151,809
Shoes, furnishings	190,135	367,293	834,392	1,261,430	396,151	8,743	39,660	59,369
Travel and hotels	99,243	866,906	1,359,618	170,821	41,551	123,786	84,417	46,150
Jewelry and silverware	46,596	36,720	432,049	113,770	150,638	24,963	26,787	72,489
Schools, camps, correspondence schools	.....	.....	20,379	17,237	.....	.....	.....	38,074
Garden	4,748	936	91,644	87,380	60,690	18,922	28,481	21,200
Machinery and mechanical supplies	13,830	592,947	910,151	727,041	657,615	44,721	61,757	16,714
Sporting goods	44,500	75,893	167,228	269,003	97,678			

Source: National Advertising Records, *Broadcasting*, vol. 9, No. 11, p. 15, 1935.

although some newspapers from the beginning have owned and operated broadcasting stations. The causes of this antagonism have been twofold: (1) the rivalry between broadcasting stations and newspapers for advertising revenues and (2) the struggle for the control of news. The competition for advertising revenues was a natural development and, although severe, one to be expected. However, in the broadcasting of news reports, the press have felt that the broadcasting stations have invaded a field particularly theirs and have used material gathered by the reportorial services which the press alone supports. Many suits have been brought against broadcasting stations for unlawful use of news. The press have never presented a united front in these matters, however, chiefly because of the fact that many newspapers have radio interests, among them large, powerful papers owning important stations.

From the beginning, broadcasting programs were published in newspapers, and the general opinion was that this practice aided newspaper circulation as well as the radio. But the broadcasting of news came to displace almost completely the newspaper "extra"; and the increasing popularity of news broadcasts and news commentators, in the eyes of many, threatened to make serious inroads into newspaper circulation. A certain amount of cooperation between the American Newspaper Publishers Association and the broadcasters was developed which resulted in the limitation of commentators to news already published and the formation of the Press Radio Bureau for authorized periodic daily broadcasts of "spot" news.

Meanwhile, control of broadcasting stations by members of the press has grown apace. By Jan. 1, 1936, some 147 broadcasting stations were owned or controlled by, or affiliated with, newspapers; and pending before the Communications Commission were some 30 applications for new stations by newspapers. Certain of the important newspaper chains are among the owners of broadcasting stations or are applicants for stations—the Scripps-Howard, for instance, and the Hearst interests. Several smaller newspaper chains, such as the McClotchy group in California and the Gannett chain in New York State, also are operating broadcasting stations in connection with their newspapers. In addition, certain of the news collecting agencies have adopted the policy of selling news to broadcasting stations for

sponsored broadcasts. Among these are the United Press, International News Service, Transradio Press Service, and Radio News Association. By Jan. 1, 1936, more than 300 of the broadcasting stations in the United States were purchasing news services for sponsorship purposes. Of these, Transradio Press was serving 159 stations; International News Service, 71; United Press, 64; and Radio News Association, 32 stations.[1]

The development of radio communication represents one of the most dramatic in American industry. In the field of general public communication, the radiotelegraph services constitute an important branch of the international communication services of the United States, capable of furnishing rugged competition with the cable services, especially with the coordination which has been established between the international radiotelegraph services and the land-wire telegraph services. In the domestic field, radiotelegraph communication between many large centers has been established, and this service coordinated with wire telegraph services. Many significant technological improvements have been introduced into this service which promise important developments for the future. However, the principal elements of cost in all telegraph communication are associated with the task of collecting and delivering messages, and further extension of the domestic radiotelegraph services must rely upon further coordination with wire telegraph services for collection and delivery or substantial duplication of the offices and personnel of the wire telegraph companies. The development of radiotelephony has provided the basis for transoceanic international telephone communication; and the application of radiotelegraphy and radiotelephony the only known means of communicating with ships at sea. In addition, the radio has been adapted to a multitude of special communication needs.

Broadcasting is more than a general communication service; it is a source of entertainment and education for the general public. The economic foundation of the industry is a unique one, but, as has been seen, it does not represent an unnatural development. However, the fact that the broadcasting industry must rely upon commercial advertising for its revenues creates important problems for the managements of broadcasting stations. These stations use channels which belong to the public,

[1] "Broadcasting Yearbook," 1936, pp. 125–128.

and the use of them for purposes of private gain can be justified only where a public service is performed. The sale of advertising time, therefore, which is the only way under the existing system by which revenues necessary to the support of all broadcasting can be obtained, must be, and remain, incidental to the performance of such service. Station owners and managers thus face the difficult task of satisfying both advertisers and listeners, the interests of which are often conflicting. There are many groups in the United States who believe that this cannot be done successfully without undue use of the broadcasting medium for commercial purposes, and there are those who advocate the abolition of commercial broadcasting. The most effective answer to these arguments has been made by the broadcasting industry in the steady improvement in the technical aspects of the service and in the quality of commercial and unsponsored programs which is its outstanding achievement. The future well-being of commercial broadcasting will lie in continued progress in the same direction.

CHAPTER V

REVENUES AND EXPENDITURES

Fundamental to intelligent and effective regulation of the communication industries is a thorough knowledge of the sources from which these industries derive their revenues and the expenditures that they must make in furnishing service. Aside from the importance of cost analyses to the management, they are the essential to rate regulation, which is the central problem of all public utility regulation. Historically, the regulation of public utility rates grew out of the need of preventing unjust discrimination between consumers and of establishing reasonable levels of rates fair to all consumers as well as to the companies themselves. Unjust discriminations due to the charging of one consumer more than another for the same or a similar service have been prevented by requiring that rates be published and by making it unlawful to charge other than the published rates. But unjust discriminations, as we shall see later, may arise from charges that are unfair between different classes of consumers, and a regulatory commission must be cognizant of the cost of furnishing, and the demand for, different types of service. A knowledge of costs is essential also to the determination of a reasonable level of rates, since the system of rate regulation in the United States is based upon the premise that rates are to yield sufficient revenues to meet all the expenses incurred legitimately in the furnishing of the service and to pay to the owners a fair return upon the fair value of the property used, or useful, in the public service.

A large proportion of all telegraph and cable revenues arise out of business transactions. It is estimated that 90 per cent of the total number of telegraph messages handled by the Western Union Telegraph Company are business messages and only 10 per cent social. Similarly, cable traffic consists largely of business messages, although the relative proportions vary as between cable companies. The traffic of All America Cables, for example, consists almost wholly of business and news messages,

whereas Western Union cable traffic is about 81 per cent business and 19 per cent social. Significant in determining the number of social messages handled by cable companies are the amount and direction of tourist travel, since it is from tourists and travelers that a large proportion of these messages come. More Americans travel in Europe than in South and Central America; consequently cable companies operating between Europe and America receive larger volumes of social communications than those operating between the Americas. A list of telegraph customers would present a good cross section of any business community. Principal users of the cables are importers and exporters, bankers, stock and insurance brokers, dealers in commodities, newspapers and press associations, professional people, and government officials.

Because telegraph and cable traffic consists largely of business messages, revenues rise and fall with the ups and downs of the business cycle. Cable revenues reflect also changes in the volume of international trade. Operating revenues of the land telegraph systems of the United States, as reported by the Bureau of Census (including revenues from cable traffic of the Western Union), increased from $91,312,567 in 1917 to $159,682,419 in 1927, an increase of 74.9 per cent, but declined 38.8 per cent to $97,729,160 in 1932. Operating revenues of American cable companies, not including cable revenues of the Western Union, increased from $15,677,176 in 1917 to $18,174,356 in 1922, an increase of 15.9 per cent, but declined 1.5 per cent to $17,906,677 in 1927, with a further decline of 5.5 per cent to $16,926,536 in 1932. Operating income (operating revenues minus the sum of operating expenses, taxes, and uncollectible revenues) of the telegraph and cable companies reporting to the Interstate Commerce Commission increased from $21,025,039 in 1923 to $26,332,598 in 1929, the year in which these companies handled their greatest volume of business, an increase of 25 per cent, but declined 77 per cent to $6,167,613 in 1932. In 1933, operating income for these companies increased 80 per cent to $11,123,801.

In total volume of messages handled, the telephone far outstrips other telecommunication agencies and is comparable with the mail. Normally, in the United States, as compared with about one-fifth of a billion telegraph messages and 15 billion letters handled annually, some 28 billion telephone calls are made.

About one-fourth of the subscribers to telephone service are business subscribers, but the volume of social communication which takes place by telephone is tremendous as compared with that handled by the record telecommunication agencies. In 1932, as shown in Table 5, page 69, of 17,424,406 telephones in the United States, 11,089,946, or 63.6 per cent, were residence, and 6,334,460, or 36.4 per cent, were business telephones, although the business telephones contributed a slightly larger proportion of total revenues because business rates as a rule are higher than residence rates.

The bulk of telephone revenues come from the exchange, or local, telephone service. Of $1,061,530,140 total operating revenues of the telephone systems of the United States in 1932 revenues from the exchange service amounted to $752,338,774, or 70 per cent of the total. Exchange revenues not only constitute a far greater proportion of total revenues; they are more stable than toll revenues, a fact that explains the great stability of the telephone industry. Thus, from 1927 to 1932, in spite of the depression, exchange revenues of all telephone systems in the United States increased 7.3 per cent. This was responsible for an increase of 3.7 per cent in total operating revenues, even though toll revenues decreased 4.6 per cent. Toll-telephone revenues, like telegraph revenues, are more seriously affected by business conditions. Total toll and long-distance revenues of the Bell System in 1933 were 31 per cent below the peak reached in 1929, which compares with a 43 per cent decline in gross operating revenues of the Western Union Telegraph Company from 1929, the peak year, to 1933. Exchange revenues of the Bell System in 1933 were only 15 per cent lower than those in 1930. As compared with the 3.7 per cent increase in total operating revenues of all telephone systems in the United States from 1927 to 1932, total telegraph-operating revenues declined 38.8 per cent; and cable-operating revenues, 5.5 per cent. Telegraph- and cable-operating revenues combined decreased 35.4 per cent.

Telegraph and Cable Costs.—Costs may be classified simply, and for the purposes of this book satisfactorily, into those incurred in supplying the plant and equipment—investment costs—and those incurred in operating and maintaining it—operating costs. A third class of costs may be distinguished which includes

taxes, special levies, fees, etc.; but these are beyond the control of the companies or regulatory commissions and must be accepted in their entirety as proper charges against operations. Investment costs consist of payments for the use of the loan or share capital provided for the construction of the original plant plus extensions, improvements, and betterments. Operating costs include, besides rentals, salaries and wages and the cost of materials, maintenance costs necessary to keep plant and equipment in running order, and depreciation. Depreciation is a charge against operations to cover the cost of replacing plant or equipment which, though it may last longer than a single accounting period, eventually will be used up just as material that is consumed momentarily.

Operating expenses constitute the bulk of telegraph and cable expenses. The average operating ratio (the ratio between income from telegraph traffic and general operation and maintenance expenses, including salaries and wages and legal expenses) for all telegraph and cable companies reporting to the Census Bureau was 77 per cent in 1922 and 80 per cent in 1927. During the recent depression years, the operating ratio has been even higher, owing to the fact that expenses could not be reduced so rapidly, nor to the same extent, as revenues declined. For all telegraph and cable companies reporting to the Interstate Commerce Commission, the operating ratio was 86 per cent in 1930, 88 per cent in 1931, 89.9 per cent in 1932, and 85 per cent in 1933. Salaries and wages make up the bulk of operating expenditures and constitute by far the largest single item of all expenditures. According to reports of the Census Bureau, out of every dollar received from telegraph traffic by all telegraph and cable companies, 41.8 cents was spent for salaries and wages in 1917, 51.9 cents in 1922, 56.0 cents in 1927, and 64.5 cents in 1932.

The importance of salaries and wages to operating costs is due to the nature of the telegraph service, which in spite of mechanization is still to a remarkable extent a hand operation. While the change from hand to machine operation for the bulk of the transmissions has reduced the number of operations necessary, collection and delivery have remained quite primitive by comparison. Offices with clerical and messenger forces must be maintained for the collection and delivery, receiving, recording, and preparing of messages for transmission; and operators

employed for the preparation of tape for transmission or for actual transmission and reception. Operating costs, accordingly, are fairly constant and do not vary directly with the volume of traffic.

Investment costs in the land telegraph service constitute a much smaller proportion of total costs than operating costs. Within the capacity of the plant, these costs also tend to decrease per message as the volume of traffic increases, as do depreciation and maintenance costs, both of which are directly related to the investment in plant and equipment. This tendency to decreasing costs in the telegraph service has been more than offset since 1917, however. Investment in plant and equipment for all telegraph and cable companies increased from $243,358,432 in 1917 to $506,445,426 in 1932, an increase of 108 per cent, although miles of pole line increased only 6.4 per cent, from 241,128 miles in 1917 to 256,661 miles in 1932, and miles of single wire owned and leased only 19.8 per cent, from 1,890,245 miles in 1917 to 2,266,054 miles in 1932. During the same period, the number of messages transmitted increased 45.1 per cent, from 158,176,456 in 1917 to 229,582,433 in 1927, but declined 31.0 per cent to 158,377,660 in 1932, almost back to the 1917 level. The increase in investment of the telegraph and cable companies has been due mostly to changes in the land-line service, although nautical miles of ocean cable increased 35.3 per cent from 71,251 miles in 1917 to 96,468 in 1932. The principal development which has necessitated large additional investments in equipment has been the change from hand to machine operation.

These changes have tended to increase the ratio that fixed charges bear to total costs and thus to make the telegraph companies more vulnerable in times of depression, but a very efficient wire telegraph plant has been built up, with capacity far ahead of present demands. If traffic increases in the future, the tendency to decreasing costs will become clearly manifest, and the telegraph companies will profit accordingly.

Investment costs constitute a relatively larger proportion of the total costs of ocean cable communication than of land telegraph communication, owing to the great distances over which messages must be transmitted. A very large part of such costs are those associated with the cable itself, including interest on the capital invested, depreciation, and maintenance charges.

In the case of the permanently loaded cables, investment costs are relatively less important because such cables can be channeled; that is, a number of separate circuits may be operated simultaneously. The cost of these cables is greater than those of older design, but their message capacity is proportionately much greater. The cost of the cable is dependent, in the first place, upon the size and weight of the copper core, the working part of the cable, which varies with the length of the cable and the speed at which it is intended to work. Lightweight wire may be used for ordinary cables of moderate length; but for the transatlantic cables, the copper core usually weighs from 350 to 650 lb. per nautical mile. Some are still heavier. One of the cables in the south Atlantic has a conductor weighing 700 lb. per mile, while the conductor of the cable laid by the Commercial Cable Company in 1923 between Waterville, Ireland, and Canso, N. S., via the Azores, weighs 1,100-lb. per mile.[1]

The next important item in construction costs is the gutta-percha for insulation. For a small conductor, the weight of the gutta-percha is practically the same as that of the copper; while for larger conductors, it varies from about two-thirds to one-half that of the copper. Gutta-percha costs more per pound than copper; hence it constitutes an important part of cable-construction costs.[2] Then follow the costs due to the protective coverings. These include a brass ribbon to protect the gutta-percha from the teredo, a small mollusk which may penetrate the outer covering and destroy the insulation; jute; a series of steel or iron protective wires to guard against breakage in coiling, laying, and repairing; and protective armor to guard against abrasion. Protective covering is not nearly so heavy for the deep-sea lengths as for the shore ends. Risk of breakage at depths of one or two miles is not very great, since the cable becomes partially buried in the ooze, the main sources of injury being volcanic movements, elevations, and subsidences. Near the shore, a cable is subject to other sources of injury, such as abrasion from rocky bottoms and breakage by fish trawlers and anchors.

Because of the investment involved in a transoceanic cable, short lengths are tested before it is laid. The laying itself

[1] BROWN, F. J., "The Cable and Wireless Communications of the World," pp. 26–27, Isaac Pitman and Sons, London, 1930.

[2] *Ibid.*, p. 28.

requires great skill and the use of much specialized equipment. A certain amount of slack must be allowed to ensure that the cable will lie snugly on the bottom of the ocean and to enable it to be lifted for repairs without being broken. For great depths, the slack allowed may be as much as 10 per cent of the distance between the points connected.[1]

An important factor affecting the cost of laying a cable between points separated by long distances is the fact that the effective working distance of an unrelayed cable is limited to about 2,000 miles and that the speed at which a cable may be worked varies inversely as the square of its length.[2] In other words, the number of messages a cable can carry, and hence its earning capacity, decreases rapidly as the unrelayed length of the cable increases. It is necessary, therefore, that a cable be "freshened" at some intermediate point if possible. This explains why most of the cables between the United States and Europe touch at Newfoundland or Nova Scotia. Formerly, the necessity for manual relay at such points added materially to operating expenses, but now such relay is largely automatic. Significant in this connection are the new cables of the continuously loaded type, with speeds five or more times as great as the older cables. Other improvements which have increased the speed of cables are the development of more efficient terminal apparatus and better operating methods.

Cables are not necessarily laid over the shortest route between two points, since the saving in investment costs which would thus result might be more than offset by other items. Between the United States and Japan, for example, a northern route by way of the Aleutian Islands would be some 3,000 miles shorter than the route of the present cable. The use of this route would represent a saving of at least one-third of the investment costs, and relay points could be conveniently placed. But higher maintenance costs would probably more than offset such saving, since the Aleutian Islands are fogbound a good part of the time, and the weather is often boisterous in the northern Pacific Ocean, thus tending to render maintenance work hazardous and expensive. Moreover, the bottom is volcanic, a condition that

[1] *Ibid.*, p. 37.

[2] TRIBOLET, L. B., "The International Aspects of Electrical Communications in the Pacific Area," p. 161, Johns Hopkins Press, Baltimore, 1929.

might result in frequent interruptions of a cable laid in those regions.

The matter of repairs is of vital importance in profitable cable operation, since a cable is a paying investment only if it operates over long periods of time without any serious interruption. Where a cable is a vital link in international communications and can obtain and retain all the business it can handle regardless of occasional or even frequent interruptions, it may carry a sufficient volume of business when it is working to compensate for losses sustained during interruptions. However, where it is subject to the competition of other direct or alternate routes, frequent interruption may cause permanent loss of patronage to competitors, since dependability is a quality highly regarded by users of the cable service.

Political considerations also have an important bearing upon the laying of cables. It seems to be preferred generally in international communications that communication be direct between the countries concerned so that communications between two countries may not pass through a third country. It is felt to be desirable not only in the case of diplomatic messages but for commercial messages as well to avoid the leakage of valuable trade information to foreign competitors. There is also the desire to avoid foreign regulation and taxation, the efficiency of operation of any communication system being dependent in no small degree upon the freedom of administration enjoyed by the operating company. Thus, in the case of the British cable in the Pacific, there were no British possessions within three or four thousand miles of Vancouver in the direction in which the cable would have to be laid. Economic considerations pointed to a relay somewhere in the Hawaiian Islands; but since this was not British soil, the cable was laid from Vancouver direct to Fanning Island, a British possession, over a distance of 3,458 nautical miles, the longest unrelayed cable section in the world. It limits the speed of the whole cable and accordingly its earning capacity.[1]

Depreciation costs are not particularly burdensome in the cable industry because of the long life of a cable, although cables become obsolete, and obsolescence is difficult to calculate. The average life of a cable has been variously estimated, but the most

[1] *Ibid.*, p. 165.

authoritative pronouncement comes from a committee of experts to determine the value, in terms of original cost less depreciation, of the German cables which by the Treaty of Versailles were ceded to the Principal Allied and Associated Powers. This committee agreed upon an annual straight-line depreciation rate of 2.2 per cent, which represents a life of between 45 and 46 years. Probably an even greater term may be assumed since some of the oldest cables are still in use.[1]

Maintenance expenses are occasioned mostly by breaks and interruptions in the cables. In the great depths, as has been said, interruptions seldom occur, although at lesser depths, and particularly near the shores, they are much more frequent. The principal cause of interruptions at greater depths are alterations in the bed of the ocean due to volcanic action or to earthquakes. The most serious on record was the earthquake in the bed of the Atlantic Ocean south of Newfoundland, in November, 1929, which interrupted half of the transatlantic cables. At lesser depths and near the shore lines, the principal causes of interruption are anchors and steam trawlers, steam trawling for fish being carried on at considerable depths in certain sections of the world. Chafing against rocky bottoms, particularly where there are strong ocean currents or tidal movements, and in coral regions as well as moving ice also cause much damage to cables. Many of the latter causes of breaks may be avoided, however, by careful selection of the route at the time when the cable is laid. The location of a break can be obtained electrically with remarkable accuracy, and the cable ship is enabled to proceed to a position within a mile or so of the break. The cable is hooked by a grapnel, raised to the surface, and a new section spliced in to replace the damaged part.

Cable-operating expenses, other than maintenance and depreciation, consist mostly of wages and salaries. The cost of collection and delivery of cable messages constitutes an important element in operating costs; but since this service for the American cable companies is performed by the land telegraph systems with which they are associated, the allocation of joint costs is made within the organizations and is not a matter of public record. It is logical to assume, however, that the collection and delivery of cable messages do not add proportionately to the expense of

[1] BROWN, *op. cit.*, p. 38.

maintaining offices and clerical and messenger forces, since such facilities and personnel must on any account be provided for the land telegraph service. The necessity of providing land-line connections for a cable system is obvious, since for profitable operation cables must obtain traffic from more than one or two points. It was the realization of this fact that led to the development of the Postal Telegraph system by the Mackay interests. Such a system could not be operated profitably, however, merely as a feeder to the cable system; it of necessity developed a land telegraph business. Early in its history, congestion of Western Union lines between many important cities presented an opportunity, which the Postal system was quick to snatch, for a more rapid service between those points than was then being provided by the Western Union. Gradually, this system was extended until it served practically all the larger cities of the United States.

There is a marked tendency to decreasing costs in the cable industry due to the relatively high investment cost per message, this being very high on long cables. To take an extreme illustration: The Commercial Pacific Cable Company reported to the Interstate Commerce Commission for the year 1929, the year during which it transmitted its greatest volume of traffic, an investment in plant and equipment of $22,613,565. During this year, it transmitted 574,097 revenue messages. This amounts to an investment of $39.39 per revenue message, as compared with a total investment in land lines and cables of $1.77 per revenue message for the Western Union and $1.58 per revenue message for the Mackay Companies (Commercial Cable Company and Postal Telegraph system), reported to the same commission for the same year. Investments per message in the transatlantic cables are not nearly so great, although they are much greater than corresponding investments in land telegraph facilities.

Telegraph costs, like those of all public utilities, are affected by the nature of the demands for the service and the times at which such demands occur. Low costs of operation are dependent upon full loads, and the more nearly the plant is operated to capacity the lower the per unit costs will be. The lowest costs would be attained if the plant were operated at full capacity throughout the 24 hr. and for each day of the year. However, there are fluctuations in hourly, daily, and seasonal demands, the average hourly demand, for instance, being much less than the

maximum hourly demand. This means that facilities which must be provided to meet the maximum demands lie unused for part of the time, and unused facilities add to the cost of furnishing service. Lowered costs, therefore, can be brought about by improvement of the load factor, load factor being the ratio between the average and the maximum demands for a given period of time.

Improvement of load factor in the telegraph industry is subject to special limiting conditions. The message occupies the circuit for the time being to the exclusion of all else. There can be no overloading, no use of "standing room" in rush hours. The volume of messages which a given circuit will carry can be increased only by additional use of it in off-peak hours. In the telephone industry the number of hours that a circuit may be used and the number of connections that can be given within those hours are still further limited by the necessity of having the two parties to the communication present on the circuit, by the time necessary to get both parties on the circuit, by the time taken by the communication, and by the intervals lost while waiting for parties. The capacity of a telegraph circuit is not limited in this manner, since the messages are transmitted by the operating staff, one after another, with no lost intervals during busy hours. But improvement of load factor is limited by the fact that such improvement can be attained only through the delay of a portion of the messages, which means slower and less satisfactory service.

Load factor also affects cable costs. The characteristics of the cable load reflect the time differential which is usually involved in cable communication. There is, for instance, a difference of 5 hours between New York and London time; consequently only parts of the business days of these two places overlap; and since a large proportion of cable messages arise out of business transactions, the peak of transatlantic cable traffic comes during the overlapping hours. The introduction of deferred and letter services has resulted in a much better distribution of cable traffic during the 24 hr., but the average hourly load is much less than the maximum hourly load for an average day. Thus, the peak of Western Union transatlantic cable business falls between the hours of 9:30 A.M. and 3:30 P.M. New York time. It is during these hours that the total of the eastward

and westward traffic is greatest. Before 9:30, there is a considerable volume of westward traffic but a diminished volume eastward. After 3:30, there is a marked falling off in the volume of both eastward and westward traffic, although there is a rise to a second small peak around 5:00 P.M., at which time many firms send a résumé of their daily business operations. The volume of traffic continues fairly large until midnight New York time, after which there is a dropping off until the westbound traffic begins to come in considerable volume.

The telegraph and cable services were developed originally as expedited services; that is, facilities were provided to handle all, or nearly all, the messages expeditiously. But this resulted in surplus plant to meet maximum demands which was largely unutilized except at hours of peak traffic, and the cost of which had to be borne by the expedited service. Around 1911, however, the American telegraph and cable companies introduced deferred and letter services at cheaper rates on the theory that there were many potential users of their services who desired communication service faster than the mail but who could not, or would not, pay the rates charged for the expedited service. Deferred messages and letters could be transmitted when the facilities otherwise would be unused; and since the revenues from these messages would more than cover the costs directly allocable to them, they would bear a portion of the overhead costs, thus reducing the total cost per message of furnishing the expedited service. The land lines adopted the night telegram, the day letter, and the night letter; the cable companies, the deferred cablegram and the night letter. Later, a week-end letter was added, but this was abolished in 1933. The deferred services have added much new business and have improved materially the load factor of the telegraph and cable industries.

Telegraph traffic in the United States is subject to seasonal variations which affect costs and create sectional problems in the handling of traffic. For example, during the early months of each year a considerable number of people take up temporary residence in Florida and in California. Additionally, from these same areas the large centers of population receive early vegetables and produce. These perishable products are bought and sold largely through the medium of the telegraph. As the spring season advances, and the production of fruits and vegetables

moves northward, telegraph facilities must be provided for their marketing. It has long been the practice of the Western Union Company to establish temporary offices and to provide special facilities in the areas where foodstuffs are assembled for shipment to the secondary markets and ultimate consumers. The movement of grains from agricultural areas creates similar seasonal business in those areas. Also, the summer exodus of vacationists to mountain and seashore resorts causes the telegraph companies to open many temporary offices at such places.

The cost of furnishing telegraph service is affected further by the desirability, or necessity, of providing a universal system, in which respect it is much like the postal service. Although the Postal system reaches mostly the large cities, the Western Union has more than 21,000 offices, most of which are located in small towns and cities, many in places where the volume of traffic hardly warrants the maintenance of an office. A great many of the Western Union offices are located in railroad stations and are operated under joint arrangements with railroad telegraph services. Such arrangements reduce the cost to the telegraph company but place the commercial telegraph service in a secondary position, since the first duty of the station agent is to the railroad. The tendency has been for such offices to abandon altogether public telegraph service and to become exclusively railroad offices. Collection and delivery of telegraph messages by telephone make the telegraph service available to many small towns and villages which could not support exclusive telegraph offices.

Radiotelegraph Costs.—Much cannot be said concerning radiotelegraph costs, or by way of comparison with wire telegraph costs, because the facts are not a matter of public record. In the absence of exact knowledge, there has been much speculation with respect to the relative costs of cable and radiotelegraph communication, and the radio generally has been conceded lower costs. While it is true that it costs less to construct two short-wave radiotelegraph stations to communicate over great distances than to lay a cable between the same points, a pair of high-power, long-wave stations cost about as much as a cable of the older type. Transatlantic short-wave radiotelegraph stations cost, on the average, $300,000 to $500,000 each, whereas the cables of older design, most of which were laid before the World War,

cost about $3,000,000 each. Radio circuits also may be operated at much greater average speeds than the older cables; hence short-wave radiotelegraphy has a decided advantage in investment costs per message.[1] Even less material is available for a comparison of radiotelegraph costs with those of loaded cables. These cables are more costly than those of the older type, the three permalloy cables of the Western Union Company together costing about $25,000,000; but they can be operated at high speeds, and channeling makes available several circuits in the same cable. Full advantage cannot be taken of the loaded cables, however, unless their great capacity is wholly, or largely, utilized.

But to compare radiotelegraph and cable costs solely on the basis of the investment in plant and equipment is to overlook the fundamental fact that operating costs constitute a large part of the total costs of telegraph communication and that differences in operating costs between wire and radio are not likely to be great. In all record communications, whether by wire or by radio, the problem is to find and secure the message which is to be sent and to deliver it into the hands of the party for whom it is intended. Costs of collection and delivery are the same whatever the medium of transmission, and they are such an important part of total costs that differences in the cost of radio and wire transmission may on occasion become relatively unimportant. In the land telegraph service, these considerations are especially significant. Moreover, in the land service, the high cost of radio terminal apparatus makes wires much more economical for handling small volumes of traffic between many scattered points.

The demand for transoceanic radiotelegraph service, like that for cable service, is unevenly distributed throughout the day. The services are strictly competitive, and the traffic comes from the same classes of customers. As shown in Fig. 2, the peak of the transatlantic traffic of the Radio Corporation falls within those hours during which the business hours in New York and London overlap, the total of outward and inward traffic being greatest during these hours. Traffic from Europe comes in considerable volume before the opening of the markets and business offices in New York, and hence the curve of inward

[1] Statement of W. A. Winterbottom, Hearings on S. 5201, 72d Cong., 2d Sess., pp. 54–55.

traffic rises to its peak earlier than that of outward traffic. The secondary peak in outward traffic in the late afternoon (New York time) is due, as in the case of cable traffic, to resumés of daily business transactions sent largely at deferred rates.

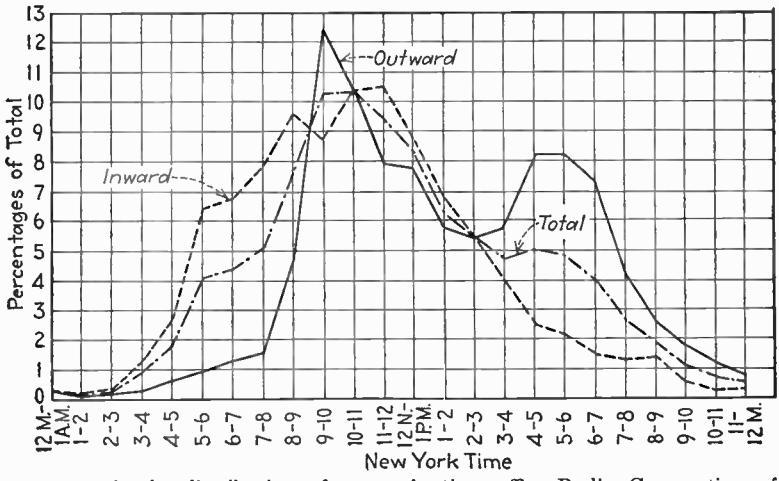


FIG. 2.—Hourly distribution of transatlantic traffic, Radio Corporation of America (by percentages).

Telephone Costs.—Operating costs constitute a very large part of the total costs of furnishing telephone service, and of these costs the bulk consists of salaries and wages. Of every dollar of operating revenue received by the telephone systems of the United States in 1932, 43 cents was paid out in salaries and wages. Revenue and expense categories and amounts taken from the consolidated income statement of the Bell System for the year 1932, as presented in Table 7, indicate clearly the relative importance of various items of expense. This table shows that operating expenditures of the Bell System for that year constituted 79.7 per cent of total expenditures. Current maintenance, which represents the cost of inspection, repairs, and rearrangements required to keep the telephone plant and equipment in good operating condition, amounted to 19.2 per cent of all expenditures and 24.1 per cent of operating expenses. Depreciation expense, which represents provision to meet loss of investment when property is retired, amounted to 21.7 per cent of all expenses and 27.3 of total operating expenses. Traffic

expenses were 20.0 per cent of all expenses and 25.0 per cent of total operating expenses. These represent the expenses incurred in the handling of telephone calls, about 68 per cent being operators' wages. Commercial expenses amounted to 11.4 per cent of all expenses and 14.3 per cent of total operating expenses. These consist of expenses incurred in business relations with subscribers, including the rendering of bills and collection of

TABLE 7.—BELL SYSTEM REVENUES AND EXPENSES, 1932[1]

Item	Amount	Percentage of total
Total revenues	$974,071,515	100.0
Operating revenues	$956,354,529	98.2
Nonoperating revenues	17,716,986	1.8
Operating expenses (total)	$665,018,139	79.7
Current maintenance	$160,427,812	19.2
Depreciation expense	181,312,237	21.7
Traffic expenses	166,339,677	20.0
Commercial expenses	94,825,122	11.4
General and miscellaneous expenses	62,113,291	7.4
Uncollectible revenues	$ 12,814,505	1.5
Taxes	86,621,779	10.4
Rents and miscellaneous deductions	15,146,053	1.8
Interest deductions	55,134,800	6.6
Total expenses	$834,735,276	100.0
Net income	$139,336,239	

[1] Source: Annual report of the American Telephone and Telegraph Co., 1932.

accounts, as well as the cost of advertising, sales activities, directories, pay-station commissions, and similar items. General and miscellaneous expenses, which include a considerable variety of expenditures, such as the expenses of the executive, accounting, financial, and legal departments; insurance premiums; sickness, accident, and death benefits; pensions; and other items of general expense incurred in operating the properties, amounted to 7.4 per cent of all expenses and 9.3 per cent of total operating expenses.

The cost of telephone service, unlike the costs of other communication services, increases per subscriber as the number of

subscribers increases. This is a fact of very great importance both to the consumers and to the telephone companies. It means that telephone service costs more, and the rates must be higher, in larger communities than in smaller ones. The principal reason for the tendency toward increasing costs in the telephone industry is that investment costs increase more rapidly than the number of subscribers. Operating costs, especially depreciation and maintenance which increase with the investment, as a whole, tend to increase per subscriber, although in certain categories they tend to decrease, with increase in the number of subscribers.

Investment costs may be divided into the costs of providing (1) the office buildings, central offices, switchboards, equipment, etc.; (2) the cable, wires, poles, conduits, and other equipment necessary to connect subscribers with the central offices and to connect the central offices with each other; and (3) the instrumentalities located in the home or office of the subscriber. Central-office investment costs increase more rapidly than the number of telephone subscribers owing fundamentally to the necessity for interconnection between subscribers. The telephone company does not supply a commodity that a consumer may receive directly from the company, as in the case of gas or electric service; nor does it transmit messages for consumers as do the telegraph companies. It merely furnishes a connection, the communication being carried on by the two parties connected. There must be two parties to every telephone communication, and the task of the telephone company is to provide facilities for the interconnection of all subscribers, new and old, such that each subscriber may be connected directly with any other when occasion demands.

The task of interconnecting a few subscribers is a relatively simple one, but it increases in complexity, and the costs mount rapidly, as the number of parties to be interconnected increases. A simple illustration will suffice to demonstrate this fact: If a telephone system were to consist of two stations, only one connection would be necessary; but for interconnection, 3 stations would require 3 connections; 4 stations, 6 connections; 6 stations, 10 connections; and so on in a geometric progression. Until five or six thousand stations are reached, the increasing costs are due to the necessary increase in multiple facilities in the switchboard; after this point has been reached, the source of increasing

costs is in the trunking equipment required.[1] Interconnection increases the value of the telephone service to all users, and the value increases with the number of parties interconnected; but the costs increase, and so must the rates.

Investment costs of outside plant also tend to increase as the size of the exchange increases. The system covers larger territory, and construction costs are increased; poles must be larger and longer, and the lines of increasing length; more aerial cable must be used; more underground cables and conduits must be installed; basements must be torn up and replaced both in construction and in repair work; labor is usually more expensive; and municipal regulations usually are more exacting. There are, however, counteracting tendencies to the upward trend of the cost of outside plant. The density of the territory served, as well as the extent, ordinarily increases with the size of the exchange, which enables a more efficient utilization of pole lines, conduits, and cables.[2] The cost of instruments in the home or office of the subscriber is about the same per station and does not vary with growth. Investment in plant and equipment per station in the Bell System for the years 1921 to 1930, inclusive, a period during which the number of stations increased consistently each year, is shown in Table 8.

Depreciation and maintenance charges per station also increase with the number of stations because they are directly related to investment in plant. The principal reason for the increase in maintenance expenses per station is that an increased amount of physical property requires greater expenditures to keep it in order. Other factors that may cause maintenance costs to rise are higher labor costs, due to the fact that with more complex equipment more skilled labor must be employed, and higher standards of maintenance. As the size of the exchange increases, a higher quality of service is demanded, and this requires adequate personnel not only for rapid repair work but for closer inspection of the property in so-called "preventive" maintenance work. A major change in the type of property or its operation may also require increased maintenance work to be performed on classes

[1] SICKLER, B. J., The Behavior of Costs in the Telephone Industry, in H. B. Doran, "Materials for the Study of Public Utility Economics," pp. 360–361, The Macmillan Company, New York, 1930.

[2] *Ibid.*, p. 361.

of property more or less closely associated with this change, such as in the case of a shift from manual to automatic switchboards.

There are, however, counteracting factors to the tendency of maintenance costs per station to increase. Although total investment per station increases as the number of stations, maintenance expenses need not rise proportionately if the increased investment is concentrated in classes of property subject to relatively low maintenance costs. For example, aerial wire and cable and poles have much higher ratios of maintenance

TABLE 8.—INVESTMENT IN TELEPHONE PLANT AND EQUIPMENT: BELL SYSTEM, 1921–1930

Year	Number of[1] stations	Investment in plant and equipment	Investment in plant per station
1921	8,914,155	$1,543,865,545	$173.19
1922	9,514,813	1,729,219,520	181.74
1923	10,406,155	1,978,947,543	190.17
1924	11,242,318	2,266,923,466	201.64
1925	12,035,224	2,524,905,590	209.79
1926	12,816,252	2,783,023,059	217.15
1927	13,726,056	3,013,985,120	219.58
1928	14,524,648	3,275,686,848	225.53
1929	15,414,005	3,671,099,689	238.17
1930	15,682,059	4,043,421,739	257.84

[1] Number at end of year.

Source: Annual reports of the American Telephone and Telegraph Co.

charges than do classes of property included in the underground plant, such as conduits and underground and submarine cable. Consequently, changes in the constitution of plant may have marked effects upon maintenance cost which is determined by the amount of work to be done and by the cost of labor and materials and not by the price level at which the maintained property was installed. It is generally true, however, that maintenance expenses per station, although they may not rise proportionately with investment per station, increase with increase in the number of stations. Depreciation costs vary directly with investment costs. Annual depreciation costs for the Bell System during the 10-year period 1921 to 1930, inclusive, averaged 5 per cent, and annual current-maintenance expense 5.1 per cent, of the investment in plant and equipment.

Depreciation costs increased from $8.22 per telephone in 1921 to $11.73 per telephone in 1930; while current maintenance costs increased from $8.47 in 1921 to $12.29 per telephone in 1930.

In the other categories of operating expense—traffic, commercial, general, and miscellaneous—trends in cost per station do not tell the whole story because of the inadequacy of the per-station basis. For certain categories, the per-call basis would represent a more adequate yardstick by which to measure costs; and for each account in a particular group of expenses, there is a particularly appropriate yardstick. As one illustration of the inadequacy of the per-station basis in measuring costs, toll messages per station of the Long Lines Department of the American Telephone and Telegraph Company increased more than 70 per cent from 1921 to 1930, and toll messages per station of the Associated Companies increased about 20 per cent during the same period. This increase in toll messages involved considerable work upon the part of the operating, commercial, and accounting departments which is not reflected directly by the increase in the number of stations. The reason for using the per-station basis is that telephone charges, except in the toll service, are per-station charges. Even where the exchange service is sold on a measured basis, the charge is a minimum monthly charge per station, under which the subscriber may make a limited number of calls without further charge. In this way, unit costs and rates are brought into more direct relationship. In Table 9 are presented telephone-operating expenses of the Bell System per station for the years 1921 to 1930, inclusive.

Expenses incurred in the handling of telephone traffic decreased from $17.20 per station in 1921 to $14.49 per station in 1930. Many factors, however, would tend to cause such costs to increase per station with increase in the number of stations. With an increase in the number of subscribers, a larger number of calls must be trunked, especially in the larger exchanges, and trunked calls consume more operator's time than those that are not trunked. Also, as the size of the exchange increases, higher quality of service is demanded, because businessmen in larger places require speedier and more accurate service than those in smaller places or than is demanded by residence users. Further, up to a certain point at least, the calling rate increases as the number of subscribers, which also tends to cause traffic expense

per station to rise, although measured service in larger exchanges tends very definitely to depress the calling rate.[1]

One important development which has affected traffic expenses of the Bell System materially is the change from manual to dial operation. Contrary to popular opinion, however, the dial system does not dispense with operators altogether, since a considerable number are required to handle toll and other special calls and to assist in its general operation. Thus, in 1921, when dial operation was being established in the Bell System, 128,000 operators were employed by the Bell companies. In 1931, with almost one-third of the total number of Bell telephones dial operated, the number of operators employed had increased to 155,000 an increase of 21.1 per cent. However, during the same period, the number of telephones in the Bell System increased 88.2 per cent; the average daily number of exchange connections, 85.2 per cent; and the average daily number of toll connections, 116.3 per cent. This indicates considerable saving in traffic expenses because of the dial system.

Commercial and general and miscellaneous expenses per telephone of the Bell System also increased from 1921 to 1930, especially during the period from 1927 to 1930. These per-

TABLE 9.—TELEPHONE-OPERATING EXPENSES: BELL SYSTEM, 1921–1930 PER STATION

Year	Expense per telephone					
	Current maintenance	Depreciation	Traffic	Commercial	General and miscellaneous	Total
1921	8.47	8.22	17.20	5.55	2.73	42.17
1922	8.66	8.69	16.60	5.39	2.81	42.15
1923	9.15	8.79	17.17	5.36	2.61	43.08
1924	9.39	9.21	16.43	5.44	2.64	43.11
1925	9.58	9.92	15.97	5.51	2.63	43.61
1926	10.12	10.27	15.91	5.74	2.61	44.65
1927	10.51	10.68	15.30	5.98	3.24	45.71
1928	10.93	10.89	15.01	6.29	3.60	46.72
1929	12.00	10.98	15.24	6.83	3.92	48.97
1930	12.29	11.73	14.49	6.84	4.35	49.70

[1] *Ibid.*, pp. 355–357.

station increases, however, have been due in part to reclassification of expenses which has brought to these accounts certain items of expense formerly appearing in other categories. At first glance, it is difficult to understand why customer costs should increase per station with an increase in the number of stations, since more efficient methods of accounting, billing, collecting, etc., should tend to reduce such costs per customer. However, there are certain items that might well account for the tendencies exhibited. The growth of measured service tends to increase customer costs. Also, as the number of subscribers increases, directory expenses increase, because a larger and more expensive book must be given each customer. Further, sales and advertising expenses tend to increase with the development of the service, since increased effort is necessary to sell additional service. Finally, certain commercial expenses result from activities which produce additional amounts of revenue, for example, expense due to the printing of advertising matter in directories from which revenues are derived and which appear under "Miscellaneous revenues"; and public pay-station commissions which increase with increased revenue from such stations or with increases in the rates of commissions paid. General and miscellaneous expense per telephone decreased from $2.73 in 1921 to $2.61 in 1926 but rose to $4.35 in 1930. The principal reason for the increase after 1926 was that in 1927 the Bell companies adopted an accrual basis of providing for future pension payments to retired employees. This alone caused an increase of 77 cents per station from 1926 to 1930. Other causes were administrative changes on account of growth and in order to improve the degree and quality of administrative attention to local construction and operation problems.

This brief analysis of the costs of furnishing telephone service by the Bell System over a period of 10 years shows clearly that telephone costs increase per station as the number of stations increases. The tendency to increasing costs, however, is due primarily to the costs of providing interconnection and is not true of the toll service. Once toll circuits are established, costs per message tend to decrease up to the capacity of the circuits. All telephone costs could be reduced materially if the plant were used to capacity during each hour of the day, but the hourly demand for telephone service is unevenly distributed.

The demand for telephone service, like the demand for telegraph service, comes mostly during certain hours of the business day. This is true both of the exchange and of the toll service. Figure 3 shows the hourly distribution of local exchange calls, the hourly distribution of A-board calls (short-haul toll calls handled by local operators), and toll-board calls during an average day in a large city. These curves indicate that the great bulk

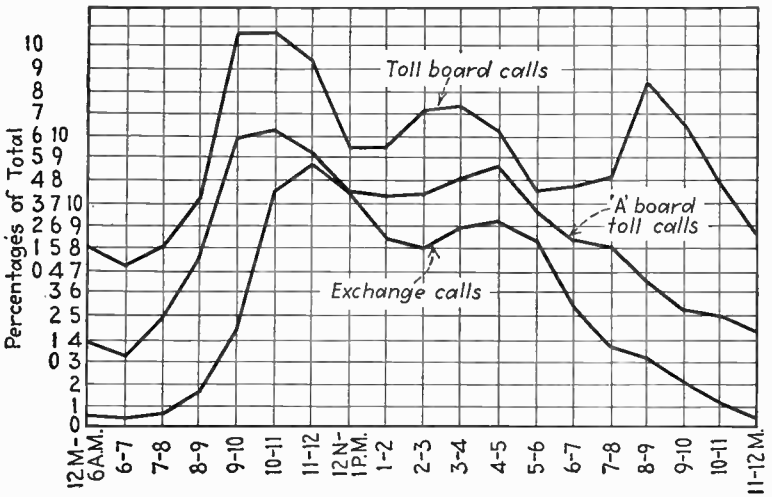


FIG. 3.—Telephone traffic curves. Hourly distribution of calls during a typical day (by percentages).

of all telephone calls are made during the 8 hours from 9:00 A.M. to 5:00 P.M. of each business day, the peak of traffic coming during the late morning hours, with a decline during the lunch hours and a rise to a secondary peak from 3:00 to 5:00 P.M. The evening peak in toll-board calls is due to calls that have been delayed in order to take advantage of the lower rates for long-distance messages after 7:00 P.M. During the early morning hours the telephone plant is little used.

The unequal hourly distribution of telephone traffic affects telephone costs materially, since plant and equipment must be provided to handle peak loads which is wholly, or partly, unused at other times. Investment costs, per station or per call, must thus be higher than they would need be to handle the same volume of traffic if it were more evenly distributed throughout the day. Similarly, operating personnel must be provided

for peak hours which are not fully employed at other times. Telephone companies, like telegraph companies, have endeavored to improve load factor by stimulating off-peak use of the telephone, but their efforts have been confined to the long-distance service. In the telephone service, as in the telegraph service, fuller utilization of plant and equipment can be had only by

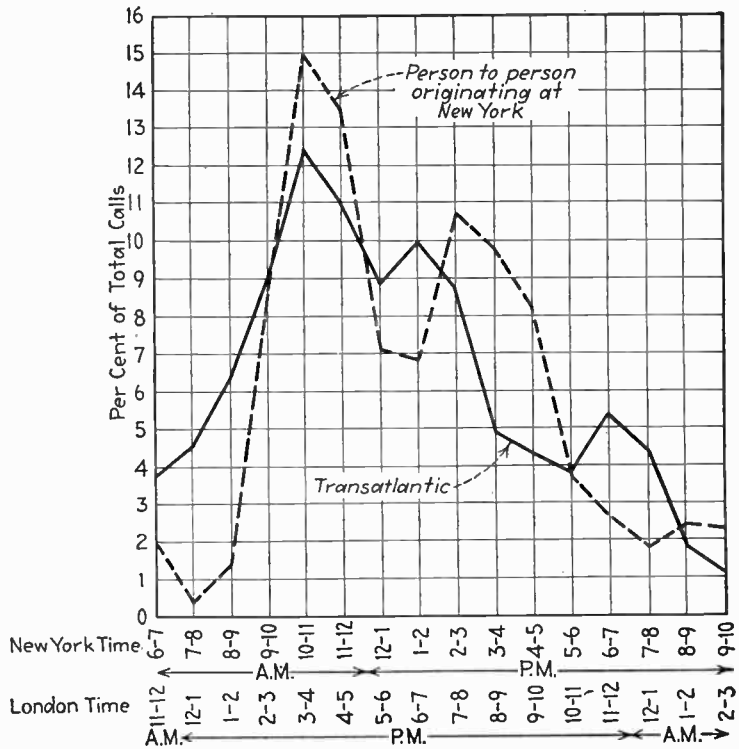


FIG. 4.—Hourly distribution of trans atlantic telephone calls. American Telephone and Telegraph Company.

delaying communications; but in this respect, as has been seen, the telephone labors under a greater handicap even than the telegraph. Since telegraph messages are handled by the operating personnel, a night message or letter may be delivered early the following day without inconvenience to the one receiving the message; but a telephone conversation is between two parties, both of whom must be present at the time the communication is carried on. The tendency, therefore, is to use the telephone

only at times convenient to both parties. However, there are many calls that will be delayed until the rush hours have passed if appropriately lower rates are charged, as shown by the increase in the number of calls at the beginning of the evening period. There is a similar unequal hourly distribution of traffic in the transoceanic radiotelephone service, as is shown in Fig. 4, the curve of transatlantic traffic corresponding to that of a similar type of long-distance traffic in the United States.

In summary, it may be said that operating costs, principally wages and salaries, constitute a large part of the total cost of furnishing telecommunication service, whether of record or of voice type; hence, changes in labor conditions and salaries and wages in general are of considerable significance to the communication companies. Distance is a factor in costs, but it is relatively more important in telephone than in telegraph communication. The relatively high cost of collection and delivery per telegraph message, which does not vary with distance, and the relatively low plant cost, as compared with the relatively low operating cost and relatively high plant cost per telephone call, make the telegraph more economical for long distances and the telephone more economical for local communication. There is a tendency to decreasing costs in the telegraph but a marked tendency to increasing costs per station in the telephone industry. This latter tendency has great significance to telephone subscribers and to the companies themselves. As the number of telephone subscribers increases, costs increase; and increased costs over a long period of time can be offset only by increased rates or by improvements in the art. Hence, research and technical improvement, which are important in all aspects of telecommunication, are vitally significant to low-cost telephone service. Both telegraph and telephone costs are increased because of low load factor, but the development of off-peak use is limited by the nature of the services. Since the rapidity of the telegraph service is its principal asset in competition with the mail, to delay messages even for a few hours is in many cases to destroy or to lessen materially the value of the service, especially for business users who contribute the bulk of the traffic. Development of off-peak use of the telephone is still further limited by the fact that both parties must be present at the telephone and that few desire to call or be called during the night and early-morning hours.

CHAPTER VI

RATE MAKING IN THE COMMUNICATION UTILITIES

In the making of communications rates, certain general principles common to all public utility rate making are applicable. In the first place, rates must be fixed at a level such that the users of the service will pay into the coffers of the company revenues sufficient to meet all expenses and to provide an adequate return upon the capital employed. The cost of furnishing the service sets an irreducible minimum below which rates as a whole may not fall. But cost alone is not controlling. Whatever the cost, a service cannot be sold for more than its value to the consumers; and the value of the service sets limits above which rates may not rise. Rates must be established, therefore, with a view to the value as well as the cost of the service. But since certain communication services are furnished under monopoly or quasi monopoly conditions, and since the tendency of the monopolist is to establish rates at a level that will yield the greatest aggregate profit, rates may be fixed so far above the cost of furnishing the service, especially where the demand is inflexible, as to be unreasonable from the viewpoint of the general public. The realization that such an eventuality is possible has been responsible in large measure for the development of rate regulation.

In the second place, rate making involves the setting up of a schedule of particular rates for various classes of consumers. The needs of different consumers vary, as do their abilities to pay for service. It is the function of rate departments, therefore, to develop schedules of rates which in the light of the differing abilities will distribute equitably among the various classes of consumers the costs of furnishing the service as a whole. This task is much more difficult than it seems, for communication services are supplied under conditions of joint cost; that is, the same plant, or parts of it, is utilized in supplying service to all classes of consumers. Certain costs may be allocated directly

to those who are responsible for them, and it is an accepted principle that no service should be furnished at rates lower than the costs directly occasioned by it. Other costs, however, incurred jointly in the furnishing of all classes of service, must be allocated arbitrarily to the various classes. The controlling principle is that joint costs are allocated to the different classes in proportion to the strength or the weakness of the various demands. This means that a relatively greater proportion of joint costs may be allocated to services where the demand is inflexible and there is no competition of substitutes than to those where the opposite conditions obtain.

The principle involved in the allocation of joint costs has come to be stated in common parlance as "charging what the traffic will bear," and it has generally been thought of as a principle of extortion. However, it may be regarded from a wholly different point of view. Sir William Acworth has designated it a matter of "tempering the wind to the shorn lamb." As such, he says, it is a principle "not of extortion but of equitable concession to the weaker members of the community."[1] In this sense, charging what the traffic will bear means that more of the burden of the joint costs is borne by the consumers who are able to bear the burden and less by those who are not. As a consequence of its application, certain consumers may enjoy communication services who otherwise would be unable, or unwilling, to pay the rates charged. An excellent illustration can be drawn from the telephone service. Business telephone rates are generally higher than residence rates not because it costs more to furnish the business service—in fact, the opposite may be, and often is, true—but primarily because the demand for business service is relatively stronger than for residence service. Telephone service can, therefore, be furnished to certain classes of users at lower rates than would prevail if costs were allocated to all consumers in direct proportion to their responsibility for them.

In the third place, the services must be classified and the rates so fixed as to promote the maximum development of the service. This is especially significant in the communication industries owing to the importance of interconnection. It matters little

[1] "The Elements of Railway Economics," p. 84, Clarendon Press, London, 1924.

to a consumer of gas or electricity whether or not his social and business acquaintances also are consumers, except that, with an increase in the scale of operations, unit costs may decrease, thus making possible lower rates. The value of a communication service, however, varies directly with the number of parties interconnected. Most people have certain acquaintances or business associates with whom they communicate frequently and regularly, others with whom they communicate occasionally, and still others with whom they communicate only in case of necessity or emergency. To the extent that communication systems are unable to provide the necessary interconnection, they fail to accomplish the purposes for which they are established. Communication facilities must be provided in unprofitable as well as profitable territories, and the services must be brought within the reach of a large proportion of the total population. Telecommunication systems, like the mail, must be universal in scope. But this means that certain classes must bear a larger proportion of total costs than others and that profitable territories must bear a portion of the cost of furnishing service in unprofitable ones.

Finally, rates must be designed to promote operating efficiency, to prevent waste, and to protect the quality of the service. They should be simple and economical in administration, and there should be reasonable stability in the charges. Special communication needs should be met by the provision of special services at special rates but only to the degree, and in a manner, consistent with the requirements of the service to the general public.

Principles of Telegraph and Cable Rate Making.—Telegraph and cable rates are based principally upon distance, the quantity of service rendered, and the expedition in transmission which is desired. Distance is a factor because it costs more to transmit messages over great distances than over short ones, but it is not so important as in the case of other common carriers, especially the telephone, and telegraph rates are only roughly proportional to distance. This is due to the fact that a telegraph circuit is a relatively inexpensive one and to the further fact that the costs of collection and delivery, the costs of installation and maintenance of sending and receiving equipment, and the costs of maintaining operating, clerical, and administrative personnel,

which together make up a large part of total costs, are for the most part independent of distance.

In the cable service, the distances over which facilities must be provided account for the relatively high charge per word. However, cable rates are only roughly proportional to distance, and competition between different production and trading areas throughout the world materially affects cable-rate structures. The distances from cable landings to hinterland points also are taken into consideration in the making of through rates for traffic between such points.

In determining the quantity of service rendered, rules and regulations governing the word count are of vital importance, since the charges are made on the basis of the number of words transmitted.

In domestic telegrams, the address and signature are carried free of charge; but in the cable service, because of the high cost per word, all that the sender writes upon his form to be transmitted to his correspondent is charged for, including the address and signature. To reduce the cost of cable messages and to facilitate their transmission, it has long been customary for business firms to register a single code word representing the complete name and address of an individual or firm. Thus, a saving to cable users is effected, and cable space is conserved for traffic. In most foreign countries, cable addresses have long been registered with the government telegraph or postal system; but in the United States prior to 1917, the individual cable companies maintained their own records. At that time, no charge was made for registry, and there was no limit upon the number of such addresses allowed a single customer. These conditions, together with the competition between cable companies for the recording of addresses, brought about such confusion as to interfere seriously with the proper delivery of received messages. Old addresses long out of use remained on the record; addresses would be registered with one company and not with others; the same code word would be used by different firms; and some firms would file long lists of addresses wherein a slight change in letters or arrangement would have a code meaning.

To eliminate this confusion, when the cables were placed under censorship upon the entry of the United States into the World War, the chief cable censor canceled every cable address, and all

customers of the cables were required to file new addresses, only one registered code name being allowed to each individual or firm. After the abolition of censorship in 1919, by agreement among the cable companies, a Central Bureau for Registered Addresses was established in New York, and an annual fee fixed for each cable address registered with this bureau. Under the system that now obtains, a cable address registered with any cable or radio company is referred to the central bureau and is made available to all. There are no duplication of addresses, no question as to the proper address, and no delay in delivery.[1]

Many special rules govern the word count for the body of the message, and they vary as between the domestic telegraph and the cable services, the latter being expressed in the international regulations which govern practically all cable communications. These concern such matters as proper names, figures, ordinal numerals, decimal points, punctuation marks, abbreviations, and so forth. Most important are the rules that govern the word count of messages written in secret language, as distinguished from plain language. A plain-language message may be defined as one that conveys an intelligible meaning in the language in which it is written, whereas a message in secret language conveys no intelligible meaning in any known language. Secret language may be divided into three fairly distinct classes: (1) code language, (2) cipher language, and (3) figure language. Code language is composed of bona fide dictionary words used in other than their generally accepted meanings or of artificial or spurious words. Cipher language is composed of sequences or groups of letters in indiscriminate mixtures of vowels and consonants not having the appearance of real words, constructed by applying a system of cryptography to the individual letters of plain-language or code telegrams, which involves the substitution of other letters for the original letters or a rearrangement of them. Figure language consists of sequences or groups of Arabic numerals.

Secret language has long been in use in telegraphic communication for reasons of secrecy and economy. Until recently, charges per word were the same regardless of the language used, but the maximum length of words permissible in secret language has

[1] International Communications and the International Telegraph Convention, U. S. Department of Commerce, *Misc. Ser.* 121, pp. 8–9, 1923.

long been less than in plain language. In Europe, where codes had been used in semaphore signaling systems, the introduction of code language into telegraphic communication represented merely the taking over of existing semaphore codes. In the United States, since the semaphore telegraph had not been established here, no such background existed, but the secrecy and economy of code language were soon appreciated, and it came into use early.

Charges and word count for secret language have been subject to regulation almost from the beginning. In international telegraphic communication, these matters are governed by the rules and regulations of the International Telecommunication Convention (formerly the International Telegraph Convention) and the Telegraph Regulations annexed thereto; but the United States is not signatory to the Telegraph Regulations; hence they are not applicable to domestic telegraph communication, and American telegraph and cable companies need observe them only where communications go to foreign countries which are signatories. In actual practice, however, American cable companies adhere to these regulations for the bulk of their communications.

Early codes, like the semaphore codes which preceded them, consisted of cipher and figure language. Messages written in these forms were charged for on the basis of five characters per word. It was not long, however, before another principle in the construction of codes developed, that of using plain-language words in other than their generally accepted meanings. The reasons were obvious: In the first place, longer words could be used as code words, since the maximum permissible length of plain-language words has always been greater than for words in secret language; and in the second place, the number of words available for code compilation was much greater than could be obtained from the combinations of ciphers in common use, and the longer and more varied the words the greater was the degree of economy that could be achieved by the use of codes. Then followed the use of artificial or spurious code words.

Although the American telegraph companies have never been subject directly to the International Telegraph Regulations, their rules governing word count in domestic telegrams for a long time were roughly the same as the international rules, except that, in the former, cipher language and figure language were charged

for at the rate of one word for each separate character, whether letter or figure, whereas, in the latter, the count was at the rate of five characters per word.[1] Artificial and spurious code words came to displace dictionary words in the codes used in domestic telegrams, but they were counted as plain-language words. In 1893, the Western Union company placed limits upon the construction of code words by requiring that they be "pronounceable" in order to be carried as dictionary words; and a similar rule was incorporated into the London revision of the international regulations in 1903. In 1909, however, the American companies, realizing that the requirement of "pronounceability" was unenforceable, abandoned this rule and required that all groups of letters, when such groups were not dictionary words and not combinations of dictionary words, should be counted at the rate of five letters per word. This is the rule that obtains today. Dictionary words may be taken from the English, German, French, Italian, Dutch, Portuguese, Spanish, or Latin languages. Dictionary words from other languages than these may be used but are charged for at the rate of five letters per word.

Code language has been a troublesome problem in international communication, owing to the many abuses that have arisen from time to time. In the beginning, dictionary words used as code words were accepted as plain-language words and counted accordingly; and since dictionary words could be drawn from more than 50 languages, and the maximum length of a word was fixed at seven syllables for all telegrams—plain language or code—code compilers drew up codes that served well the purposes of users but added materially to the difficulties and the cost of cable communication. At the St. Petersburg Conference, in 1875, the maximum length of a code word was fixed at 15 characters in the European regime and at 10 characters in the extra-European regime;[2] and in 1879, the number of languages that could be used in code messages was restricted to eight in the

[1] There was a brief period during which three characters constituted a word in both American and international rules.

[2] The European regime includes all countries in Europe and countries situated outside Europe which are declared by their respective administrations as belonging to this regime.

extra-European regime but with no limit upon mixing languages in the same message.[1]

The principal abuses of code language, however, arose from the inadequacies of dictionary words as code words. It often happened with the use of codes compiled of dictionary words that the sender would not encode every word of the text but would use certain words in their plain-language meaning, thus rendering it difficult to interpret the message correctly. This led code compilers to select only uncommon, rare, and unusual dictionary words for their codes, thus adding materially to the costs of cable communication, since it not only required more time of the operating personnel but increased the likelihood of error. In addition, code words selected in this fashion often differed from each other by not more than one letter or were telegraphically similar; and since the context of the message served as no guide or control in making errors apparent, they occurred frequently. To eliminate such errors in so far as possible, code compilers introduced the so-called "two-letter differential"; that is, code words must differ from each other by a minimum of two letters throughout. This was done on the theory that if a telegraph operator should make a mistake in one letter, the resulting word would not be a bona fide code word, and the error would be manifest, the chances being few that an experienced operator would make more than one mistake in a word.

The adoption of the two-letter differential reduced the liability to error but created the problem of finding enough bona fide dictionary words differing in two letters to satisfy the needs of code users. The practice developed, therefore, of using spurious or artificial words in codes, spurious words being made up of mutilated or badly spelled dictionary words or by adding prefixes or suffixes to ordinary words, contrary to the usage of the various telegraph languages, and artificial words consisting of combinations of syllables unlike ordinary dictionary words. Whether or not such words were bona fide dictionary words only the most accomplished linguist, a master of all the telegraph languages, could have determined at a glance. Counter clerks were unable to do so, and as a consequence all sorts of letter combinations

[1] The eight telegraph languages are German, English, Spanish, French, Dutch, Italian, Portuguese, and Latin.

were accepted as words by the telegraph companies. They appeared first in domestic telegrams within the United States and gradually in international cablegrams.

Difficulties with code-language communication multiplied rapidly. One conference after another of the International Telegraph Union attempted to regulate its use, but no substantial agreement on methods could be reached. It was proposed several times that the union prepare an official vocabulary to govern all code messages so as to eliminate the abuses; and at the conference in Paris in 1890, such a proposal was adopted. The International Bureau then prepared an official vocabulary, published in 1894, which contained 256,740 words of 5 to 10 letters, taken from the eight authorized languages. This vocabulary, however, aroused so much opposition that it was never officially adopted, and eventually the matter was dropped altogether.

The next attempt to govern the use of code language was a regulation adopted at the conference in London in 1903, which legalized the use of artificial words in code telegrams but required that the words, whether real or artificial, must be formed of syllables "capable of being pronounced" according to the usage of one of the accepted telegraph languages. The adoption of the rule of pronounceability, far from eliminating the difficulties with code language, actually multiplied them. What happened immediately was the compilation of five-letter codes of pronounceable words, the economy of which was soon recognized. In the extra-European regime, where code language was much more widely used than in the European regime, the length of a code word was limited to 10 characters; and since each five-letter code word was pronounceable, two could be put together and transmitted as a single word; thus two code words could be sent for the price of one.

The five-letter codes had many advantages. They were not only more economical, but the liability to error was much less than with the older codes. Within a short space of time, they came to be the most used codes in international telegraphic correspondence, but they led to widespread abuse of the regulations governing code language. There were limits to the number of five-letter words that could be created, if they were to be readily pronounceable, especially if the principle of the two-letter differential were observed. Consequently, code compilers,

always searching for new words, constructed code words that strained the rule of pronounceability to the breaking point. Almost any conceivable combination of letters came to be accepted. The Lisbon Conference, held in 1908, modified the rule of pronounceability by requiring that artificial words be pronounceable according to *current usage*, but this merely added another uncertain, debatable factor. A code-control committee was set up by the International Telegraph Union to which code compilers could submit their codes for approval, but the submission of codes was not compulsory, and, of course, many were not submitted. The compilation of larger and larger codes went on; regulation was ineffective; and with increasing competition among cable companies, less and less attention was paid by them to abuses.[1]

Nothing further was done with regard to the regulation of the use of code language until the Paris Conference of 1925. At this conference, a subcommittee on tariffs reported that the administration of the international rules regarding code language imposed upon the charging, transmission, and reception personnel of the telegraph companies undue burdens; that code-language messages were more costly to the companies than plain-language messages, code words being 10 letters per word whereas plain-language words averaged only 7 letters per word, the charge being the same for both; and that code language complicated the service on account of the errors that occurred and the rectifications that had to be made. The conference set up a Committee for the Study of Code Language and entrusted it with the task of making a thorough investigation of the problems of code language and of making recommendations at the next conference.

The majority of this committee, the so-called Cortina Committee, recommended to the Brussels Conference, held in 1928, that code words be limited to a maximum of five letters, with no restrictions as to pronounceability or construction, and that coefficients be applied to the existing rates for code words in establishing new rates in order that the application of the new word count would not have financial effects less favorable for the

[1] The foregoing discussion has been adapted from W. F. Friedman, "The History of the Use of Codes and Code Language," International Radiotelegraph Conference, Washington, 1927, U. S. Government Printing Office, 1928.

customers. The advantages claimed for the adoption of the five-letter maximum were that from the standpoint of the users the abandonment of any rule of construction would make code language a system of correspondence rationally and mathematically established, permitting everything useful to be expressed and employing the minimum of characters. In the second place, it would permit the continuance in use of the greater part of the codes then employed. From the standpoint of the companies and administrations, it would reduce the number of service telegrams requesting repetition which are transmitted gratuitously by the communication agencies; it would remove the greatest single cause for disputes, the altercations over pronounceability; and it would avoid the wasteful practice which had developed, where 10-letter code words were customary, of transmitting syllables nonsignificant in meaning or nonessential to the text simply to fill out 10-letter words.

The minority of the committee, however, represented by the British delegation, submitted a report not in agreement with the majority. Although recognizing the difficulties in connection with the prevailing use of code language, they believed that the setting up of five letters as a maximum for the length of code words would force the discarding of dictionary-word codes, at considerable expense to their users. They also objected to the charging systems proposed by the majority as unnecessarily disrupting the existing systems of charges which had been established over the years with great care and with due regard to economic, geographic, and even political considerations. Moreover, since the Telegraph Union, although it had had the power to prescribe the maximum terminal and transit charges in Europe, had not attempted to prescribe the rates for cable or radio services or the terminal or transit charges for extra-European countries, it would be difficult, if not impossible, to assure the general application of the rates proposed. They proposed to leave untouched the 10-letter maximum but to change the method of construction of code words by requiring that the first five letters contain at least two vowels and that there be at least two vowels in the second group of letters. Also, they proposed not to permit the employment in succession of more than four consonants or four vowels in the same word.

The Brussels Conference adopted a compromise between these two proposals. Code telegrams were divided into two categories: A and B. In category A, code words up to 10 characters in length might be used, but the regulations provided that such words to be acceptable must contain at least one vowel if they comprised not more than 5 letters; at least two vowels, with at least one vowel in the first 5 letters and at least one in the rest of the word, if they comprised 6, 7, or 8 letters; and at least three vowels, with at least one vowel in the first 5 letters and at least one in the rest of the word, if they comprised 9 or 10 letters. In category B, code words were limited to a maximum of 5 letters, but no restriction was placed upon their construction.

The regulations governing the use of code language were again changed at the Madrid Conference in 1932. The 10-letter code system was abolished altogether, and code words were limited to not more than 5 letters, with no restriction as to their formation. So as not to increase unduly the costs to cable users, it was provided that the charge per word for code messages, in the extra-European regime, should be 60 per cent of the full ordinary rate, with a minimum charge of five words for each message, address and signature counted. Under the present regulations, words in the address and signature of code messages, while chargeable at the reduced rate, are counted at 15 letters to the word. In mixed messages, containing both code and plain language, the plain-language words are charged at the rate of five letters to the word. Figures are admitted in code messages but are limited to one-half of the total chargeable words and groups contained in the text and signature. Messages that contain words in secret language exceeding five letters in length and those that contain more than the specified proportion of figure groups or commercial marks are chargeable at the full rate, each secret-language word being counted at the rate of five characters to the word.

In connection with charges for code telegrams, the question has been raised from time to time as to whether the code user ought to pay higher charges for code language because this type of language enables him to convey a greater quantity of information in a given number of code words than in the same number of plain-language words. At present, there is the apparently anomalous situation of the words that convey the greater quanti-

ties of information bearing the lower rates. Some who raise this issue say that code messages should bear higher rates on the same principle that high-valued commodities are charged higher transportation rates than low-valued, bulky commodities, but this analogy is not correctly drawn. A telegraph or cable message has no value of itself, and who is to say that one message is more valuable than another measured from the point of view of the service rendered? Is a telegraphic order to a broker by which one gains a substantial sum of money more valuable than a birthday greeting or a telegraphic message of condolence? Should one who gains by a telegraphic order be charged more than one who loses? Obviously, it is not the "value" of the message that is at issue but the quantity of service rendered measured by the quantity of information conveyed.

But assuming that telegraph and cable charges were to be based upon the amount of information conveyed, no workable system of charging on that basis could be developed. How could a counter clerk know the quantity of information conveyed by a message in secret language? Moreover, if telegraph rates were to be constructed upon this principle, consistency would demand that it be applied to all messages, plain language as well as code, and counter clerks would have to examine all telegrams, measure the quantity of information conveyed, and charge accordingly. The absurdity of such procedure is apparent when one considers that abilities of different people to compose telegrams vary widely, and a person who would require 50 words to convey a certain amount of information would be charged no more than one who could convey the same idea in 10.

But the foregoing considerations are much less important than the probable effects that higher charges for code messages would have upon revenues and the development of the service. It has been claimed that the use of code reduces the revenues of telegraph and cable companies because fewer words are transmitted by code than would otherwise be required. But is this necessarily true? To assume that greater aggregate revenues would be obtained by higher charges for code words is to assume also that there would be no falling off in the number of code words transmitted because of the higher charges, an assumption that has a questionable foundation. The popularity of code language in cable communication is due not so much to the secrecy attained but to the

economy. The fact that a lengthy communication can be reduced to a few words and thus be transmitted at relatively low cost has been of immense significance in the development of cable traffic. It has made the cable available for business and other purposes to many people who otherwise could not afford to use it. Whatever differences one might like to make between the charges for code and plain-language words, no charge could be made heavier than the traffic would bear. Experience has demonstrated that the volume of communications and total revenues are increased by progressive lowering of the charges. After communication companies have been compensated for differences in cost occasioned by the transmission of code, they need have no concern whether a group of letters expresses one word or an entire sentence. Charges for code messages, as for other messages, inevitably will be fixed at the point that will yield the greatest aggregate profit.[1]

Telegraph and cable rates vary in accordance with the expedition in transmission that is desired, the rates for delayed service being lower than those for immediate, or expedited, service. The reason for this classification is the differential effect upon costs of transmission during different hours of the day. If the demands for service were evenly distributed throughout the 24 hr. of a day and were the same for each day of the year, each consumer would be responsible for fixed and variable costs in direct proportion to the quantity of service received. But the demands for telegraph service are unevenly distributed throughout the day, and facilities must be provided to handle the traffic during peak hours, facilities that lie idle, or partly so, after the peak has passed. The problems of peak load are particularly important in the communication industries, since as has been said, greater use of the same wire or radio facilities can be had only by delaying certain communications. Those consumers, therefore, whose demands come at peak hours are directly responsible for the provision of facilities greater in capacity than would be necessary to handle the average hourly load and should have charged against them a greater proportion of the fixed costs than is charged against those consumers whose demands come at off-peak hours and who accordingly require no additional facilities. These differences in responsibility for costs are reflected in higher

[1] *Cf.* FRIEDMAN, *op. cit.*, pp. 76–80.

charges for ordinary telegrams than for delayed messages, such as the night telegram, the night letter, and the day letter in the domestic service and the deferred cablegram and the cable letter in the cable service. Such classifications reflect also attempts to adapt the telegraph service to different demands for it. There are many communications that demand expedition but that cannot, or will not, bear the full rates. The introduction of cheaper, delayed services has attracted much traffic which otherwise would have gone by the slower, but cheaper mail.

There is some difference of opinion as to the effect that the delayed services have had upon telegraph and cable revenues, many believing that they have been developed, at least in part, at the expense of the full-rate service. At the time of their introduction into the domestic service, although there was little question concerning the value of the night telegram and the night letter, some doubt was expressed about the day letter, since it threatened to destroy an important source of telegraph revenue. The charge for regular telegrams being a minimum for 10 words with an additional charge for each additional word, it was felt that the revenues from excess words would be lost, especially on long messages, whenever the charge for a regular telegram with excess words exceeded the charge for a day letter. Generally it is believed, however, that the day letter has made a place for itself without hampering the growth of the full-rate service.

Similar doubts have been expressed regarding deferred cable messages. The whole character of cable traffic has been changed materially as a result of the introduction of the cheaper delayed services. As has been seen, in 1911, before their introduction, there were to England, for example, only the full-rate service at 25 cents a word and the press service at 10 cents a word; but by 1930, the average rate of the Western Union Company was only 9 cents a word,[1] yet the volume of business had increased enormously, and the gross revenues from telegraph and cable traffic of this company had increased fivefold. Such a development tends to support the opposing point of view that the very cheapness of these services has stimulated the development of cable communication as a whole by educating the public generally to a realization of the fact that cable communication is not

[1] Statement of Newcomb Carlton, Hearings on S. 6, 71st Cong., 2d Sess., Part 11, p. 1461.

the luxury it once was considered. The truth of the matter can hardly be found, since it cannot be told what the "normal" development of the full-rate traffic would have been in the absence of such services. Within recent years, owing to unprecedented cable capacity and improvements in the service as a whole, all classes of service have been handled with such expedition that there has been some justification for the feeling that some communications which formerly would have paid the full rates now are sent at lower rates with slight sacrifice of expedition.

There are few wholesale telegraph or cable rates, the charge per message generally being the same for all messages of the same class and length over the same route, regardless of the number of messages transmitted. Press rates, which are usually about one-third to one-half the full commercial rates, have often been called wholesale rates, but there are other factors than volume to account for these low rates. Operators can handle press messages at higher speeds because of the absence of code and their familiarity with world affairs. Moreover, press dispatches originate from only a few sources and are delivered to only a few addresses, usually over special wires. In the cable service, low press rates stimulate the dissemination of news, and this in turn may lead to increased trade between nations and greater volumes of commercial messages.

Large users of the domestic telegraph service lease private wires, the charge for which is on a mileage basis. Under contracts for private-wire telegraph service, a circuit is provided each morning at a stated time for the exclusive use of the lessee. The user transmits messages by his own operators without the aid or interference of the telegraph company. The principal users of private-wire service are railroads, the press, bankers and brokers, and industrial concerns that have large volumes of communications. Private-wire service is highly expeditious and economical. The principal advantages are: The facilities are always ready; no messenger service is required; a restricted vocabulary adapted to the needs of a particular business may be employed, especially technical terms and abbreviations; there is no need for enciphering and deciphering code messages; and there is greater proficiency in manual operation by an attendant's handling only one type of message, this making for speed and accuracy. The rate is a stated amount per mile per annum,

plus installation charges, and monthly or annual charges for the use of instruments based upon the number of hours of use.

An interesting departure from the word-count basis of charging for the public telegraph service is the timed-wire service introduced by the Western Union and the Postal Telegraph companies in December, 1931. This service was adapted to lengthy messages which could be sent over telegraph printers; and the charges, graduated to distance, were for the first time in telegraph history based upon the amount of circuit time used, rather than upon the volume of words transmitted. The service was limited to those who had installed printer telegraph machines, but it was available to some 10,000 patrons of the two companies, the printer lines of both companies being interconnected in a nation-wide hookup. The charge was a minimum for an initial period of 3 min., with an additional charge for each additional minute. Timed-wire service is now offered separately by the telegraph companies. The principal advantages to users claimed for the timed-wire service are speed, simplicity, and economy, the economy being due to the fact that the volume of communications transmitted at equivalent costs may be much larger than in regular messages, and the full economy of technical language can be realized because the customer provides his own operators. The charge for timed-wire service thus is an attempt to introduce into the telegraph service the principle of volume-discount charges which is practically universal in American industry. Another application of this principle is the introduction of serial service, in which several day letters may be sent as serials for a charge much less than the sum of the charges would be if they were sent as individual letters. Other departures from the word-count basis are the transmission of standard greeting and consolation messages in social correspondence, but these are charged lower rates than ordinary messages to stimulate such correspondence, and because the transmission of such a message involves merely the sending of a code word or number.

Classification of Telegraph and Cable Messages.—All messages accepted for transmission by telegraph and cable companies are subject to the classifications set up and to the conditions and stipulations adopted for each of the respective classifications. For telegraph messages, the following classifications are established: (1) telegrams, (2) night messages, (3) day letters, (4)

night letters, (5) press messages, (6) government messages, (7) serial service, and (8) timed-wire service. Telegrams constitute the expedited service. They are transmitted in the order received, subject to the priority only of government messages, and pay full rates. Night messages and night letters are accepted up to 2:00 A.M. at reduced rates to be sent during the night and delivered not earlier than the morning of the ensuing business day. At the option of the company, such messages may be mailed at destination to the addressees. Day letters represent a deferred day service at equivalent rates per word lower than the regular telegram rates. They may be forwarded by the company at its convenience, their transmission and delivery being subject in all respects to the priority of transmission and delivery of regular telegrams. The company does not undertake to deliver a day letter on the day of its date absolutely but only if sufficient time shall remain for its transmission and delivery after the regular telegrams have been handled. Messages may be repeated or unrepeated, a higher charge being made for the former type.

Press messages are messages addressed to newspapers and press associations by their correspondents or to newspapers by press associations or to one newspaper by another. They must be written in plain English language and contain bona fide reading matter for newspaper publication. The rates for press day messages are one-third, and for night press messages one-sixth, of what the full commercial tolls for the same message would be at commercial count. Day press rates apply to messages filed for transmission between 6:00 A.M. and 6:00 P.M. Night press messages may be filed before 6 P.M., but they are not transmitted before then unless it suits the convenience of the company.

United States Government messages include those presented by officials of the government acting in their official capacity and involving matters in which the government is interested. Personal telegrams of such officials, where the rates are not payable out of public moneys, pay regular commercial rates. Any of the four classes of service (day message, day letter, night message, and night letter) may be used for government messages. Government day messages have priority in transmission and delivery over all other messages, but government day letters are subordinate to full-paid commercial traffic, although they have

precedence over commercial day letters. Government night letters and night messages have no precedence in transmission but must be so handled that no other overnight traffic is allowed to interfere with their transmission to destination in time for delivery the morning after they are filed. Rates for government messages were fixed by the Postmaster General and are about 40 per cent of the tolls of commercial messages of the same class and length between the same points in the United States. Special rates are also provided for United States Government messages originating in the United States and destined to points in Canada and Mexico. Recently, the Federal Communications Commission, which now has jurisdiction over the rates for government messages, fixed the rates for government serial messages and timed-wire service at 80 per cent of the commercial rates. Serial service and timed-wire service have already been explained.

For cable messages, the following classifications are established: (1) cablegrams, (2) urgent messages, (3) deferred cablegrams, (4) night letters, (5) press messages, and (6) government messages. The order in which international messages are transmitted is established by the International Telecommunication Convention, which governs radio as well as cable communication. The order of transmission has much to do with the quality of the service rendered and represents the basis of the differential charges for various classes of commercial messages. Telegrams of the same rank are transmitted in the order of their filing. The rank of the various classes is as follows:

1. Telegrams relating to the safety of human life in maritime or aerial navigation.
2. Government telegrams.
3. Meteorological telegrams.
4. Service telegrams and notices referring to the impairment of communication channels.
5. Urgent service telegrams and notices and paid-service notices.
6. Urgent private telegrams and urgent press telegrams.
7. Nonurgent service telegrams and notices.
8. Government telegrams for which the sender has waived priority of transmission, ordinary private telegrams, and ordinary press telegrams.
9. Deferred telegrams and other classes of reduced-rate telegrams.

Ordinary cablegrams pay full rates. Urgent messages, which are given precedence over ordinary messages, are charged twice the full rates. Deferred messages, which are subject to transmis-

sion at the convenience of the company when the cables are free of full-paid traffic, must be written in plain language in one and the same language selected from one of the authorized telegraph languages and are carried at one-half the full rates. Cable letters also must be written in plain language and, in the extra-European regime, are charged rates equal to one-third of the charge per word of ordinary full-rate telegrams. A minimum charge is made for 25 words or less. Night letters are subject to transmission at the company's convenience and have a fixed time of delivery.

Cablegrams of which the text consists of political, commercial, or other information and news intended for publication in newspapers or in other periodical publications are accepted as press cablegrams at reduced rates. Press cablegrams must be addressed to newspapers, periodical publications, or publicity agencies only in the name of such newspaper, publication, or agency and not in the name of any person attached, in any capacity whatsoever, to the management. They must contain only matter intended for publication or instructions relating to its publication and must be written in plain language, in one of the languages permissible for international telegraph correspondence.

The Telegraph-rate Structure.—Although telegraph rates are based partly on distance, it would be costly and uneconomical to compute separately distances and rates from each telegraph office to every other one. Consequently, some scheme must be devised which will give proper weight to the factor of distance but which will obviate the necessity of computing millions of rates. Here we shall present a brief description of the rate structure of the Western Union Company, the Postal Telegraph Company having a similar structure. Western Union and Postal Telegraph rates are the same for interstate communications. In some 10 states, intrastate rates of both companies are the same; but in the other states, Western Union rates are about 20 per cent higher than Postal rates.

The rate structure of the Western Union Company is based upon two types of rates: (1) state and (2) square. The two types are not mutually exclusive, since one may merge into the other.

State Rates.—Each state has a single fixed rate to each other state. This rate applies from all points in the state of origin to

all points in the state of destination, except as modified by the square rates. Each state has also a fixed maximum rate for intrastate messages, which applies between all points within the state of origin, except as modified by the square rates.

Square Rates.—To provide suitable rates for the shorter distances, lower than the state rates, each telegraph office is surrounded by an area in which such lower rates, graduated to distance, prevail. For this purpose, a system of squares is used, measuring 50 miles on each side. The whole United States is laid off in such squares, arranged in staggered or brick fashion and numbered from North to South and from East to West. Rate is the same to all points within two squares of the originating square. A higher rate is charged to all points within the next encircling tier of squares (*i.e.*, in squares that are three squares distant from the square in which the originating office is located); and a still higher rate to all points in the next encircling tier of squares (*i.e.*, in squares four squares distant from the square in which the originating office is located). Beyond these zones, the state rates prevail. In all cases, the lower rate prevails whether determined by the application of state rates or by that of square rates. Rates for the night message, the night letter, the day letter, and the serial letter are all based upon the rates for regular telegrams between the points connected. A minimum charge for 10 words or less is made in the case of regular telegrams, with higher minima for day letters, and night letters. The minimum charge accomplishes several purposes. It ensures that each user of the service will reimburse the company, at least in part, for costs in addition to those incurred directly in the transmission of a given message; and it reduces costs by limiting the use of unnecessary words without unduly restricting development, since users, depending upon their ingenuity, may convey considerable quantities of information and still keep within the maximum number of words permitted without extra charge.

Special Rates and Charges.—In addition to the state rates and square rates, many special rates, lower than corresponding state or square rates, are in existence. These are for traffic between designated points and do not conform to the general rate structure. Prior to 1888, a large number of such rates had been

established, the majority of them affecting traffic between important centers. About 1905, the Western Union began to eliminate such rates; and since that time, many have been increased to accord with the appropriate state or square rates, although others have continued in effect.

The Western Union rate structure is in many respects unscientific, although the attempt has been made to introduce more scientific principles. Zones are disproportionate in size, and the special rates lie outside the general structure based on square and state rates. They result in an inequitable distribution of the costs of telegraph service, although they have earned the respect of age and have become so firmly established as elements of cost in so many businesses upon which the telegraph company must depend for its traffic that their elimination would present a difficult practical problem.

Special charges are made for the special services performed by the telegraph companies, such as market quotations and other reports and news furnished by messenger, private wire, or ticker; money-order service; and messenger service. As a general rule, the costs of furnishing such special services can be more readily segregated in the case of the telegraph than for most common carriers and made the bases of special charges. The principle applies that no special service can be supplied at rates less than the costs directly allocable to such service, and the proportion of the joint costs that it can be made to bear will depend upon the strength of the demand for that particular service.

Cable Rates.—Cable rates are quoted as through rates from points of origin to points of destination, although they are made up of several components. Besides the charge for the cable haul, there may be land-line charges at both ends, terminal charges of foreign administrations, and taxes or transit charges of intermediate administrations in cases where the territories or installations of such administrations are used for the transmission of correspondence. Where a message is carried wholly over the lines of an American cable company, as where it has its own offices in a foreign country, there is no other party with whom tolls are divided; but where a part of the haul is over the lines of a foreign company, the through rate is divided by contract between the connecting companies, or a definite charge per message is made for the land-line service by the foreign company.

Rates to foreign points are not the same for all points in the United States but vary roughly with distance from the cable landings. The Western Union Company, for example, has divided the United States into five zones each for the transatlantic traffic, the transpacific traffic, and traffic with the West Indies and Central and South America. These zones conform largely to state boundaries, although there are many exceptions. All points in the same zone bear the same rates, and the rates for the various zones increase with distance from the cable landings. Rates are often the same to all points in a foreign country. However, in many cases, important trading or communication points are singled out, and special rates applied to them lower than those to all other points in the same country.

Radiotelegraph Rates.—Radio companies engaged in the international radiotelegraph service, because of the competitive situation, offer the same classes of service and charge the same rates as the cable companies. Similarly, in the domestic radiotelegraph service, classes of service and rates are the same as those offered by the wire telegraph companies between the same points. There is this difference, however, that the minimum charge is for 15 words, as compared with the 10-word minimum of the wire telegraph companies.

Radiotelegraph messages to and from ships at sea are handled by the telegraph and radio companies in a coordinated service. The cable system of counting and charging is used throughout in ship radiotelegraph messages, the address and signature being counted and charged for. Registered code addresses may be employed in messages that originate at ship stations for delivery on shore. The through rates of the Western Union and the Radiomarine Corporation are computed by adding land telegraph and radio rates. Land telegraph rates for the marine service are state rates, and they vary with distance from the radio station, all points in the originating or terminating state having the same rate. The radio rates are quoted from the North Atlantic Coast, Atlantic and Gulf Coast, Pacific Coast, and Saint Lawrence and Great Lakes stations of the Radiomarine Corporation. There are different schedules for transoceanic, American-owned and foreign-owned coastwise vessels, except that the same schedule applies to and from all vessels on the Saint Lawrence and the Great Lakes.

In summary, it may be said, the domestic telegraph rate structure is unscientific. The charges are only roughly proportional to costs, since there are only a small number of possible charges for a standard domestic telegram whatever the length of the haul, whereas the costs of handling a single message may vary from a few cents to several dollars. Also, the zones for interstate communication are unequal in size and irregular in extent, and there are many special rates which bear little relationship to the general rate structure. It is essentially an empirical structure, in which have become firmly fixed many rates that in the beginning were intended to be promotional in character or rates that competition or community rivalry forced the telegraph companies to institute. To make over the structure along scientific lines would require more far-reaching adjustments than the managements would like to undertake in a short space of time, but the companies have made some progress toward uniformity, and continued effort along these lines should ultimately result in rate structures in which charges would be more directly related to the costs of furnishing service. Such a development would be in sympathy with the evolution of public utility rate schedules in general. Scientific rate schedules have as their function the distribution of the costs of service equitably among the various consumers. An interesting and important recent development is the attempt to introduce the principle of volume-discount charges into the construction of telegraph rates in the charges for serial service and timed-wire service.

CHAPTER VII

RATE MAKING IN THE COMMUNICATION UTILITIES
(Continued)

Telephone Rate Making.—The demand for telephone service varies between wide limits, from no demand at all to demands of huge proportions. Some users are fully satisfied with the service that they receive from public pay stations; others desire only part use of a line and a single telephone; while still others require hundreds of telephones and the full use of many lines. As to calls, some users are satisfied with a few calls per month, while others require thousands of calls a day. Further, the needs of some users are met by communication within the limits of a single community, while those of other users require communication between cities. Finally, the demands for long-distance telephone communication vary as to the length of conversation, the time of day during which service is desired, and limiting conditions imposed by the users as to conditions of use. All these variations in demand affect both the ability and the willingness of the various consumers to pay for telephone service and the cost of furnishing it. The problem of telephone rate making, therefore, is fundamentally one of providing different classes of service suited to the needs of the various users at rates that will distribute equitably among them the total costs of the service, having in mind their relative abilities to pay for service.

Exchange and Toll Rates.—Telephone rates are first classified as exchange and toll rates. The former refer to rates charged for local service, while the latter refer to those charged for interexchange and long-distance service. Strictly speaking, toll service includes all interurban service charged for by the message. In the early days of telephone development, there was provided by telephone companies at flat rates an interexchange, often interurban, service called district service, which sometimes covered wide areas. Experience has shown, however, that district service is unsound, inequitable, and uneconomical, and

in its grosser forms it has been eliminated. With the elimination of district service, rates have been provided for each exchange with toll rates for calls between exchanges. Foreign-exchange service is often provided at special rates whereby a subscriber located in one exchange area may receive service as a subscriber to another, or foreign, exchange; and certain contract or special toll-line services are provided under contract or lease of facilities, not on a message basis; but these strictly are not toll services.

The reasons for the classification of telephone service into exchange and toll service are obvious. In the first place, the costs of furnishing these two classes of service vary materially, since toll service is furnished over greater distances, and costs increase with distance. In the second place, some users of telephone service make no toll calls, and the demands among toll users vary widely. Since additional facilities must be provided for the toll service, it is no more than just that those who are responsible for the extra costs should bear the burden of them. If all telephone service, including the toll service, were to be charged for at flat rates, those who make little or no use of the toll service would be compelled to pay for services that they would not receive. More than that, charges, in order to return sufficient revenue to support the service as a whole, would of necessity be so high as to retard development, because the cost of service would exceed its value to many actual or potential users.

But the problems of establishing proper levels for exchange and toll rates with respect to each other are complex. Toll and exchange service are both functions of the same public service. The toll business is carried on through the local exchanges and in many respects is an integral part of the exchange service. Every telephone is both an exchange and a toll telephone, and much of the plant and equipment, as well as the time of the operating personnel, is utilized jointly in the performance of both services, additional facilities in larger central offices and the facilities that interconnect exchanges representing the only plant that belongs solely to the toll service. The costs that are directly allocable to the toll or the exchange service, therefore, cannot be determined with exactness. Allocations of the joint costs are more or less arbitrary, and many differences of opinion among rate experts are encountered.

Whatever theory of cost allocation one may employ, it is nevertheless true that joint costs are allocated to the various classes of service according to the strength or weakness of the relative demands. If a greater proportion of joint costs were allocated to the toll service than that service would bear, there would result a lessened development of the toll service and, in extreme cases, its destruction, since the long-distance service is subject to the competition of other communication mediums, like the telegraph and the mail. Such an eventuality would represent loss not only to habitual toll users but to all subscribers. A subscriber normally may make only local calls, but he cannot tell when he may have occasion to make a toll call. It enhances the value of his telephone to know that when occasion demands he may communicate directly and immediately with practically every other telephone subscriber in the United States. This does not mean that the toll service cannot be developed at rates that will cover a reasonable proportion of the joint costs. It does mean that joint costs must be allocated to the toll service on the basis of the value of that service to toll users, and it implies that toll rates may in justice be lower than a strict cost allocation would require because of the enhancement in value of all telephone services due to the existence of toll service. On the other hand, if toll rates are too low, an extra burden is placed upon the exchange service which will retard its development. The determination of proper levels for exchange and toll rates, therefore, represents a difficult task of balancing cost and value factors.

The Exchange, or Base-rate, Area.—The division of the telephone service between toll and exchange service involves the setting of limits to the exchange area. How large the exchange area should be and what considerations should determine its boundaries are matters of importance both to subscribers and to telephone companies, since telephone costs increase with the number of subscribers and the size of the exchange, and rates must increase with costs. Usually, the exchange area corresponds to the corporate limits of the municipality, although in larger cities from time to time attempts have been made to establish zones in which base rates prevail with toll charges between zones. Zoning systems have been based upon the theory that in this way the cost of telephone service, especially to small users, can

be reduced, and telephone development stimulated. However, such systems have never been popular for various reasons. In the first place, no matter where zone lines are drawn, situations are created to which certain subscribers react unfavorably. It seems ridiculous and unfair to subscribers living on the border line between zones to be asked to pay a toll to call a neighbor across the street or a few blocks away. In the second place, limiting the size of the base-rate area does not lower the cost of telephone service to a small user unless his calls are limited to the zone in which he resides. The assumption that small users make calls only within restricted areas is not necessarily true, and, moreover, it would be difficult to create zones that would affect equally all small users. In the third place, toll calls within the area comprised by the municipality are very objectionable, especially to business subscribers who install telephones not only that they may call other subscribers but that they may be called by them. In certain cases where zoning systems have been tried, many business subscribers have found it necessary to install telephones for more than one zone to save their patrons toll calls. It is generally agreed that the zoning of larger cities for telephone rates creates artificial barriers to social and business intercourse and tends to hamper telephone development by making it more costly or troublesome. Regulatory commissions generally have regarded such plans with disfavor, although in some cases optional rates have been permitted whereby the subscriber may elect a limited zone service at lesser cost than that for the entire exchange with toll charges between zones.

Where an exchange includes the entire municipality, other exchanges are established for suburban areas. Distance is a factor in establishing the boundaries of exchange areas, but it cannot be strictly applied. If the boundaries were in all cases to be determined by radial lines extending equal distances from the central office, it would then be necessary to locate the office approximately in the center of population, since the arbitrary or accidental location of a central office does not necessarily determine that to be the center of population or the economic center of the subscribers concerned. A strict application of the distance principle often would result in placing subscribers in the same business or social community into different exchanges and thus compel them to pay tolls to call each other. The boundaries

of the exchange area should bear some relation to the distribution of population, the natural centers of business for the subscribers affected, community of interest, and public convenience. But wherever exchange boundaries are drawn, some subscribers are likely to be affected unfavorably. The best that can be done is to accomplish the greatest good for the greatest number.

Exchange Rates. *Business and Residence Rates.*—Telephone-exchange service is divided first into business and residence service for which different rates are charged. The allocation of telephone costs in accordance with the principle of joint costs is clearly seen in the determination of rates for the various classes of exchange service. Business rates are generally higher than residence rates, although the cost of furnishing the latter service is often greater than that of furnishing the former. Residence lines are longer, involving larger investment and maintenance costs; and there are many classes of business subscribers, such as small stores and offices, where the amount of service provided is not greater than that furnished some residence subscribers. Business rates are higher because of the greater value of the service to business subscribers. The telephone is indispensable to the efficient and expeditious conduct of business operations, and in many cases the value of the service to business subscribers is increased with development of the residence service, such as in the case of department stores, which receive queries and orders by telephone. It is this interdependence of subscribers, already referred to, that distinguishes the telephone from other services and justifies a higher margin of profit from certain classes of service than from others.

The classification of business and residence service must be rather arbitrary in many cases. Professional subscribers, contractors, draymen, photographers, seamstresses, and others who maintain no separate business offices are difficult to classify. Generally, it may be said that the use of a telephone instrument, not its location, is the criterion by which the classification is established. This does not mean that a residence telephone may not be used for business calls. Where a physician, for example, maintains a telephone in his office and a separate telephone in his residence, the mere fact that business calls are made over the residence telephone does not change its classification to business. Nor is a residence telephone classed as business because of the

fact that the owner's place of business is in his residence, although it would be unreasonable for a subscriber who conducts his business at his residence to hide behind that fact in order to avoid the payment of business rates. As a general rule, where the evidence shows that a telephone is used primarily for business purposes, it is considered to be a business telephone, and one that is used primarily for social purposes a residence telephone. Other doubtful classifications include public schools, churches, societies, fraternities, and boarding or rooming houses.

Individual and Party-line Rates.—Both the business and the residence services are subclassified into individual-line and party-line services. In the case of the business service, usually no more than four-party service is given; while in many large cities, only individual or two-party services are provided. Except in the large cities, 4-party residence service is quite common; and in rural communities and smaller towns, 8- or even 10-party service is frequently provided. In some rural districts, more than 10 parties may be connected to a single line, but the tendency has been away from such overloading and in general toward the reduction of all multiparty services to fewer subscribers per line in a general effort to improve the quality of telephone service.

Party-line services are established to reduce the cost of telephone service to subscribers with limited means and thus to stimulate telephone development. In determining the differentials between the various party-line services and between them and the individual-line service, considerations of cost and value arise. It has been contended often that each class of telephone service should be self-supporting and that the rates for different classes of service should reflect differences in cost. To a certain extent, party-line rates are, and can be, lower than individual-line rates because it costs little more to serve two or more subscribers attached to a line than to serve one, but the differentials depend not alone upon the relative costs but upon the relative demands of different classes of subscribers. Party-line service is an inferior one, but there are many subscribers who will endure the inconveniences because of the lower rates charged for that service. If the differential between two services is too great, the tendency on the part of subscribers will be to change to the lower rate, even though lower grade, service. On the other

hand, unless the rates for the lower grade services are sufficiently low, telephone development will be hampered. The making of rates for telephone-exchange service involves more than the equitable distribution of costs; it is concerned with the development and improvement of the telephone service as a whole.

The making of rural telephone rates constitutes a particularly knotty problem. Certain elements of cost, like the cost of the pole line, can be segregated out and charged for separately; but others are joint costs, and these, as elsewhere, must be allocated in accordance with the principle of joint costs. The statement frequently made that rural telephone service as a whole is furnished below cost and the implication that rural rates should be made to bear a larger proportion of the total costs may be unsound in many respects; for cost is a matter of allocation, and the value of the service, while not altogether controlling, is a vital factor in all telephone rate making. Connection with rural subscribers adds to the value of telephone service in centers of population just as connection with such centers adds to the value of rural service. Rural rates, like other telephone rates, must be established with a view not only to the allocation of costs but to the development of the telephone service.

Flat Rates and Measured Rates.—Telephone rates, except in the larger cities, are flat rates. This is in contrast with most other public utility rates, which are measured. Flat rates permit unlimited use of the telephone service for a fixed monthly or yearly charge. They are easy to administer; they tend to enhance the value of the service in the eyes of the subscriber and thus to aid in the development of the service; and they do not require the installation of expensive machinery or the additional labor necessary for measuring the service. However, flat rates have several disadvantages: They discriminate unfavorably against small and in favor of large users in the matter of charges; and they tend to encourage wasteful use of the telephone by many subscribers, which increases the cost unnecessarily to all subscribers and lowers the quality of the service on party lines.

Measured rates distribute the burden of the service more equitably among the various subscribers in accordance with the use that each makes of the service; and they tend to raise the quality of the service by eliminating unnecessary calls. However, the advantages of measured rates are more apparent in

large than in small cities. In smaller places, where the amount of use of the telephone does not vary widely as between subscribers, and where the volume of traffic handled does not affect so directly, or so seriously, the amount of facilities that must be provided, flat rates not only result in no great inequities; they avoid the additional expense necessary to measure the service and the unfavorable reaction of many subscribers to measured service. In larger cities, variations in the amount of use of service are greater, and the effects upon costs of unnecessary use of the telephone are more serious. Where many central offices must be established, considerable investments in trunking equipment must be made and larger operating staffs provided to handle peak loads; consequently, measured rates which tend to reduce unnecessary use may depress costs and to that degree stimulate rather than hinder the development of the service.

The advantages of measured rates are also more apparent in the business than in the residence service. In the first place, variations in the amount of use among business subscribers are greater, and flat rates for business service would be correspondingly less equitable. In the second place, measured service is subject to more resistance from residence subscribers than from business subscribers because of differences in the degree of necessity with which telephone service is regarded. This tends to retard development of the residence service to the disadvantage of all subscribers. Over against the observation that the right of unlimited use of a telephone may lead to wasteful use should be placed this fact that the principal advantage of the flat rate is the unlimited use of the telephone which goes with it, and whether or not costs under flat rates would rise so as to hinder telephone development more than it is hampered by the use of measured rates is a problem which must be solved empirically in each case. There is much to be said for flat rates in the residence service even in larger cities, for, in a sense, there is no such thing as unnecessary use of the telephone. The business of a telephone company is to facilitate communication, and any use made of the telephone is therefore a necessary use. It is only where use by one subscriber denies equal opportunities to another or where such use throws an inequitable burden upon other subscribers that the need for measured rates which restrict the use of the telephone arises.

Measured rates in use generally provide a minimum monthly charge which entitles the subscriber to originate a limited number of calls, with an additional charge for each call in excess of the number permitted. The minimum charge varies with different classes of service, as does the number of calls permitted. The minimum charge in the telephone service is designed primarily to guarantee that the very small user will not be furnished with equipment and with the advantage of the company's readiness to serve altogether at the expense of other users in his class or in other classes. The charge is collected whether or not the consumer originates calls, and thus it covers elements of cost which are segregated out and charged for separately in the two-part and three-part rates which are common in other public utility services.

It has been suggested that telephone rates should be two-part rates, one part consisting of a service charge, and the other of a charge for each call originated.[1] Arguments in favor of such rates are based, first, upon the assertion that they would give proper recognition to the responsibility of the various consumers for three classes of costs: (1) those dependent upon the provision of telephone plant in readiness to serve (demand costs); (2) those dependent upon the giving of service but not varying with the quantity given (customer costs); and (3) those dependent upon the quantity of service given. In the second place, they are based upon the assumption that if the costs dependent upon the provision of equipment to handle peak load and those dependent upon the number of customers are segregated out and made the basis of the service charge, a charge per call sufficient to cover the costs dependent upon the quantity of service given could be made so low as to encourage development. Against the use of two-part telephone rates, it has been argued that since many telephone costs are incurred jointly in the furnishing of toll and exchange, as well as the different classes of exchange service, it would be difficult, if not impossible, to ascertain the cost of standing ready to serve a particular subscriber or class of subscribers; and, moreover, if ascertained, a demand charge

[1] See LYNDON, L., "Rate-making for Public Utilities," Chap. XIII, McGraw-Hill Book Company, Inc., New York, 1923; SICHLER, B. J., A Theory of Telephone Rates, *Jour. Land and Public Utility Economics*, vol. 4, pp. 180–184, 1928.

sufficient to cover demand costs would have to be so large as to discourage telephone development.[1]

Private-branch Exchange Rates.—Large establishments having many officers and employees whose duties require frequent telephonic communication with each other and with the general telephone-using public are furnished service through private-branch exchanges. Such service is furnished by means of a switchboard located on the premises of the subscriber, from which extensions are run to individual telephone stations. The advantage of private-branch exchange service is that it admits of an almost unlimited number of extension telephones so that the subscriber and his associates can at all times have unlimited telephonic communication with each other and with the outside. The disadvantages are that the service necessarily is slower than in the case of individual or party-line service and is not completely under control of the telephone company, since a private-branch exchange switchboard is operated by an employee of the subscriber. Private-branch exchange stations may be located on or off the premises on which the switchboard is located; but in the latter case, the locations must conform to permissible use of the service, and satisfactory transmission must be secured. Private-branch exchanges are classified as business or residence, but usually if one or more of the stations of a private-branch exchange system are at business locations, business rates apply to the entire system.

Private-branch exchange rates, where flat rates prevail, are composed of charges for the trunk lines which connect with the central office; charges for the switchboard, depending on the size and character of the board; and charges for each station connected with the switchboard. In message rate districts, besides charges for equipment and stations, a charge is made for the first trunk line which includes all messages and is identical with the charge for individual-line service for the same number of messages in that district. Additional trunks are charged for at a specified rate per trunk, all messages being associated with the charge for the first trunk.

Semipublic-branch exchange service is provided in the larger cities for transient and apartment hotels and clubs. Often coin-

[1] JONES and BIGHAM, "Principles of Public Utilities," pp. 370–372, The Macmillan Co., New York, 1931.

collecting devices are provided for stations in connection with such branch exchanges, located in lobbies or corridors for the use of the public. The hotel or club management is required to become and acts as the agent of the telephone company for the collection of charges for all local and toll messages handled by the management. Such messages sent over the trunk lines connecting the hotel or club switchboard with the central office of the telephone company are charged for at established public-telephone rates. In those exchanges where flat-rate business service is furnished, usually flat-rate service is furnished hotels where branch-exchange service is installed only in connection with telephone stations so located as to be accessible solely to the officials or employees constituting the hotel management.

The general rule under which telephone service is provided is that the service is furnished for the subscriber's own use and that no service shall be resold to the public, but the right of resale by private-branch exchange subscribers has been a moot question. Hotels, apartment houses, and clubs have been excepted from the general rule on the grounds that the telephone company must contract with the proprietor of the premises upon which the telephones are located no matter who uses the service and that since the proprietor must pay the telephone company, he is entitled to reimburse himself by charging his patrons. Proprietors of office buildings, however, are not permitted to resell telephone service to tenants because the services that the management of an office building furnishes tenants differ materially from those furnished by hotel managements to their guests. Tenants in office buildings have no need of frequent personal communication with the management, and they can get the service that they require by contracting directly with the telephone company.[1]

Resale of telephone service is more closely restricted than the resale of other public utility services, such as gas and electricity, because of important differences in the nature of the service. In the case of gas or electricity, a specified commodity is delivered, capable of measurement, comparison, and restriction as to quantity and quality. Poor service affects primarily the consumer

[1] See *Re Hotel Service and Rates* (*Mass.*), P.U.R. 1919 A, 190; also, *Connally v. Burleson* (*N.Y.*), P.U.R. 1920 C, 243; also 1015 *Chestnut St. Corp. v. Bell Tel. Co.* of *Pa.* (*Pa.*), P.U.R. 1931 A, 19.

himself. The telephone service, however, is always between two parties. Where faulty equipment or unsatisfactory connections exist, both parties suffer equally. It is necessary, therefore, in order to maintain the quality of the service, that private-branch exchange service be under the control of the telephone company. Private-branch exchange subscribers generally have neither the ability nor the inclination to maintain and improve the telephone service at all comparable with those of the telephone company. Moreover, whereas in ordinary private-branch exchange service the subscriber is the user, if the service were resold to tenants they would become the real users, not the branch-exchange subscriber, and their relations should be with the telephone company. The objections to the resale of telephone service in office buildings have been well stated by the New York Public Service Commission, as follows:[1]

> It would establish a third party between the telephone company and the users of its service.
>
> The middleman would use only such equipment as he considered necessary.
>
> All of the company's dealings with the real users of its service would have to be through the medium of this third party over which the company would have no control, since presumably the middleman would not be considered a utility.
>
> Many difficulties would be thrown in the way of providing efficient service, not only from the standpoint of the telephone utility but also in the way of regulation, and service complaints would undoubtedly multiply with very little chance of reasonable or timely correction or adjustment.
>
> If the practice were acknowledged and followed, there seems to be no limit to such utility service, because it could not be restricted to one building or a group of buildings or even to an entire city block.

Public and Semipublic Pay Station Rates.—Public pay stations, equipped with coin boxes, are installed for the convenience of the general public, and both exchange and toll service provided on a message basis. Semipublic pay stations, similarly equipped with coin-collecting devices, are provided for the use of both the general public and the subscriber. Such stations are so arranged that the subscriber may receive incoming calls and thus obtain a complete telephone service, while the company and the sub-

[1] *Gelsam Realty Co. v. N.Y. Tel. Co.*, P.U.R. 1929A, 224, 226.

scriber can be protected from misuse of the telephone service by "borrowed" calls without depriving the patrons of the subscriber of the added convenience of telephone service.

The introduction of semipublic telephone service in many cases has been resisted by merchants and other businessmen accustomed to letting their patrons use the telephone without charge, but the justification for such a classification is obvious. Under flat rates, borrowed calls throw an unjust burden upon the company and the other subscribers. The borrowers pay nothing for the use of the service, yet such use increases the traffic load and accordingly the traffic expenses, which have to be met by the paying users of the service. In certain instances, telephone companies have found such borrowed calls to represent considerable portions of the total telephone traffic. Semipublic service compels those who make use of telephone service to help pay the cost of it. It does not lessen the value of the service to subscribers; and it may tend to develop the service, since nonsubscribers becoming accustomed to the use of the telephone may become regular subscribers. The rates are message rates. The subscriber guarantees the company a specified minimum payment, and it is customary for telephone companies to pay the subscriber a commission on collections over and above the guaranteed minimum. In this way, some subscribers are able to reduce the cost of their telephone service.

Special Charges.—In addition to the regular rates for telephone service, special charges may be assessed to cover special costs, such as advance deposits, service-connection charges, and charges for multiple directory listings. As a general rule, telephone companies require payment in advance where flat rates prevail, although some companies offer discounts for prompt payment, while others impose extra charges for lax payment. Where the service is measured, advance deposits may be required. The requirement of advance payments or advance deposits by telephone companies has been upheld by regulatory commissions and courts, including the Supreme Court of the United States.[1] Justification lies in the fact that they protect the utility and the subscribers from bad accounts and thus reduce the cost of service to those who pay their bills. Telephone companies, and public utilities in general, unlike other companies, have placed upon

[1] *Southwestern Telep. & Teleg. Co. v. Danabar*, 238 U. S. 482.

them the obligation to serve all who apply. They may not choose between applicants; and since telephone accounts are usually small, the cost of collecting overdue accounts by ordinary legal process would be prohibitive. Telephone rates are fixed and regulated in the expectation that all subscribers will pay. Failure to do so throws an unjust burden upon other subscribers, since all costs must be met if the company is to continue to furnish service.

A service-connection charge usually is made every time a telephone is connected. The reason for making a special charge to cover the costs of service connection, rather than to incorporate such costs in the general expenses to be met from the general revenues, is to distribute more equitably the total costs of service. In the first place, a considerable part of the total cost is occasioned by adding new subscribers, discontinuing service, and moving stations from one location to another. Besides the investment costs, this work involves the expenditure of substantial sums of money to accept applications for service; to connect or disconnect, install, or remove telephones; to open and close accounts; to give directory listings; and to issue orders for all such work. In the second place, all subscribers are not responsible to the same extent for such costs. Some take service at a given location for a few days or months and then change to another location; others take service for a limited time and then disconnect. Many, however, take service without change in equipment or location for a number of years. Obviously, where responsibility for costs varies so greatly, it would be unreasonable to make those who cause little of such expense bear prorata shares, as would be the case were such costs included in the general expenses of the company.

Special construction and attachment charges are often applied where telephone-exchange service is desired at a point outside the base-rate area. Extension of service to all who apply within the built-up, established portion of the territory served by an exchange obviously is a proper obligation of the telephone company, but it does not follow therefrom that the company at its expense, and accordingly at the expense of other subscribers, must construct extensions for all applicants residing in the territory in which the company has established its lines. The reasonableness of a particular extension depends upon the dis-

tance from the central office as well as the population and the probable future growth and development of the district under consideration. How long an extension should be made at the company's expense is a matter that must be determined in individual cases, and there is no uniformity in practice. A common method of dealing with this problem is to levy special construction and attachment charges for extensions longer than 8 or 10 poles and in most cases to refund part or all of such charges to subscribers if, and when, the territory has been developed so as to make the service wholly or largely self-supporting. In some instances, excess-radius rates are charged for service outside the base-rate area; but in such cases, it is generally felt that no special construction charges should be levied, since it is presumed that such rates provide for the additional cost.

The publishing of a directory is necessary for the convenience of subscribers and to facilitate efficient operation. All subscribers are entitled to one listing without extra charge as a part of the general operating expenses of the company, but additional listings should be charged for on the ground that such extra costs should be borne by those specially benefited.

Toll Rates.—Toll rates, unlike most exchange rates, are message rates, since toll service could not with equity be furnished at flat rates because of the wide diversity in the demands for such service and because of the effects that unrestricted use would have upon toll costs. As has been seen, many telephone subscribers make little or no use of the toll service, and it would manifestly be unfair to charge them for service that they do not receive. The inequities resulting from the application of flat rates would, therefore, be much greater in the toll service than in the exchange service. In the second place, toll costs would be more seriously affected by unrestricted use. Toll circuits are longer, and hence more costly circuits, and operating costs per message are greater. Unrestricted use of the toll service would result not only in more but in longer calls and would lead to rapidly increasing costs which would have to be met by increasingly higher rates. This would tend to restrict the development of the toll service.

Toll rates vary with distance and with the length of the call. They increase with distance because it costs more to give telephone service over longer than over shorter distances; and they

vary with the length of the call because long calls represent greater quantities of service than short calls, quantity of service being measured definitely in minutes of circuit use. Moreover, if there were no restriction upon the length of toll calls, the average length of call would increase, costs would rise, and of necessity rates would mount also. The effects would be, as in the case of flat rates, inequitable distribution of costs and a restricted development of the toll service.

Toll rates are based upon minutes of circuit time with a minimum charge for an initial period and an additional charge for each additional minute. The determination of the proper length of the initial period is a matter of great importance, since the length of this period controls the amount of the initial-period rate, the amount of the overtime rate, the relation between initial rates and overtime rates, the length of conversations, and consequently the use of circuits and the development of the service. Moreover, since the demands of toll users vary as to the length of conversation, short periods are sufficient for some, while longer periods are required by others to complete their calls.

The initial period in use in the long-distance service of the Bell System is established at 3 min., that for short hauls being 5 min. The 3-min. initial period represents, in the judgment of the rate men, that which will result in the most equitable distribution of costs and the most satisfactory development of the toll service. If the initial period were made longer, say 5 instead of 3 min., the tendency would be for the average length of long-distance calls to increase, and costs to rise with no increase —even a decrease—in revenue, since with a longer initial period there would be less overtime conversation. Initial period rates accordingly would have to be higher, and this would restrict the development of the toll service. If, on the other hand, the initial period were made shorter, say 2 instead of 3 min., costs theoretically would decrease, and initial period rates could be made lower. But there would be a counteracting tendency of very great importance. While a shorter initial period would make possible, theoretically, lower initial period rates and thus bring the toll service within the reach of lower income groups, the shorter period would represent a smaller quantity of service for the initial rate. This would render the service less valuable

in the eyes of the consumer and would result in higher overtime charges for calls of longer duration. These effects would tend also to restrict both the traffic and the development of the toll service, just as too narrow an allowance of messages in measured exchange service will tend to restrict its development. Thus, the longer the initial period the higher initial period rates must be, and the lower the development of the service in number of messages will be, although a larger amount of service will be rendered in connection with the calls that are made. The shorter the initial period the lower the rates may be, the greater the development in number of messages may be, but the less the amount of service rendered in connection with the calls that are made. Under longer initial periods, variations in the value and the cost of individual messages are greater than under shorter initial periods, but the variations in total charges are less. The tendency under longer initial periods is to restrict the use of the toll service by the public as a whole, to increase the usefulness of the service to those to whom long conversations are of value, and so to distribute the charges that those who find value in long conversations derive an advantage as compared with those to whom short conversations are sufficient. Under shorter initial periods, the tendency is to increase the development of the toll service and its usefulness to the general public, to prevent waste of toll facilities, and to distribute charges more equitably in relation to the cost and the value of the service.[1]

The standard overtime period is 1 min., except for short hauls. Overtime rates cannot be fixed separately but only in relation to the initial period rates, the differential between them being a problem of initial period and overtime quantities, since revenues and expenses cannot be separated for the two classes. The lower the overtime charge the higher relatively initial period rates must be, and the greater the tendency to restrict toll development. Charges for overtime periods must be substantial, or they defeat their purpose, for to fix such charges at a nominal sum would practically constitute the abolition of overtime charges and in effect the undue lengthening of the initial period. On the other hand, overtime charges cannot exceed the prorate per minute of the initial period rates for obvious reasons. If, for

[1] *Cf. Pub. Serv. Com. v. Mountain States Telep. & Teleg. Co. (Mont.)*, P.U.R. 1924 C, 545, 639, 640.

example, the total charge for 6 min. were more than twice the charge for 3 min., subscribers would place two calls of 3 min. each instead of one for 6 min., with resultant waste of time and facilities. The usual practice in the long-distance service is to fix overtime rates at the prorate for the initial period rates, modified to permit all charges to be made in multiples of 5 cents.

Toll rates are classified according to the hour of use and the type of service demanded. Different charges apply during different periods of the day because demands for toll service are not uniform throughout the 24 hr.; and since plant and equipment as well as operating personnel must be provided to handle the maximum hourly demand, off-peak calls cost less than those at peak hours. Theoretically, toll rates for off-peak calls should be lower than for calls made during peak hours both because of the lower cost of handling such calls and because lower rates tend to stimulate off-peak use and thus to improve load factor. Classification of toll service by hour of use is on the basis of very broad periods, those for the Bell System being as follows: day, 4:30 A.M. to 7:00 P.M.; and night, 7:00 P.M. to 4:30 A.M. Lower rates are charged for night than for day service, and on Sundays. A detailed classification by hour of use is neither feasible nor justifiable. The development of toll traffic does not increase plant requirements on many toll routes; on short-haul routes, plant and equipment costs affected by the nature of the load amount to relatively small proportions of the total costs of operating short-haul service; and operating-personnel costs may increase during night hours, the ones of least load, and thus offset the saving in plant costs on account of peak load. Experience has shown, furthermore, that failure to classify by hours of use does not restrict the development of the service to an important degree, since greatly reduced rates during the night hours do not result in material increases in traffic. This is because of the fact that most toll calls cannot be delayed and to the further fact that since telephone communication requires the presence at the telephone of both parties, the night hours are those of minimum natural use. Accumulated toll calls at the beginning of lower rate periods have at times created serious operating problems in some large cities. In fact, the principal reason for the introduction some time ago of evening rates lower than day rates but slightly higher than night ones was to reduce

the congestion due to accumulated calls at the opening of the night period. Classification by hour of use is restricted to the station-to-station service, since the actual operating-work and circuit-time requirements of person-to-person traffic are usually greater during the night hours, the off-peak hours, owing to the greater difficulty of locating parties.

Different types of service are provided because the demands of toll users differ in the conditions under which the completion of telephone calls is desired or required. To meet these various demands, four types of service are provided:

1. Station-to-station service, where the user desires communication only with a specified telephone station.
2. Person-to-person service, where the user desires communication only with a person or persons at a specified station.
3. Appointment service, where the user desires communication only with a specified person or persons and only at a specified time.
4. Messenger service, where the user desires communication only with a specified person or persons, but where such demand can be met only by utilizing the services of a messenger.

Higher rates are charged for person-to-person, appointment, and messenger calls than for station-to-station calls because a greater quantity of service is performed in one case than in the other and should be paid for accordingly. The nonrevenue-producing use of toll facilities involved in furnishing person-to-person service is greater than for station-to-station service and, in the case of appointment and messenger service, still greater, since the circuits must be established at least twice—once in arranging for the appointment or messenger and once more for actual communication between specified persons.

In establishing the rates for these different classes of service, station-to-station rates are used as the base because they are the lowest and simplest. But this method is used for convenience only, the differentials between the classes being determined by the effect of the various rates upon the cost of furnishing and the development of the toll service. If the entire body of toll rates should not produce the revenue desired, station-to-station, or person-to-person, rates might be changed with or without changes in other rates, depending upon the conditions that limit or determine the differentials. The demands for station-to-station and person-to-person service are particularly flexible, and the relative

amounts demanded depend upon the rate differentials between them. Since it costs more per call to furnish person-to-person service, a differential too small would tend to result in a larger proportion of person-to-person calls which might unduly hamper the development of the toll service as a whole because of greater cost, as well as discriminate unjustly against those users whose needs could be satisfied by station-to-station service.

The differentials between person-to-person and station-to-station rates are relatively greater for short hauls than for long hauls, owing to the fact that the relative economies of station-to-station operation are greater than on longer hauls and to the additional fact that the demand for person-to-person service on short hauls is relatively not so great. The rate jumps and the mileage steps for person-to-person rates on longer hauls, as in the case of station-to-station rates, are determined by experience. In the case of messenger calls, where the call is completed, the exact amount expended for the messenger service, in addition to the message rate, is charged.

Under certain circumstances, a charge, called a report charge, which does not represent a rate for a separate class of service is made. This represents a charge made for certain calls which cannot be completed owing to circumstances beyond the control of the telephone company. Report charges are made on station-to-station calls where, in case of a request for reversal of charges, such request has been refused by the called party, and the calling party refuses to pay the charges to complete the call; or on person-to-person calls, when the called party is not available at the called station or refuses to talk or to accept reversal of charges, and when the calling party refuses to talk or is absent from the calling station, or no answer can be obtained; and on appointment and messenger calls, in addition to the conditions for person-to-person calls, when because of conditions not under control of the company the call is not completed.

Telephone companies receive many complaints about report charges, but the reasons for making such charges are clear. In the first place, although the call is not completed, the extra work before the completion of the call, which represents the basis for the difference between the charges for station-to-station and other toll calls, has been done, and the cost must be met. If the call is completed, such cost is included in the higher rate; if not

completed, the work has been done in accordance with the subscriber's orders and should be paid for directly by him. It would be inequitable to meet such costs by higher rates for the service, since the percentage of uncompleted person-to-person, appointment, or messenger calls would not necessarily be the same for all parties. Moreover, report charges prevent needless waste of toll facilities by subscribers making long-distance calls on the mere chance of establishing communication, the probability of reaching the desired person being small. Finally, report charges tend to prevent fraudulent use of the toll service. Before the introduction of such charges, it had been a practice to convey certain information by code through calling for some fictitious person at a designated station, the information being conveyed by the answer from the called station.

The Toll-rate Structure of the Bell System.—The great practical problem in toll rate making is the setting up of a schedule of rates governing communication between the many points connected. This task is a huge one, for the Bell System and its connecting companies reach some 90,000 points. To make separate rates from each point to every other one would involve the calculation of nearly eight billion station-to-station rates, an undertaking the cost of which would be prohibitive. It is necessary therefore, as in the case of the express, postal, or telegraph service, to adopt a system of block rates based upon mileage for the toll service.

Up to distances of about 40 miles, station-to-station rates for the Bell System are based upon the direct air-line distance between points as measured on United States Government maps. The rates increase as distance increases. For toll-rate purposes, each exchange area has one toll-rate computing center, which coincides with the location of the United States Post Office bearing the same designation as the exchange. In some of the larger cities, the exchange may be zoned for toll purposes. The Philadelphia exchange, for example, is divided into four zones for toll rates. The toll-rate computing center for zone 1 coincides with the post-office location, and for the remaining zones corresponds to the geographical center of each zone.

Station-to-station rates for distances greater than 40 miles are computed on a group or block basis. The block system includes Canada, the United States, and Mexico and is laid out upon maps

obtained from the respective governments. The system is made up of blocks each 7 miles square and sections (composed of 25 blocks) each 35 miles square. The sections are lettered consecutively from north to south in capital letters, beginning in Canada, A, B, C, etc., and continuing AA, BB, CC, etc.; and are numbered consecutively from west to east, beginning in the Pacific Ocean so as to include all continental points, 1, 2, 3, etc. The blocks of each section are lettered consecutively with small letters. Each town or city is assigned the block and section number of the particular block and section in which it is located. Thus Philadelphia is given the designation, T80e.

Between 40 and approximately 350 miles, rates are based upon the computed air-line distance between the centers of the 7-mile blocks, and all points in a given block take the same block rates. For distances greater than 350 miles, the rates are based upon the air-line distance between the centers of the 35-mile sections, and all points in a section take the same section rates.[1] Long-distance toll rates of the Bell System have been reduced substantially on four different occasions since 1925.

Rates for the International and Ship-to-shore Radiotelephone Services.—As has been seen, the telephone service of the United States, through the development of radiotelephony, has been extended to most of the important countries of the world and to many of the larger ships at sea. These services are furnished under conditions similar to those which govern the long-distance service within the United States and to Mexico and Canada, although many exceptional conditions obtain. Station-to-station and person-to-person rates to the same points are the same. Appointment and messenger calls are accepted with the understanding that while they cannot be handled on the regular appointment basis, efforts will be made by the telephone company to complete them as near the time specified by the calling party as practicable. No additional charges are made for appointment and messenger calls. A report charge is made when, after a called station has been reached, a call for a particular person cannot be completed owing to circumstances beyond the control of the telephone company, such as the called or calling party's not being available or refusing to talk. The initial period is 3 min., and the overtime period 1 min. Rates for these services

[1] *Bell Tel. Q.*, vol. 8, p. 107, 1929.

have been reduced greatly since their inception. For example, the original New York-London initial period rate was $75. This has been reduced successively until at present it is $21.[1] Rates to other foreign countries are based upon the New York-London rate. Ship-to-shore initial period rates are $9 to ships within 500 miles and $18 to ships beyond 500 miles.

The telephone rate structures in existence are much more scientific than telegraph rate structures, especially in the toll service. Toll charges of the Bell System are directly related to cost in that the blocks and sections are of uniform size, and the rates are based upon the actual distances between the centers of these blocks and sections. There has been a marked tendency toward lower charges for long-distance service on the theory that additional volume can be handled at decreasing costs. In the exchange service, both cost and value factors have had their influence in determining the classifications that have been established, as well as the charges for the various classes of service. The value of the service is an important consideration in the construction of telephone rates because of the value of interconnection. Whereas record communication is carried on by the personnel of the companies themselves, voice communication is carried on by the subscribers, the telephone company merely furnishing a connection. The user of telegraph service can reach by telegraph any party within the area covered by the facilities of the telegraph companies, but a telephone subscriber may reach only those interconnected by the telephone lines. Hence, the addition of new subscribers adds to the value of the service to all subscribers, and for this reason charges for certain classes of service may be made lower than strict cost allocation would require. Telephone rate structures, therefore, represent attempts to balance cost and value factors and, as a general rule, distribute equitably among the consumers the costs of furnishing telephone service.

[1] Night rates (5 P.M. to 5 A.M.) and Sunday rates, initial period, $15.

CHAPTER VIII

COMPETITION, COMBINATION, AND COORDINATION

The Extent of Combination in the Communication Utilities.—The tendencies toward the consolidation of small companies into larger operating and financial units, which have been so marked a feature of public utility developments in recent years, have characterized also developments in the communication industries. There has been a high degree of integration and concentration of control within the various industries, and some tendency to bring companies engaged in furnishing different types of communication service under common control. The greatest concentration of ownership is found in the telephone industry, although the telegraph and cable industry of the United States is almost altogether under the control of two corporations, the Western Union Telegraph Company and the International Telephone and Telegraph Corporation, and the commercial radiotelegraph service is carried on chiefly by the Radio Corporation of America and Mackay Radio and Telegraph Company, a subsidiary of the International Telephone and Telegraph Corporation.

The great bulk of the telephone service is performed by the Bell System, controlled by the American Telephone and Telegraph Company. A comparison by selected statistics of the Bell System with all other lines and systems reporting annual incomes of $10,000 or more for 1932 (Table 10) shows that the companies comprising the Bell System owned 93.2 per cent of the total miles of wire and 84.7 per cent of the total number of telephones for these systems. They originated 86.1 per cent of the total number of calls originated; they received 90.5 per cent of the total exchange revenues and 93.6 of total toll revenues; they employed 87.7 per cent of the total number of employees and paid to them 91.8 per cent of the total amounts paid out in salaries and wages; and their investment in plant and equipment was 90.2 per cent of the total for such systems.

There is practically no competition in the telephone industry between companies furnishing exchange service in the sense that two companies operate in the same community to serve the same group of customers. The Bell System operates in all the states and the District of Columbia, and in practically every state there are independent telephone companies, but in almost every case the territory is divided between the independents and the Bell companies, and each operates in its own territory to the exclusion of others. This does not mean, however, that there is no competition. The independent companies are always alert to expand and improve their systems. Many of the independents are strong companies, and a number are the outgrowth of combinations of still smaller companies effected for the purpose of bringing about more harmonious and compact operations. Outside the cities of 50,000 population and over, independent companies serve almost as many telephones as the Bell companies. They furnish the only facilities for telephone service in some 14,000 communities. In addition to the larger independent companies,

TABLE 10.—COMPARISON OF BELL SYSTEM WITH ALL OTHER TELEPHONE SYSTEMS REPORTING ANNUAL INCOMES OF $10,000 OR MORE: 1932

	Total	Bell System		All other systems	
		Amount	Per cent of total	Amount	Per cent of total
Number of systems	918	25	2.7	893	97.3
Miles of wire	86,484,493	80,585,879	93.2	5,898,614	6.8
Central offices	12,724	6,778	53.3	5,946	46.7
Telephones, total	16,284,231	13,793,229	84.7	2,491,002	15.3
Residence	10,057,281	8,277,469	82.3	1,779,812	17.7
Business	6,226,950	5,515,760	88.6	711,190	11.4
Calls originated	29,100,458,313	25,061,085,648	86.1	4,039,372,665	13.9
Employees	320,763	281,350	87.7	39,413	12.3
Salaries and wages	$ 451,477,844	$ 414,341,515	91.8	$ 37,136,329	8.2
Revenues (operating), total	$ 1,046,392,359	$ 956,354,529	91.4	$ 90,037,830	8.6
Exchange	$ 741,087,550	$ 670,736,747	90.5	$ 70,350,803	9.5
Toll	$ 281,047,593	$ 263,147,955	93.6	$ 17,899,638	6.4
Investment in plant and equipment	$ 4,734,705,708	$ 4,269,268,095	90.2	$ 465,437,613	9.8

Source: Telephones and Telegraphs, Bureau of Census, 1932, p. 25.

there are the mutual companies and rural, or farmer, lines which provide service in territories not served by either the independent or the Bell companies. They are, for all practical purposes, noncompetitive.

The wire telegraph industry also is a highly integrated one. The Western Union Company and the telegraph and cable companies of the International Telephone and Telegraph system (All America Cables, Inc., Commercial Pacific Cable Company, and the Postal Telegraph-Cable System) on Dec. 31, 1932, together owned and operated 99.02 per cent of the total miles of telegraph wire and cable. In 1932, they transmitted 99.74 per cent of the revenue messages and reported 99.89 per cent of the total operating revenues of all telegraph and cable companies operating in the United States. In Table 11 are presented selected statistics to show the relative importance and comparative size of the Western Union Company, the International Telephone and Telegraph system, and the independent telegraph companies.[1] This table shows that of the two major groups, the Western Union is by far the larger. At the end of 1932, its investment in plant and equipment was 70.13 per cent of the total for all telegraph and cable companies; it owned 80.86 per cent of the total miles of wire and 85.18 per cent of all telegraph and cable offices; and it transmitted, in 1932, 71.31 per cent of all revenue messages and received 75.26 per cent of all operating revenues. Both the Western Union and the International companies serve the public in all the states and the District of Columbia, as well as in all parts of the world, and they are fully competitive, although the system of the Western Union is more universal in the United States. Each is a combination of many previously independent companies, the Western Union during its history having brought into its system some 537 telegraph and cable systems and properties.

The independent telegraph companies, in view of the small scale of their operations, offer no substantial competition to the major companies. Four of these companies were acquired principally for the purpose of serving the telegraph needs of certain industries; two are connected with Class I steam-railroad companies; and only one, the National Telepost Company, Inc.,

[1] Preliminary report on communication companies, H.R. 1273, 73d Cong., 2d Sess., p. 76.

TABLE 11.—RELATIVE IMPORTANCE AND SIZE OF THREE GROUPS OF TELEGRAPH COMPANIES: 1932

Basis of comparison	Total amount	Western Union		International Telephone and Telegraph system		Independent telegraph companies	
		Amount	Per cent of total	Amount	Per cent of total	Amount	Per cent of total
Investment in plant and equipment	$465,639,421	$326,547,318	70.13	$138,198,262	29.68	$893,841	0.19
Operating revenues	$110,302,414	83,013,712	75.26	$ 27,171,078	24.63	$117,624	0.11
Total miles of all wire	2,348,377[1]	1,899,174	80.86	426,697	18.16	22,906[2]	0.98
Revenue messages transmitted	126,915,907	90,507,600	71.31	36,082,530	28.43	325,777	0.26
Number of employees	65,116	48,338	74.23	16,620	25.52	158	0.25
Number of telegraph and cable offices[3]	25,770	21,950	85.18	3,545	13.76	275	1.06

[1] Included are 10,240 nautical miles, which are here equated as 11,801 statute miles.

[2] Excludes 119 miles operated by Interstate Telephone and Telegraph Co. to Aug. 31, 1932; property was leased to Postal Telegraph Co. (Oregon) effective Sept. 1, 1932.

[3] Included are certain offices used jointly with railway and other companies.

Source: Interstate Commerce Commission; reprinted in Preliminary Report on Communication Companies, H.R. 1273, 73d Cong., 2d Sess., p. 76.

is operated in competition with the Western Union and the Postal Telegraph system. Its volume of business is, however, slight. The names of these companies and the states in which they operate are as follows: Central Idaho Telegraph and Telephone Company, Idaho; The Colorado and Wyoming Telegraph Company, Colorado; Continental Telegraph Company, North Dakota, South Dakota, Montana, Idaho, and Washington; Interstate Telephone and Telegraph Company, Oregon; The Mountain Telegraph Company, Colorado; National Telepost Company, Inc., Pennsylvania, Ohio, Indiana, Illinois, and Michigan; and Northern Telegraph Company, Maine. In addition to these, the Canadian Pacific Railway Company operates some 228 miles of telegraph line in the United States.

Ownership of the radio stations offering communication service to the general public is divided among some 72 different companies, but the bulk of public radiotelegraph and radiotelephone communication is carried on by three companies or systems: the Radio Corporation of America and its subsidiaries R.C.A. Communications and the Radiomarine Corporation of America; the Mackay Radio and Telegraph Company, a subsidiary of the International Telephone and Telegraph Corporation; and the American Telephone and Telegraph Company and its subsidiaries. The radio services of most of the other companies originally were established primarily to serve the communication needs of the companies that organized them, but impressed upon them was the obligation to serve the general public. Certain of these companies are engaged in transportation on the oceans or the Great Lakes, solely or as a part of other operations; others are fishing and packing, oil, tire, mining, or moving picture companies; and still others transmit news for the press. A summary of the companies owning 1 per cent or more of the radio stations rendering telegraph service to the public on Dec. 31, 1933, is given in Table 12. This shows that the subsidiaries of the Radio Corporation of America own 22.92 per cent; Mackay Radio and Telegraph Company, 11.24 per cent; and American Telephone and Telegraph Company and its subsidiaries, 5.27 per cent of the total number of stations.

Of the two major radio companies, the Radio Corporation, through its subsidiaries, R.C.A. Communications, Inc., and the Radiomarine Corporation, handles much the larger volume of

TABLE 12.—SUMMARY OF STATIONS RENDERING WIRELESS SERVICE TO THE PUBLIC, DEC. 31, 1933

Stations	Fixed public service		Fixed public press stations	Mobile press stations	Public coastal service			Total number of stations	Percentage of stations operated	
	Point-to-point telegraph stations	Point-to-point telephone stations			Coastal telegraph stations	Coastal telephone stations	Coastal harbor stations		By company	By group
Radio Corporation of America:										
Radiomarine Corp. of America	5	..	..	..	20	..	..	25	3.65	
R.C.A. Communications, Inc	126	6	..	..	...	..	..	132	19.27	22.92
International Tel. & Tel. Corp.										
Mackay Radio & Tel. Co	69	..	..	..	8	..	..	77	11.24	11.24
American Tel. & Tel. Co	...	23	..	..	...	2	..	25	3.65	
New England Tel. & Tel. Co	...	..	..	..	...	..	1	1	0.15	
New York Tel. Co	...	..	..	..	...	..	1	1	0.15	
Pacific Tel. & Tel. Co.	...	..	..	..	...	..	2	2	0.29	
Southern Calif. Tel. Co	...	..	..	..	...	..	1	1	0.15	
Transpacific Communications Co	...	6	..	..	...	..	..	6	0.88	5.27
Alaska Pacific Salmon Corp	8	8	..	..	7	..	8	31	4.53	
Alaska Packers Association	12	..	..	..	9	..	..	21	3.07	
Farish Railroad	2	2	..	..	2	..	2	8	1.17	
Globe Wireless, Ltd	35	..	..	..	7	..	..	42	6.13	
Libby, McNeill & Libby	4	18	..	..	4	..	7	33	4.82	
Mutual Telephone Co. (Hawaii)	7	8	..	..	1	..	..	16	2.34	
Nakat Packing Corp	4	4	..	..	4	..	4	16	2.34	
Pacific American Fisheries	9	..	..	..	9	..	..	18	2.62	
Press Wireless, Inc	...	..	90	..	...	..	..	90	13.14	
Tropical Radio Telegraph Co	27	..	..	..	5	..	..	32	4.67	
Wabash Radio Corp	4	..	..	..	4	..	..	8	1.17	
All others	41	16	..	3	32	..	8	100	14.57	60.57
Total, 72 companies	353	91	90	3	112	2	34	685	100.00	100.00

Source: Adapted from preliminary report on communication companies, H.R. 1273, 73d Cong., 2d Sess., pp. 149–151.

messages. As shown in Table 13, the average number of messages handled monthly by this company is more than twice the number handled by the Mackay Radio and Telegraph Companies. Besides its international circuits, R.C.A. Communications has a domestic radiotelegraph system; it furnishes radiotelephone service between Hawaii and the United States in conjunction with the radiotelephone stations of the American Telephone and Telegraph Company; and it renders radiotelegraph

TABLE 13.—AVERAGE NUMBER OF RADIO MESSAGES TRANSMITTED MONTHLY: 1928–1932

Year	Radio Corporation of America			International Telephone and Telegraph Corporation		
	R.C.A. Communications	Radiomarine Corporation	Total	Mackay Radio and Telegraph Co. (California)	Mackay Radio and Telegraph Co. (Delaware)	Total
1928	.....	38,407	.....	58,271		
1929	124,209	44,514	168,723	55,507	4,408	59,915
1930	123,627	40,808	164,435	49,000	13,456	62,456
1931	114,260	34,674	148,934	53,543	22,325	75,868
1932	114,541	26,579	141,120	45,400	21,854	67,254

Source: preliminary report on communication companies, H.R. 1273, 73d Cong., 2d Sess., pp. 144–147.

service at Manila with ships at sea. In addition, this company engages in international program transmission, frequency measuring, and foreign-remittance service. The international program-transmission service consists of point-to-point transmission of program material for broadcasting at destination. In 1932, the average number of programs so transmitted per month was 36; and the average number of minutes of transmission per month, 1,101. Frequency-measuring service consists of the precision measurement of the frequencies of broadcasting or other stations. Foreign-remittance service involves the telegraphic transfer of money to or from foreign points. The number of such remittances handled averaged 1,230 per month in 1931 and 2,132 per month in 1932. The Radiomarine Corporation of

America operates a general public marine radiotelegraph service between coastal radio stations and ships at sea or on the Great Lakes. Mackay Radio and Telegraph Company of California transmits messages by radiotelegraph, operating transcontinental, Pacific ship and shore; Pacific Coast point to point; and between San Francisco, Honolulu, Manila, and Shanghai. The Mackay Radio and Telegraph Company of Delaware also transmits messages only by radiotelegraph, operating transcontinental, Atlantic ship and shore, and between New York and points in Europe and South America.[1]

In summarizing the extent to which combination has taken place in the communication utilities, we find that the bulk of the telephone service is furnished by the Bell System and that although there are many independent telephone companies, there is little actual competition, rather a division of territory between companies operating as monopolies in their own territories. Two systems render all but a very small part of the telegraph and cable service furnished by American companies, and they are competitive in both domestic and foreign telegraph communication. In the radio service, although there are many small companies, a large part of the public communications is handled by two companies which also are highly competitive and would be more so were it not for the existence of exclusive contracts with foreign radio companies. These combinations have been brought about by various means, such as consolidation, merger, lease, purchase of property, and stock ownership.

Advantages and Disadvantages of Combination.—The motivating forces underlying consolidations of companies engaged in furnishing the same type of communication service are in many respects similar to those that have given the impetus to combination in other utilities. These have been discussed so fully by other writers that they need be but mentioned here. Economies are effected through large-scale operation, owing to more efficient use of equipment and labor, more opportunity to employ and to utilize effectively high-paid specialists and executives, and centralized purchasing of materials and supplies. Funds necessary for capital purposes are obtained more readily and more cheaply by larger units, and the diversification which comes from serving

[1] *Ibid.*, pp. 143–151.

wider areas and a greater variety of customers lends stability to earnings. Moreover, large-scale operation makes possible the standardization of equipment and facilities which not only promotes efficiency but improves the quality and dependability of the service. Finally, many combinations among communication companies have been motivated by the desire to lessen or eliminate competition. However, the developments that have culminated in the creation of a few large communication companies have in no small measure been impelled by the peculiar nature of the services.

Telephone service, certainly the exchange service, can be furnished efficiently and economically only under monopoly conditions, owing to the necessity for interconnection. Two telephone companies operating in the same community would be competitive only to the degree that they had duplicate lists of subscribers, for a telephone company supplies no service like transportation, gas, or electricity. It furnishes only a connection between two parties, both of which must be connected to its lines. But duplication could not be carried to the point where the subscribers of the two companies would be identical throughout, because all subscribers would then be paying twice for the same service. What happens, therefore, where two telephone companies operate in the same community is competition for new subscribers, with each subscriber being placed under the necessity of installing the telephones of both companies or of accepting an inferior telephone service. The effect is duplication, not competition, and the uneconomic nature of such duplication has been universally recognized. Today, it is practically nonexistent.

With regard to the telephone toll service, both economic and technical reasons point to the desirability of its development also by one system. Centralized control of the operating companies, at least of those in the larger towns and cities, was from the beginning considered by the Bell interests to be essential to the development of an efficient national telephone service. Theoretically, a national telephone service could have been built up, as in the case of the railroads, by physical connection between independent companies operating in the different local areas; but practically, physical connection for telephone communication presents problems quite different from those involved in physical

connection for the transportation of freight. A package of freight is transported to its destination along with other packages at the convenience of the company that performs the service. All the property, facilities, and operation remain in the control of the owning company and its operating staff, and no property intended for the benefit of the customers of one company is put to the exclusive use of another company. The transmission of a telephone message, however, represents a vastly different type of problem.

A telephone company, to repeat, does not supply a commodity, nor does it transmit messages as does a telegraph company. It merely furnishes a circuit which enables one subscriber to communicate with another subscriber, and this is true whether the two parties live in the same community or in communities separated by thousands of miles. For obvious reasons, no separate toll system could be set up with separate lines and separate instruments for each subscriber. Exchange service and toll service must be coordinated into one telephone service with much of the same equipment and personnel utilized in the performance of both services. In order, therefore, that a telephone subscriber may be enabled to communicate with a distant subscriber, a circuit must be set up which is continuous and unbroken; it must be for the exclusive use of these two parties; and while it is at their service, it cannot be used by any others for telephonic communication. To do this satisfactorily, the operators making up the circuit must have absolute control of the circuits over the whole distance between the points of communication, the operator at the starting point having control of, or perfect working unity with, all operators of the trunk lines and exchange lines necessary to the completion of the circuit. From an operating standpoint, physical connection demands the exclusive use by one company of a part of the property and facilities and operating staff of another, regardless of the latter's need for the use of such property and facilities and of how small surplus facilities might be. While it is feasible, and physical connection is established between the Bell System and the connecting companies, it is generally agreed that the remarkable universality and efficiency of the long-distance telephone service in the United States has been due to the development of the bulk of it under the control of a single organization.

Further, an efficient and economical national telephone service is dependent upon standardization of practices and common administration and its continued improvement upon the organization and coordination of research activities, together with adequate financial resources for the introduction of new and costly equipment. It is questionable whether many of the technical improvements which have increased the efficiency and lowered the cost of the long-distance telephone service in the United States could have been developed and introduced by many companies competing with each other for the toll business. Moreover, in a national network, there are likely to be many circuits that yield a small margin of profit. The tendency under competition would have been—in fact, necessity would have compelled the competing companies—to develop profitable circuits at the expense of less profitable ones. The result in all likelihood would have been a less economical, less universal national telephone system.

Many consolidations in the telegraph industry were of the so-called end-to-end type, similar to those which have been effected in the railroad service. Such consolidations enabled more rapid and efficient service over larger areas, since every transfer of a telegraph message meant an additional reception and transmission which represented slower speed, greater cost, and increased liability to error. The need for efficient organization of the service also compelled consolidation of small telegraph units into larger ones. Low-cost operation in the telegraph service is dependent upon the establishment of high-speed circuits to handle the heavy volume of business on trunk routes between traffic centers and less expensive circuits radiating out to points that normally originate and receive smaller volumes of traffic. In the third place, the larger systems often were compelled to purchase small competitors to protect their revenues, many small telegraph companies having been organized from time to time to get the cream of the traffic by cheaper or faster service between the points from which the larger companies received the bulk of their revenues. These revenues enabled the larger systems to supply telegraph service in communities the volume of traffic to and from which would scarcely warrant the maintenance of telegraph offices, and they had to be protected if such services were to be maintained.

The foregoing considerations led inevitably to the formation of a few large rather than many small systems for the conduct of telegraph communication. To these may be added others which possibly point to the desirability of setting up a single domestic telegraph monopoly. The two systems that have been created are not of equal strength, and the competition between them is in many respects undesirable from a public standpoint. The Western Union has many more offices than the Postal, and the universality of the system of the former gives it a competitive advantage, but many of its offices handle scarcely enough traffic to warrant their separate maintenance. The offices of the Postal Company, on the other hand, are for the most part located in the larger cities of the United States, where they compete with the Western Union offices for the cream of the telegraph traffic.

True competition in the telegraph industry would imply competition between universal systems reaching largely the same points, but such competition does not exist. Neither could it be established without much further wasteful duplication of facilities and personnel. What exists at the present time in the United States is competition in the larger cities between the two major companies and a certain amount of division of less profitable territory between them. The competition is severe for the traffic originating in the cities served in common, but while it has tended to lower rates and to multiply the number of offices, its effects to a degree have been undesirable. In the first place, competition has created—in fact, it has compelled—much uneconomic duplication of telegraph offices, plant, and equipment and duplicate groups of managers, messengers, clerks, and operators. For example, the Western Union has some 300 offices in New York City, and its competitor, the Postal, some 150 offices. Such duplication, while apparently advantageous to the public, is not wholly so. It makes the service more costly than need be, since the total volume of communications could be handled as efficiently with fewer employees, fewer offices, and less plant and equipment. As a consequence, either the consumers must pay more for the service than it would cost them if such duplications were eliminated, or the telegraph companies must reduce their expenditures in order to earn a fair return on their properties. The latter inevitably acts to depress wages because of

the large proportion of total telegraph costs which wages and salaries constitute.

In the second place, competition between the telegraph companies in the larger communities has rendered each less capable of extending its service to small communities. Over against the claim that competition has tended to increase the number of telegraph offices must be placed the fact that such increases have occurred mostly in the larger cities and that for many years there has been a tendency to deprive small towns of the telegraph offices that they formerly possessed. The telegraph service in many respects is like the postal service. The total cost must be borne by those who use it, but the less profitable services must be supported in part by the profitable ones. The need for a universal telegraph service demands that it be extended to as many communities as is possible within the limitations of cost and value factors. Competition which reduces the revenues of the telegraph companies in profitable territories obstructs in part the attainment of this objective and to that extent is socially undesirable.

The telegraph service has never been a truly national service, owing in no small degree to competition. At the present time, the Western Union has offices in approximately 17,524 places, and the Postal in 3,425 places. With duplications eliminated and the cities served by the smaller telegraph companies included, less than 20,000 places in the United States have telegraph offices. A consolidated company would have the duty and the ability to make the telegraph service more universal. Moreover, with consolidation, resources now wasted in destructive competition would be available for more effective competition with the telephone and the air mail. Both of these services have been extended into fields of long-distance communication which formerly were occupied by telegraphy. In addition, as has been pointed out, the Bell System through its leased-wire and teletypewriter exchange services is actively engaged in the telegraph business in serving parties who otherwise might be large customers of the telegraph companies. Competition between the telegraph companies and the Bell System for the private-wire business is of a vicious sort. The telegraph service of the Bell System is a by-product service and can be sold at by-product rates, it being a very small part of the total business of that system. To the

telegraph companies, however, the private-wire service is an important part of their total business, and they must rely upon it for important revenues.

In the third place, there has never been absolutely free competition between the major telegraph companies, owing to the existence of contracts which exclude a competing company from places to which the general public has access. The Federal Communications Commission summarized the results of a recent study of such contracts between the telegraph companies and transportation companies, hotels, baseball parks, and sports arenas as follows:

1. The contracting railroad grants exclusively to the other party the use of its present right of way and any extensions thereof:

Company	Number of Contracts
New England Telephone and Telegraph Company	3
Northern Telegraph Company	1
Postal Telegraph-Cable Company (Mackay Land Lines System)	5
Western Union Telegraph Company	185

2. No employee of the contracting transportation company will work for any competing telegraph or telephone company, nor will the transportation company allow any competitor to open an office on its premises:

Company		Number of Contracts
New England Telephone and Telegraph Company		4
Northern Telegraph Company		1
Postal Telegraph-Cable Company (Mackay Land Lines System)		4
Western Union Telegraph Company:		
a. Airways	1	
b. Bus companies	2	
c. Railroad or terminal companies	228	231

3. The contracting railroad company will not transport men or material for the construction, maintenance, or operation of a line of poles and wire or wires and underground or other telegraph or telephone lines in competition with the company named below, except at and for the railroad's current local rates:

Company	Number of Contracts
Northern Telegraph Company	1
Postal Telegraph-Cable Company (Mackay Land Lines System)	5
Western Union Telegraph Company	111

4. The contracting railroad company will not furnish any competing telegraph or telephone carrier any facilities or assistance that it may lawfully withhold:

Company	Number of Contracts
Northern Telegraph Company	1
Postal Telegraph-Cable Company (Mackay Land Lines System)	5
Western Union Telegraph Company	84

5. The contracting railroad company will not stop its trains or distribute material for any competing telegraph or telephone carrier at other than regular stations:

Company	Number of Contracts
Northern Telegraph Company	1
Postal Telegraph-Cable Company (Mackay Land Lines System)	2
Western Union Telegraph Company	75

6. The company named below may use the name of the other contracting party to defend exclusive privileges granted by the contract:

Company	Number of Contracts
Northern Telegraph Company	1
Postal Telegraph-Cable Company (Mackay Land Lines System)	4
Western Union Telegraph Company	117

7. The contracting hotel will not permit any competing telegraph carrier to have an office or station in the hotel:

Company	Number of Contracts
Postal Telegraph-Cable Company (Mackay Land Lines System)	115
Western Union Telegraph Company	1,316 hotels, 225 clubs, resorts, camps, etc.

8. No competitor may have an office at or have access to, for pickup and delivery of messages, the place or places of assemblage covered by the contract (baseball parks and sports arenas):

Company	Number of Contracts
Postal Telegraph-Cable Company (Mackay Land Lines System)	3
Western Union Telegraph Company	15

9. All business coming to the lines of one contracting company will be routed over the lines of the other:

Company		Number of Contracts
Bell Telephone Company of Pennsylvania		13
Indiana Bell Telephone Company		4
Postal Telegraph-Cable Company (Mackay Land Lines System)		
Railroad companies	14	
Telephone companies	232	
Air transport companies	2	248
Northern Telegraph Company		1
Ohio Bell Telephone Company		70
Pacific Telephone & Telegraph Company		32
Petersburg Telephone Company		3
Southern Bell Telephone & Telegraph Company		572
Western Union Telegraph Company (Complete figures on the large number of small telegraph and telephone companies with which Western Union has connecting agreements were not submitted)		
Wisconsin Telephone Company		254

One of the principal sources of opposition to the consolidation of the domestic telegraph services comes from those who fear that consolidation would result in the elimination of duplicate personnel as well as duplicate facilities. In the long run, it is inevitable that employment in the telegraph service must be adjusted to the needs, and there is much opposition to throwing men out of work under present conditions. This argument springs from existing conditions which we hope are temporary and bears little relation to the creation of permanent improvement in the industry. Various methods of taking care of telegraph employees in a transitional period might be devised, such as the

retiring and pensioning of older employees and the opening of offices in places not now served. In many respects, the real interests of labor would be better served by a unified telegraph industry than by a continuance of destructive competition, which inevitably tends to depress wages, to increase hours of work, and to render tenure of employment insecure. The real problem would be to distribute among the managements and labor proper shares of the burden of bringing about necessary improvement in the industry through consolidation.

In the field of ocean cable communication, because of high cost in relation to the volume of communications to be expected as well as the necessity of providing adequate land-line systems or connections, only a few American companies have been organized. There are, at present, the two systems, those of the Western Union Company and the International Telephone and Telegraph Corporation. The cable service is highly competitive; the American cable companies compete with each other, with foreign communication companies and administrations, and with the radio. Competition in cable communication, as in land telegraph communication, implies duplication of facilities and personnel, and the cost of such duplication is the price that must be paid if the benefits of competition are to be retained. If, however, the volume of communications is not sufficient to support the competitive systems which have been established, the only way to avoid the financial ruin of one or more of the competitors is to eliminate duplicate services through consolidation.

There is competition, also, between the companies engaged in international radiotelegraph communication, although the Mackay Radio and Telegraph Company has been excluded from most of the principal European countries by exclusive contracts for radio communication between the United States and those countries negotiated by the Radio Corporation with the respective foreign companies or administrations. Most of these contracts were negotiated, however, before the Mackay Company had become a serious competitor, and many are for short terms. At their expiration, the American companies will be in a position to compete with each other for foreign connections. Competition among American companies in the international radiotelegraph service has certain unique features. An international radiotelegraph service between the United States and a foreign coun-

try is performed jointly by the companies or administrations of the two countries. No foreign-owned radio station may be established in the United States, and with few exceptions an American company may not set up its own station in a foreign country. This means not only that the service is performed jointly but that the tolls are shared by the two companies or administrations, and the share that each receives depends in part upon the relative strength of its bargaining power. In most foreign countries, radiotelegraph communication, and often all forms of international communication, are under the control of a single agency, usually a government administration. It has been contended on occasion, therefore, by American communication companies that two American radio companies negotiating for the privilege of carrying on communication with a foreign company would find themselves competing with each other for all or as large a share as possible of the communications under the control of the single foreign company. In such a situation, the foreign company would be enabled to play one American company against the other and to receive the lion's share of the division of tolls. Such competition inevitably would benefit American consumers only to the degree that rates might be lowered because the American companies would receive smaller divisions of the tolls.

While the tendency toward further and further integration within the communication industries has been clearly marked, combinations of agencies performing different types of communication service have not proceeded far. From time to time, suggestions have been made that the telephone and telegraph services could be combined with benefit to the public; and in 1910, the American Telephone and Telegraph Company obtained a controlling interest in the stock of the Western Union Telegraph Company. However, the opposition of private interests which were affected adversely by such a combination and public opposition on the score that a monopoly of wire communications was being set up were so insistent that the American Telephone and Telegraph Company after some three years of association, at the instigation of the Attorney General's office, disposed of its holdings of Western Union stock.

The principal advantages of such a combination are the savings to users and the improvement of the service which would result.

The savings would come mostly from economies in central plant and line construction and maintenance, since much of the work could be done jointly for both services with economy. Also, to reap the full advantage of technical developments, such as the compositing of trunk telephone circuits for simultaneous telephone and telegraph operation, it is claimed, the arrangement and distribution of the lines must be under common control and necessarily under that of the telephone company. Moreover, coordination between the two services would improve them both, would reduce costs, and in the case of the telegraph service would make it more universal. The telephone not only would serve as a pickup and delivery agency for the telegraph service generally but would provide the only means by which telegraph service could be provided economically in small places. Many small towns and cities in the United States could not support telegraph offices, but most of them have telephone exchanges. Common control would enable the joint use of facilities and personnel in the performance of both services and thus make possible telegraph service where otherwise none could be provided.

These are persuasive arguments. To them might be added the further advantage which would follow from the consolidation of the private-wire services of the telephone and the telegraph companies. As has been seen, the telegraph companies offer a timed-wire service to their printer-telegraph patrons which competes with a similar service furnished by the telephone company to its teletypewriter patrons. Competition between these services has resulted in unprofitable operation because of duplication and has limited the value of the service to all by restricting it to one or the other group of patrons, just as competition in local telephone service limits its value. Barring certain technical difficulties, which could be overcome, these services could be consolidated with profit to the companies and with benefit to the public; for competition, however desirable it may be to this special class of consumers, in so far as it depresses rates unduly places proportionately heavier burdens upon other telephone and telegraph users, especially those who make use of the noncompetitive services.

Opposition to consolidation of the telephone and telegraph services is chiefly on the ground that the interests of consumers would be adversely affected. It is pointed out that while

probably the full benefits of coordination may be received only through common ownership or control, very effective coordination has been established between the two services under separate control by contract, and consolidation is not necessary. The Bell companies have contracts with both telegraph companies by which telephone subscribers may dispatch telegraph messages to the telegraph offices by telephone, and the charges be billed them by the telephone companies; and similar arrangements have been made with many independent telephone companies. In many cases, the telephone companies act as local agents for the telegraph companies. Arrangements are made whereby telephone subscribers may telephone their telegraph messages to the local exchange, whence they are transmitted by telephone or, in some instances, by printing telegraph machines, to the nearest office of the telegraph company where they are handled in the usual manner. The local telephone company also receives messages from nonsubscribers at its exchange. Incoming telegrams are delivered by telephone or, if necessary, by messenger. The responsibility and liability for the transmission and delivery of the telegraph messages are at all times upon the telegraph company, the telephone company merely acting as agent. This coordination is not unlike that which for a long time has existed between the public and the railroad telegraph services in many small places, where both services are performed by the station agent. It is superior, however, in that whereas many such railroad stations are open during the day, or during specified hours, telephone exchanges even in small towns are seldom, if ever, closed.

The American Telephone and Telegraph Company also has contracts with the telegraph companies under which the latter lease from the former by-product circuits and equipment necessary for their operation. Further coordination between these companies formerly had been developed in the furnishing of facsimile-, or picture-, transmission service. Facsimile transmission by wire requires a metallic circuit; hence single-wire telegraph circuits having a ground return are not usable. The circuits for the domestic system were provided by the telephone company; and the collection and delivery services, for the performance of which that company is not equipped, by the telegraph companies, both of which were accredited agents of the telephone

company for the solicitation, collection, and delivery of facsimiles. This service, as we have seen, dwindled in importance and is now operated by the press for its own purposes.[1]

In view of the present effective coordination between the telephone and telegraph companies, a monopoly of domestic wire communications would offer few advantages over competition. Competition between companies furnishing different types of communication service provides a spur to technical improvement and efficient operation. It does not lead to the uneconomic duplication of facilities and personnel which is the principal disadvantage of competition between companies furnishing the same type of service. The telephone enables greater flexibility and fullness of expression and eliminates delays occasioned by the necessity of waiting for an answer to a written communication, but it is more costly than the telegraph over long distances. The telegraph has the advantages of cheapness, accuracy, and permanence of record. Each is better fitted to fulfill certain communication needs than the other, but both furnish instantaneous communication between widely separated points, and the place that each should fill in a general communications system may best be determined by competition. The function of regulation is to see that the public interest is protected and that full advantage is taken of technical developments.

Combination of radio and wire companies was specifically forbidden by the Radio Act of 1927 (and similar provisions have been incorporated in the Communications Act of 1934), if the effect of such combination is, or would be, substantially to lessen competition between them. It was this provision of the Radio Act that prevented the acquisition a few years ago by the International Telephone and Telegraph Corporation of R.C.A. Communications, Inc. Negotiations had been completed, and the price agreed upon, but it was felt that such a combination would be in violation of the law; and since efforts to have the law amended proved of no avail, the plans were abandoned. There existed, however, the rather anomalous situation that the International Telephone and Telegraph Corporation, which at that time controlled several cable companies and the Postal Telegraph system, controlled also the Mackay Radio and Telegraph Company, the chief competitor of R.C.A. Communications.

[1] The telephone company discontinued its public telephotograph service in June, 1933.

Arguments both in favor of and against permitting the consolidation of wire and radio were presented fully in Senate hearings on a new communications bill,[1] held at the time when the foregoing merger was under contemplation. It was argued that the combination of radio with the wire companies was the most effective way of providing the radio with necessary pickup and delivery services in the United States. When the Radio Corporation first entered the field of commercial transoceanic communications, it established offices in New York and later in Boston, Washington, and San Francisco. However, a large part of the total volume of American international communications traffic originates in or is destined to points in the United States other than those in which it had offices. To reach such points, it was necessary for the Radio Corporation either to duplicate the offices of the telegraph companies or to negotiate contracts with them for the interchange of traffic. A contract was negotiated with the Western Union by which the latter would furnish pickup and delivery services for its transpacific traffic, but not until 1931 was a similar contractual arrangement entered into with the Western Union for its transatlantic traffic, owing to the competition between the two companies. Until that time, the Western Union would not receive from the Radio Corporation and deliver to domestic points in the United States any transatlantic traffic except upon payment of the full maximum cable-zone tariff per word, the same for all classes of traffic. As for outgoing traffic, the Western Union refused at all its offices in the United States to accept public messages intended to be sent abroad via the Radio Corporation's stations in competition with its own cables. The Radio Corporation negotiated a contract with the Postal Telegraph system by which the latter would receive and deliver incoming messages at regular cable-zone rates, except certain deferred messages from points reached by the Radio Corporation's foreign system but not by the foreign system of the Mackay companies, and would usually, although not uniformly, receive at its offices outgoing messages to be sent via the Radio Corporation's stations. Thus, neither telegraph company would contract with the Radio Corporation for domestic collection and delivery of its transatlantic traffic except upon terms that would limit the effectiveness of radio competition

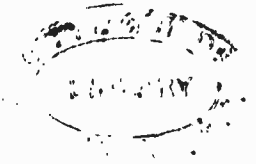
[1] S. 6, 71st Cong., 1st Sess.

with the cable systems. As a consequence, during the first 9 years of its activity, the Radio Corporation delivered to the Western Union and the Postal Telegraph ten times as many transatlantic messages for delivery at interior points as it received from those companies for transmission abroad, although the history of the traffic shows that the volume is always substantially equal incoming and outgoing.[1]

In this connection, it might be said that although the competitive position of the Radio Corporation has been improved under present contractual arrangements with the Western Union, it can never be wholly satisfactory so long as the radio is dependent upon its competitors for pickup and delivery services. It is inconceivable in a competitive system that a telegraph company having cable lines of its own would handle the foreign communications of its competitor with the same care and expedition as it handles its own. The training and interests of telegraph employees are to the contrary. This is not very important in the handling of deferred traffic, but it prevents the Radio Corporation from competing with the cables in certain high-speed services to and from points outside New York City.

It has been contended that the radio could relieve itself of this handicap by direct operation between interior points of the United States and foreign points, but such a system would not be economically feasible, except for limited services. Not only would it result in wasteful duplication of offices and operating forces, but it would represent uneconomic use of radio channels and the equipment necessary for their operation. The demand for high-speed service comes mostly during the hours when the business day in Europe and America overlaps; and accordingly as one travels westward from the Atlantic seaboard, the period of overlapping shortens. The volume of communications demanding expedition, therefore, or the total volume of international communications for that matter, is not sufficient to keep many expensive, high-power international circuits in operation except for a few hours of each day, and the establishment of such a system would necessarily involve wastage of capital and uneconomic utilization of the limited number of available radio

[1] Affidavit of W. A. Winterbottom before the Federal Radio Commission, application of Radio Corp. of America, Docket 212, reprinted in Hearings on H.R. 15430, 70th Cong., 2d Sess., Part 2, pp. 785–786, 1929.



channels, none of which probably would be used to capacity. Efficient radio operation, like efficient telegraph operation, must provide for what is called trunk-line handling of communication traffic, that is, high-speed, low-cost handling of large volumes of traffic from one local point to another on one or more trunk circuits, with less expensive circuits and apparatus radiating out from the various focal points. Low costs in telegraph communication come from full loads.

A second argument advanced in favor of the consolidation of cable and radio was that present conditions demand the coordination of all facilities necessary to secure prompt, reliable, and economical communication. Those who held this view contended, first, that only large systems with huge financial resources are able to provide the research facilities necessary for the technical improvement of radio; and, second, that only in coordination with the wire services can radio communication attain its greatest usefulness. Radio, it was said, while admittedly capable of offering rugged competition, should not be a competitor of the cables. To encourage such competition is to bring about wasteful duplication with no compensating advantages. The two agencies supplement each other, each having a distinct place in a comprehensive system of universal communications: the radio to open up new channels of communication to hinterland points and to points not served by wires and to supplement the cables in safeguarding continuity of service and relieving traffic congestion; and the cable to handle expeditiously and economically the great volumes of messages traversing the main communication routes.

A third argument was based upon the belief that only by common control of all companies engaged in international communication could American companies successfully meet foreign competition. In most foreign nations, international communications agencies are under a common directing head. This not only permits a more effective coordination of different services, but it enables the communications agencies of a given country to present a united front in bargaining with other countries, an advantage of great importance where communication services are performed jointly by companies of different nationalities, as in the case of international radiotelegraph communication. Competition between American companies, it was said, would not

necessarily lower the rates, since the foreign company is also concerned, but it might seriously affect the division of tolls so that the foreign company would receive the lion's share. The best answer to the contention that under consolidation there would be no effective regulation of cable and radio rates is that the foreign end of a circuit is not subject to regulation by Americans whether under competition or monopoly, and to require competition among American companies when there is none on the other side is to give the advantage to the foreigner.

These arguments in favor of the establishment of great coordinated communications systems for international communication were answered by others equally persuasive. In the first place, it was contended—and there has long been a feeling in responsible quarters—that if the cable companies were to obtain control of radio, they would stifle its technical development. On this point, the Interdepartmental Committee appointed in 1933 by President Roosevelt to study communications stated in its report not only that the British merger of her cable and radio companies had not been a financial success but, more important, that "the radio companies which joined the merger appear to have suffered disproportionately due to the fact that the cable interests have been protected to the disadvantage of radio." The committee also found that in the United States, where radio and cable are not merged, the technical development of radio stands ahead of that in Great Britain.[1]

In the second place, it was argued that the advantages of competition between radio and cables far outweigh the disadvantages. The radio supplements wire services by furnishing direct instantaneous communication with points to which the construction of wire lines or the laying of cables would not be physically or economically feasible and by providing alternative or additional facilities which may be used when wire facilities are interrupted or overloaded. It provides the only known means of communication with moving objects except for short distances. But the usefulness of the radio is not limited to the performance of these services; it has proved itself a very able competitor of

[1] Letter from the President to the chairman of the Committee on Interstate Commerce, transmitting a memorandum from the Secretary of Commerce relative to a study of communications by an interdepartmental committee, p. 12.

the wire services, particularly the cable, for the business that formerly seemed securely theirs.

In competition with the cable, the radio often has the advantages of cheapness, flexibility, and direct communication. A further advantage from a national viewpoint is that radio is less likely to interruption in wartime or disaster than cable, since it cannot be cut, diverted, or destroyed by enemy or catastrophe. Radio is more flexible than the cable in that a radio station can be shifted from one circuit to another as convenience or necessity dictates, whereas cables once laid are serviceable for communication only between the points that they connect. This is an important consideration where shifts occur in the direction of the flow of international communications, and where the volume of communications over a given route varies materially and rapidly with changing circumstances. The advantage that radio offers of direct communication with a foreign country is also important, since it enables the direct transmission of a message from one country to another and thus avoids transmission through an office in an intermediate country, as is so often necessary in cable communication. This provides a speedier service and allays suspicion and ill-feeling between nations due to actual or assumed leakage of valuable trade or other information to third parties.

Many of the claimed disadvantages of radio, like lack of secrecy and unreliability, are more apparent than real. Radio communications are sent out through the ether, and they may be received by anyone equipped with proper apparatus, but new high-speed methods of transmission and the use of special equipment have reduced this disadvantage to a minimum. Similarly, the disadvantage of unreliability has largely been eliminated. Radio is subject to static and fading, but all frequencies are not affected alike nor always at the same times. Certain ones are more serviceable over a given circuit during certain hours of the day, or seasons of the year, than others. Knowledge of such variations and understanding of the peculiar characteristics of the various frequencies have enabled their use in groups and the establishment of reliable radio service. Furthermore, through the development of diversity reception, which involves the use of three antennae spaced about 1,000 ft. apart and connected with a central receiver, a signal of comparatively

uniform strength is obtained, and fading is no longer so great a menace to radio communications.

In the third place, the consolidation of the radio and cable services would create a monopoly of international record communications so far as American companies are involved without adequate protection to ratepayers, in that international rates would be beyond the control of regulatory commissions in the United States. A commission could not control the rates for messages deposited in the foreign offices of American communications companies, since rates from a foreign country to the United States are beyond the control of the United States. Neither could it control the rates on outgoing messages from the United States without considering the rates of competing foreign companies which also would be beyond its control. As to services performed jointly, as in the case of radio, regulation of the American portion of the rate would affect only indirectly the rate itself. An American commission could hamper and penalize an American company, but it could not effectively regulate the rate, since the rates for international messages are made by agreement between contracting companies or administrations. Detailed regulations which govern the conditions under which service is furnished also are matters of agreement between all nations. Legally, our communications companies are not bound by these regulations, since the United States is not signatory to the international telegraph regulations; but practically, they must adhere to the regulations if they desire to do business with foreign companies or in foreign countries. The argument that competition is solely on the American side and that its effect is only to weaken or destroy the American companies overlooks the fact that destructive competition results only where there is wasteful duplication of facilities and that in the absence of effective regulation or government ownership the only protection to consumers against exorbitant charges is competition.

Finally, the communication experts themselves disagreed as to the necessity of a consolidation of American cable and radio companies to meet foreign competition, some holding that such is not the case.[1] It was pointed out that as to radio traffic, since the laws of the United States do not permit foreign-owned

[1] *Cf.* statements of Newcomb Carlton and Ellery W. Stone, Hearings on S. 6, 71st Cong., 2d Sess., Part 11, pp. 1464–1468, 1548–1550.

radio stations in this country, all international radio communications which concern Americans directly must enter or leave by way of American-owned stations. As to cable communications, southbound messages carried between points in the United States and points in the West Indies and Central and South America must go either over the lines of the International Telephone and Telegraph System or over those of the Western Union. Northbound traffic will be filed either in American cable offices or with British cable companies which are bound by contract to turn it over to the Western Union. Eastbound traffic to the British Isles now goes mostly by the lines of the Western Union and the Commercial Cable Company; and for westbound traffic these companies have their own offices in the British Isles, where they compete with other companies by direct solicitation, the unrouted traffic being a very small proportion of the total. American companies also have offices in France, Belgium, and Holland. Cable traffic between Germany and Italy, on the one side, and the United States, on the other, is governed by contracts between the German and Italian and American companies, connection being made at the Azores. In the Pacific, there is only one cable from the United States to the Orient, this terminating in Shanghai and connecting with a Japanese cable. The transpacific cable is operated by the Commercial Pacific Cable Company, with traffic agreements with the foreign cable companies and administrations in Asia. Thus, it was contended, the creation of foreign communication monopolies cannot adversely affect the situation of American companies except where competition among American radiotelegraph companies might give the advantage to the foreign company in the division of tolls. Many of these arguments, it should be noted, were presented in favor of or against a particular consolidation and should be weighed accordingly, but they incorporate the principal arguments that have been presented from time to time on both sides of this highly controversial matter.

It is inevitable in the development of national policy with respect to communications that attention be given to the matter of consolidation and that present alignments be considered as well as those that should be established in the interests of the companies and of the American public. Competition between companies furnishing the same type of communication service

is less desirable than that between companies supplying different types of service. Competition in the telephone-exchange service is undesirable because of the nature of the service, and monopoly control or complete coordination is essential to the establishment of an efficient national telephone service. While competition in the domestic telegraph service has admitted advantages, it leads to uneconomic duplication of facilities and personnel, which inevitably tends to depress the earnings of the companies and the wages paid to employees, as well as to restrict the development of the service and to render the telegraph industry less effective in competition with long-distance telephony and the air mail. Choice between competition and regulated monopoly would involve the sacrifice of certain benefits to attain others. Competition between radiotelegraph companies in the domestic service would be subject to similar disadvantages; and while competition in the international field at present is restricted by the existence of exclusive contracts with foreign companies, the effect of unrestrained competition between American companies would be to give bargaining advantages to foreign monopolies with few benefits to American ratepayers. Competition between wire and radio companies engaged in telegraph communication would be desirable in many respects; but at present, it is an unequal competition in that a company engaged solely in radio communication is dependent upon the wire telegraph companies for pickup and delivery services. The coordination which has been developed between wire and telegraph communication is distinctly advantageous to both, but consolidation of the domestic telegraph systems besides effecting new alignments of the cable systems would involve the establishment of new relationships between wire and radio companies. The exigencies of the present situation may require further consolidation of the telegraph services. If so, the details and the alignments will have to be worked out by the companies themselves, and although they must be subject to the approval of regulatory authority in the public interest, Congress should not make consolidation mandatory or prescribe in detail the setup. Consolidation of the telephone and telegraph services is neither necessary nor desirable, since competition between companies furnishing different types of service does not lead to wasteful duplication but serves to establish the proper place of each in a national communication system.

CHAPTER IX

FEDERAL REGULATION OF COMMUNICATIONS PRIOR TO 1934

Federal regulation of communications in the United States may be said to have had its beginning with the passage by Congress, July 24, 1866, of the Post Roads Act "to aid in the construction of telegraph lines and to secure to the government the use of the same for postal, military and other purposes." This Act provided that any telegraph company should have the right "to construct, maintain, and operate lines of telegraph through and over any portion of the public domain of the United States, over and along any of the military or post roads of the United States which have been or may hereafter be declared such by Act of Congress, and over, under, or across the navigable streams or waters of the United States."[1] Before any telegraph company might exercise any of the powers or privileges conferred by the Post Roads Act, such company was required to file its written acceptance with the Postmaster General of certain terms and conditions relating to the construction and maintenance of lines, the priority of government messages, and so forth. Having done so these rights and privileges would constitute its Federal franchise, the right to grant which rested upon the constitutional power of Congress to establish post offices and post roads. By a subsequent act, Mar. 1, 1884, Congress declared all public roads and highways, while kept up and maintained as such, irrespective of whether mail was actually carried thereon, either by way of city letter carriers or in rural delivery, to be post roads.

By Act of Congress, Aug. 7, 1888, the Interstate Commerce Commission was given certain powers with respect to the telegraph services required to be furnished by railroad and telegraph companies to which the United States had granted subsidies in lands, bonds, or loans of credit for the construction either of railroad or of telegraph lines.[2] These included authority to

[1] 14 Stat. 221, Rev. Stat., Sec. 5263 *et seq.*

[2] Government-aided Railroad and Telegraph Act, Aug. 7, 1888.

compel such companies to maintain and operate telegraph lines for railroad, governmental, commercial, and all other purposes and to require such companies to connect their lines with telegraph companies that have accepted the provisions of the Post Roads Act at the place where the lines meet for the prompt and convenient interchange of telegraph business so to operate their respective lines as to afford equal facilities to all, without discrimination for or against any one of such connecting lines, and to receive, deliver, and exchange business with connecting telegraph lines on equal terms.

Provisions of the Interstate Commerce Act Relating to Communications.—Federal regulation of the rates and practices of communication companies dates from the passage by Congress of the Mann-Elkins Act, in 1910, which amended the Interstate Commerce Act so as to make certain of its provisions applicable to the transmission of messages in interstate commerce by wire or wireless. There was some doubt, however, as to what telegraph and telephone companies were subject to the Act and the nature and character of service that would render a telegraph or telephone company subject thereto. In December, 1910, the Interstate Commerce Commission held a series of hearings; and in March, 1911, it expressed the view that the provisions of Sec. 1, 3, 15, and 20 of the Interstate Commerce Act as then amended were applicable to the communication companies in so far as the terms thereof applied to such companies.[1] Certain of these sections were later amended, and other sections added to the Act which were applicable to communication companies. A brief summary of the principal provisions of the Interstate Commerce Act applicable to such companies follows.

By Sec. 1, Par. 1, of the Interstate Commerce Act, its provisions were made applicable to common carriers engaged in the transportation of passengers or property and "the transmission by wire or wireless" of messages in interstate or foreign commerce; but by Par. 2, provisions of the Act applied to such transportation or transmission only in so far as it should take place within the United States. They were not applicable to the transmission of intelligence by wire or wireless "wholly within one state." The term "common carrier" was defined, in Par. 3, to include "all persons, natural or artificial, engaged in such transportation

[1] 29th report of the Interstate Commerce Commission, pp. 5–6, 1911.

or transmission as aforesaid as common carriers for hire"; and the term "transmission" was used to include "the transmission through the application of electrical energy or other use of electricity, whether by means of wire, cable, radio apparatus, or other wire or wireless conductors or appliances, and all instrumentalities and facilities for and services in connection with the receipt, forwarding and delivery of messages, communications, or other intelligence so transmitted, hereinafter also collectively called messages." Paragraph 5 provided that all charges for any service in transmission of intelligence by wire or wireless should be just and reasonable, although messages by wire or wireless subject to the provisions of the Act might be "classified into day, night, repeated, unrepeated, letter, commercial, press, government, and such other classes as are just and reasonable," and different rates might be charged for different classes of messages.

Section 3 made it unlawful for a common carrier subject to the Act to "make or give any undue or unreasonable preference or advantage to any particular person, company, firm, corporation, or locality, or any particular description of traffic, in any respect whatsoever, or to subject any particular person, company, firm, corporation, or locality, or any particular description of traffic, to any undue or unreasonable prejudice or disadvantage in any respect whatsoever." This section rendered unlawful the charging of one consumer more than another for the same service.

Section 15 gave to the Interstate Commerce Commission the power, where it had found that the rates or charges for interstate messages, classifications, regulations, or practices whatsoever of carriers subject to the Act were or would be "unjust or unreasonable or unjustly discriminatory or unduly preferential or prejudicial," to determine and prescribe just and reasonable rates and charges to be thereafter observed, or maximum or minimum, or maximum and minimum rates and charges, and to prescribe just and reasonable classifications, regulations, or practices. Section 19*a* provided that the Commission should "investigate, ascertain, and report the value of all the property owned or used by" every common carrier subject to the Act. Section 20 authorized the Commission to require annual reports from all common carriers subject to the Act, monthly reports of earnings and expenses, and periodical or special reports con-

cerning any matters about which it was authorized or required to keep itself informed or which it was required to enforce. This section provided, further, that the Commission might, in its discretion, prescribe the forms of any and all accounts, records, and memoranda to be kept by carriers subject to the provisions of the Act and that it should prescribe for such carriers the classes of property for which depreciation charges might properly be included under operating expenses, and the percentages of depreciation that should be charged with respect to each of such classes of property, classifying the carriers as it might deem proper for this purpose.

Federal vs. State Regulation.—Telephone, telegraph, and to a certain extent radio-communication companies have for some time been subject also to state as well as Federal regulation. With the establishment rapidly after 1907 of public service commissions in all the states but Delaware, their jurisdiction was extended in most cases to telephone and telegraph companies. In 45 states and the District of Columbia, the commissions have jurisdiction over telephone communication; and in 44 states, over telegraph communication. Telegraph communication is largely interstate, although the telegraph companies do an important intrastate business, the intrastate traffic of the Western Union being estimated to be about 25 per cent of the total traffic of that company.[1] The bulk of telephone communication, on the other hand, is intrastate in character. A study of the traffic of the Bell System a few years ago showed that, in the exchange service, the number of messages were 99.53 per cent intrastate and 0.47 per cent interstate; and that 99.54 per cent of exchange revenues came from intrastate messages and 0.46 per cent from interstate messages. In the toll service, messages were 80.5 per cent intrastate and 19.5 per cent interstate; and revenues, 67.6 per cent intrastate and 32.4 per cent interstate. Of the total number of messages of the Bell System, exchange and toll, only 1.36 per cent were interstate; and of the total operating revenues, only 9.9 per cent came from interstate traffic.[2] Regulation of telephone communication, consequently,

[1] Statement of Newcomb Carlton, Hearings on S. 6, 71st Cong., 3d Sess., Part 11, p. 1477.

[2] Statement of Joseph B. Eastman, Hearings on S. 6, 71st Cong., 2d Sess., Part 12, pp. 1585–1586.

has been preponderantly state regulation. Radio communication has been declared to be wholly interstate in character; and since no submarine cables lie wholly within a single state, these forms of communication are not subject to state jurisdiction, except perhaps some aspects of radio broadcasting.

Because of the dual nature of our system of government, conflicts of jurisdiction inevitably arise where public utility companies, subject both to Federal and to state jurisdiction, engage in both interstate and intrastate operations. The problem of defining and delimiting the appropriate spheres of jurisdiction is the same for communication companies as for railroad companies, and similar issues arise. However, whereas the tendency has been very definitely in the direction of the concentration of more and more aspects of railroad regulation in the hands of the Federal body, no similar tendency has been manifest with regard to regulation of telephone communication. Perhaps the principal reason for these different tendencies has been the relative preponderance of interstate and intrastate operations. The bulk of railroad traffic crosses state lines, and, in addition, transportation which is truly intrastate in that the movement takes place wholly within the borders of a single state may affect interstate commerce in such a manner as to come necessarily within the province of Federal regulation as to rates. On the contrary, as has been pointed out, the telephone business is very largely intrastate in character. The problems of regulating telegraph communication, because of the competition that has existed, have not been so pressing nor so complex as those of regulating telephone communication; and no similar jurisdictional questions have been raised concerning cable and radiotelegraph communication, since there are no truly intrastate operations in these services.

One interesting jurisdictional question raised in connection with the telegraph stock-ticker service was as to whether or not an interstate transmission loses its interstate character and becomes intrastate commerce after it crosses the border of the state of destination. The New York Stock Exchange, having a monopoly of the information concerning prices collected by it on the floor of the Exchange, had contracts with the telegraph companies by which the latter for specified sums received from the former body full and continuous quotations of prices made

in transactions upon the Exchange. The telegraph companies, in turn, furnished these quotations to customers which applied for them, provided that such customers were approved by the New York Stock Exchange. The intent of the Exchange in reserving the right to disapprove applicants was declared to be only to prevent improper and unlawful use of the quotations, particularly by the operators of so-called "bucket shops." A stockbroker in Boston, having been refused stock-ticker service by the telegraph companies on the ground that his application had been disapproved by the Exchange, appealed to the Massachusetts Public Service Commission to compel the companies to furnish him such service. The telegraph companies, in this case, contended that the Massachusetts Commission was without jurisdiction, the traffic in controversy being interstate commerce and within the sole jurisdiction of the Interstate Commerce Commission.

The Massachusetts Commission assumed jurisdiction on the ground that although the conveying of the quotations over the wires from New York to Boston constituted interstate commerce, the interstate movement ended when the property was delivered to the main offices of the telegraph companies in Boston. The distribution to customers' offices in Boston, the Commission said, was intrastate commerce, subject to the jurisdiction of the state. The Commission ordered the telegraph companies to furnish stock-ticker service to the complainant, on the ground that if they were to furnish such service to any customers in Boston they must in keeping with their public service obligation supply all customers within the district who would comply with all lawful regulations connected with the service, and who should desire the quotations for lawful and proper use.[1] An appeal was taken to the Supreme Judicial Court of Massachusetts which affirmed the holding of the state Commission that the matter in controversy did not constitute interstate commerce, since no messages were sent from New York direct to the individual ticker subscriber, the quotations as messages being sent by Morse code from New York to the offices in Boston, where they were transferred by employees of the telegraph companies to instruments of a different character. This, the court held, was analogous to breaking the bulk of merchandise received by

[1] *The Stock Ticker Case*, P.U.R. 1915 E, 1068.

interstate commerce, putting it into smaller packages, and delivering it in retail trade. It constituted, in effect, a sale at retail of the information which it had received by interstate commerce. The latter part of the transaction, the court held, was properly subject to state regulation.[1]

The issue finally was taken to the Supreme Court of the United States, which, however, contrary to the Massachusetts Court, held that the entire transmission was interstate commerce and not anywhere subject to the jurisdiction of the Massachusetts Commission. Regarding the analogy to the breaking of bulk in freight transportation, the Court said:

> It is enough that, in our opinion, the transmission of the quotations did not lose its character of interstate commerce until it was completed in the broker's offices and that the interference with it was of a kind not permitted to the States. The supposed analogy that has prevailed is that of a receiver of a package breaking bulk and selling at will in retail trade. But it appears to us misleading. . . . Unlike the case of breaking bulk for subsequently determined retail sales, in these the ultimate recipients are determined before the message starts and have been accepted as the contemplated recipients by the Exchange. It does not matter if they have no contract with the Exchange directly. It does not matter that if the telegraph companies did not deliver to any given one the Exchange could not complain. If the normal, contemplated, and followed course is a transmission as continuous and rapid as science can make it from Exchange to broker's office, it does not matter what are the stages or how little they are secured by covenant or bond.[2]

REGULATION OF COMMUNICATIONS BY THE INTERSTATE COMMERCE COMMISSION

The Interstate Commerce Commission dealt with the rates and practices of communication companies in a number of cases, but its regulation of those companies for the most part consisted of supervision over certain routine matters. The Commission set up no separate departments, bureaus, or divisions to deal exclusively with communication problems, the work being distributed throughout the organization set up to supervise railroad matters. Annual and monthly reports filed by these companies were received and supervised by the Bureau of Statistics, from which selected financial data were compiled and

[1] *Western U. Tel. Co. v. Foster*, P.U.R. 1916 F, 176.

[2] *Western Union Tel. Co. v. Foster*, 247 U. S., 105, 112, 113, 1917.

published in mimeograph form. Questions relating to accounting were handled by the Bureau of Accounts, which, as one of the first tasks of the Commission with regard to communications, prepared uniform systems of accounts for telephone and for telegraph and cable companies which were prescribed by the Commission. The Bureau of Valuation conducted investigations and collected data for the valuation of the properties of the communication companies. Formal complaints regarding rates or practices of these companies were handled administratively by the Bureau of Formal Complaints, and informal complaints or queries by the Bureau of Informal Complaints. Tariffs and contracts filed were placed in the custody of the section of tariffs in the Bureau of Traffic. Applications with respect to telephone consolidation were handled administratively by the Convenience and Necessity Section of the Bureau of Finance. The Bureau of Law had charge of the defense if any order of the Commission were attacked in court; and prosecutions of companies in court for violation of any law administered by the Commission were in charge of the Bureau of Inquiry.[1]

Uniform Accounts: Depreciation.—The Commission early prescribed uniform accounts for telephone, telegraph, and cable companies which, except for certain modifications dictated by experience, have remained fundamentally unchanged. A vexatious problem concerned depreciation accounting. In prescribing uniform accounts, the Commission of necessity dealt with depreciation accounts, but the law required that it prescribe also the percentages to be charged for each class of depreciable property. This requirement was introduced by amendment to the Interstate Commerce Act in 1920, and the Commission set out immediately to determine the classes of depreciable property of the railroad and the telephone companies and the rates to be charged. The matter proved to be such an involved and controversial one, however, owing to the varying conditions under which different properties are operated, that it was not until 1933 that a final order was promulgated laying down the principles and the rules by which depreciation charges for railroad and telephone companies were to be determined. The telephone companies were ordered to file depreciation rates and supporting data with the state regulatory commissions, and these commis-

[1] Statement of Joseph B. Eastman, *op. cit.*, pp. 1566–1567.

sions in turn were asked to make recommendations to the Interstate Commerce Commission which then would prescribe the rates to become effective. This work was not completed before the effective date of the Communications Act of 1934; but by the provisions of the Act, the Interstate Commerce Commission might complete its task, and any of its determinations of depreciation charges would have the same force and effect as though made by the Communications Commission. Prescribing depreciation charges for telephone companies raises a controversial question as to the proper spheres of Federal and state jurisdiction which will be discussed later. The Interstate Commerce Commission made no determinations of depreciation charges for the other communication companies, as it was desirous of establishing a body of principles and rules for the railroad and telephone companies which would serve as a guide in dealing with other carriers.

Valuation.—Under Sec. 19*a* of the Interstate Commerce Act, the Interstate Commerce Commission undertook a valuation of the properties of the telegraph companies and completed the final valuation of the small, independent companies. A tentative valuation report on the property of the Western Union Telegraph Company was served on the carrier on Mar. 27, 1928, but no final report was made, because this company proposed that a new field inventory and report as of a current date would be of greater value. The Western Union agreed to make such an inventory and furnish the data to the Commission, a proposal that was accepted by the Commission. The new inventory was completed and field checked, and the preparation of a current-valuation report in process when the Communications Act was passed. A tentative valuation report of the property of the Postal Telegraph Company was served on the company on Aug. 29, 1928, but no final report was completed for reasons similar to those which delayed the completion of a final report for the Western Union. No new inventory and compilation were undertaken for this company. One complex problem yet to be solved involves the valuation of telegraph lines owned jointly by steam railroads and telegraph companies and that owned by the railroads, which will have to be so valued. Certain property in the twilight zone of ownership and use has aroused much controversy, the Western Union having intervened in almost all of the larger railroad valuation cases claiming ownership of the

telegraph lines.[1] The data collected by the Interstate Commerce Commission have been made available to the Federal Communications Commission, and the former Commission has been relieved of further duties in the valuation of the telegraph companies. No valuation work has been done by the Interstate Commerce Commission for the other communication companies.

Rate Regulation.—In many respects, the powers of the Interstate Commerce Commission over the rates and charges of communication companies were as comprehensive as those which it possessed over the railroads, but they were lacking in other respects. Communication companies were not required by law, and only in certain instances by the Commission, to file, publish, and post rates, charges, rules, and regulations before putting them into effect. In practice, the American Telephone and Telegraph Company, for account of itself and its subsidiaries, filed with the Commission tariffs of transatlantic telephone rates, long-distance station-to-station rates between frequently called points in the United States, and other tariffs purporting to provide the bases for computing telephone rates between other points, but no other tariffs of telephone rates were filed.[2] The principal cable companies filed tariffs, and the telegraph companies were required to do so by order of the Commission but only for purposes of information.[3] The filing, publishing, and posting of rates and charges are essential to protect consumers against unjust discrimination, and any lack of authority to require that rates be published and that only the published rates be charged renders a commission less able to safeguard the interests of consumers. One important power that the Interstate Commerce Commission lacked was the power to investigate proposed changes in charges, classifications, regulations, and practices and to suspend the operation of such changes during the period necessary to determine whether or not they would be just and reasonable. As a consequence, the communication companies could initiate new rates and practices, and they would be operative unless and until upon complaint and after investigation they were

[1] Statement of Frank McManamy, Hearings on S. 2910, 73d Cong., 2d Sess., pp. 33–35.

[2] Statement of Hon. Joseph B. Eastman, Hearings on S. 6, 71st Cong., 2d Sess., Part 12, pp. 1567–1568.

[3] Liability in Transmitting Telegrams, 61 I.C.C. 541.

set aside by the Commission as unjust or unreasonable. The Commission also had no jurisdiction over through rates, joint rates, and divisions of joint rates of communication companies or over physical connections between them or of their security issues.

Only relatively few formal complaints concerning the rates and practices of communication companies were brought before the Interstate Commerce Commission during the 24 years that they were under its jurisdiction. That Commission dealt with telegraph rates in some eight, with cable rates in two, and with telephone rates in four cases. In five of the cases in which telegraph rates were complained of,[1] the rates or practices were held not to be unreasonable or unjustly discriminatory. Particular rates were held to be reasonable, including full commercial rates and press rates, and it was held that the rates and charges of a telegraph company were binding upon it and upon all others when such rates and charges had been lawfully fixed and offered to the public and that they might not be departed from until lawfully changed. A sixth case involved unfair methods of competition between the major telegraph companies.[2] It was found that the practice of the Western Union in refusing to extend credit to the Postal Telegraph Company for tolls on messages transferred by the latter to the former company, while granting credit generally for tolls on messages tendered to the Western Union by the same senders and others, was unjust and unreasonable. The Commission held that the denial of credit in this case was not due to a belief on the part of the Western Union that either the Postal or the senders were irresponsible but solely to make it inexpedient for the Postal to accept such messages and thus to hamper its activities as a competitor.

The two most important telegraph cases concerned rates for private-wire contracts and limitations upon the liability of telegraph companies in transmitting telegrams. In the first of these cases, the Commission had under investigation the

[1] *White v. Western Union Tel. Co.*, 33 I.C.C. 500 (1915); *Unrepeated Message Case*, 44 I.C.C. 670 (1917); *Whitaker v. Western Union Tel. Co.*, 59 I.C.C. 286 (1920); *Consolidated Press Assoc. v. Western Union Tel. Co.*, 85 I.C.C. 15 (1923); and *Davis v. Western Union Tel. Co.*, 88 I.C.C. 489 (1924).

[2] *Postal Telegraph Cable Co. v. Western Union Tel. Co.*, 59 I.C.C. 512 (1920).

private-wire services furnished by the telegraph companies and by the American Telephone and Telegraph Company, as well as the talking service of the latter company. It considered both the reasonableness of the classifications and the reasonableness of the rates charged for such services. As to the classifications, the Commission held that private-wire service, stripped of certain abuses, such as the restoration of private wires after interruption before the needs of the general public were adequately cared for and the sending of messages over private wires by others than the lessees or concerning other than the lessee's affairs, could properly be placed among "such other classes as are just and reasonable," which the law permitted the telegraph companies to establish. Private-wire talking service it held to be not a just and reasonable classification. The Commission found the charges for private-wire service unreasonably low as compared to other charges and that the companies were "furnishing the more valuable service at a relatively lower charge contrary to recognized principles of classification."[1] At the time when the decision was rendered, however, the telegraph companies were under Federal control, and no order was entered, as it was felt that it would then serve no useful purpose.

The case involving the limitations on liability in transmitting telegrams was an investigation on the Commission's own motion of the practices of telegraph companies in adjusting claims for damages arising from errors or delays in the transmission or delivery, or from nondelivery, of interstate messages and the reasonableness of their rules limiting liability on the several classes of messages dependent upon the rates paid. The practice of the telegraph companies was to offer senders the choice of three classes of messages—unrepeated, repeated, and valued—with different rates for each class, dependent upon the service to be performed and the liability to be assumed. Liability on an unrepeated message, for which the lowest rate was charged, was limited to the amount received for sending it; and on a repeated message, for which a charge of one and one-half times the rate for the same message if unrepeated was made, fifty times the rate paid, with a maximum of $50 in the case of the Western Union. The valued message was designed to insure the sender against any loss within the value placed upon the message,

[1] Private Wire Contracts, 50 I.C.C. 731 (1917).

and the rate charged was the repeated rate plus a surcharge of one-tenth of 1 per cent of the valuation.

The Supreme Court of the United States had recognized the validity of such contracts between the senders of messages and the telegraph companies on the grounds that a contract of this nature was not an effort on the part of the company to exempt itself wholly from liability for its negligence but was a proper and lawful mode of securing a due proportion between the amount for which the company might be responsible and the toll received.[1] The matter came before the Interstate Commerce Commission because of certain irregularities in practice which resulted in unjust discrimination. For example, it was the practice of the Western Union, in order to secure and retain good will and to encourage greater use of its facilities, to adjust as promptly as possible meritorious claims presented to it, regardless of the class of message and of a previous admonition of the Commission[2] that its rules, as part of the rates, must be as strictly observed as the rates themselves. Senders of repeated and unrepeated messages were treated alike, and the contractual limitations on liability were resorted to only when in the company's opinion the claim was without foundation, could not be settled for less than the cost of litigation, or was unusually large. The justification given by the Western Union for the departure from the enforcement of its rules was that the courts of many states did not recognize the validity of the partial exemptions from liability, and it was necessary in such jurisdictions in order to avoid the expense of litigation to settle claims by agreement between the parties.

The Commission held that the practice of the Western Union in not applying its rules strictly was contrary both to the spirit and to the terms of the Interstate Commerce Act, since it resulted in unjust discriminations between customers and unfair competition with the Postal Telegraph Company. The latter company refused to pay claims in excess of the amounts contemplated in the contract of transmission, and as a result the more liberal policy of the Western Union, when known, tended to induce patrons of the Postal to withdraw or curtail their business with that company and to transfer it to the Western Union.

[1] *Primrose v. Western Union Tel. Co.*, 154 U. S. 1 (1894).

[2] *Unrepeated Message Case*, 44 I.C.C. 670 (1917).

The Commission also considered the amount of the liability assumed by the telegraph companies, which had remained substantially unchanged since first established, to be inadequate in view of the improvements in accuracy of transmission, which had come in part from the use of automatic sending and receiving instruments. Records prepared by the Postal Company showed a ratio of errors in transmission to the number of messages handled as 1 to 25,000 or 30,000. The Commission fixed the maximum liability upon unrepeated and repeated messages at $500 and $5,000, respectively, and required that provision should be made for the transmission of valued messages under a liability limited to the value stated in writing by the sender upon payment of the repeated rate plus one-tenth of 1 per cent of the stated value in excess of $5,000.[1]

The first case in which cable rates were involved concerned the standard rates of the Western Union Company from New York to San Francisco and from New York to points in England, which the Commission held not to be unreasonable or unjustly discriminatory.[2] In the second case, in which a complaint of unfair methods of competition was brought against the Western Union by the Commercial Cable Company, the question of the jurisdiction of the Commission over cable rates was raised. The complaint brought by the Commercial Cable Company was that the Western Union Company charged it for transmitting deferred cable messages between New York and interior points in the United States the full local rates applicable to the transmission of regular cablegrams, whereas the Western Union performed the service for other cable companies, competitors of the Commercial Cable Company, at one-half the local rates for regular cablegrams. The Commercial Cable Company alleged that these charges were unreasonable, unjustly discriminatory and unduly prejudicial and appealed to the Commission for reparation. The complaint arose largely out of the situation created by competition between the Commercial Cable Company and the Central and South American Company for traffic originated in South America and destined to interior points in the United States. The Central and South American Company had its own cable

[1] Limitations of Liability in Transmitting Telegrams, 61 I.C.C. 541 (1921).

[2] *White v. Western Union Tel. Co.*, 33 I.C.C. 500 (1915).

system to South America, but it was solely a cable company, and it interchanged messages with the Western Union in New York, the latter charging the former for the transmission of deferred messages within this country one-half its regular rates. The Commercial Cable Company had no cables to South America, but it connected at London with the Western Telegraph Company (British) where messages were turned over to it for transmission to the United States. The Commercial Cable Company was associated with the Postal Telegraph system, and it turned over to the Postal system messages destined to interior points in the United States, except that it transferred to the Western Union at New York messages destined to interior points served only by the latter company.

The Western Union contended that the rates on messages from points in foreign countries to points in the United States were through rates and that the Commission had no jurisdiction over such through rates. The Commission held, however, that they were "combination" rates, not through rates, and that it had jurisdiction over the charge for the transmission within the United States. It declared that the refusal of the Western Union to transmit upon the same terms for the Commercial Cable Company as for its competitor was to subject the former to unjust discrimination and ordered the discrimination removed. Regarding its jurisdiction over the domestic part of the cable rate, the Commission made the following pertinent statement:[1]

> Apparently the rates on messages from points in foreign countries to points in the United States are not "joint through rates" such as those published by a railroad which holds the concurrences of its connections. The through rates, however, are made by adding together the rates or half rates of the several telegraph and cable companies which participate in the transmission, and thus the complete charge for the through service can readily be ascertained and quoted to the sender at point of origin. As previously stated, the through charge on a deferred message from an interior point in France to an interior point in this country would consist of three component parts, the French Government receiving one-half its local rate to Havre, the cable company receiving half its regular cable rate, and the land line in the United States receiving half its rate on regular cable messages. It is clear, therefore, that the through rate is a "combination" rate, one component part of which is the charge made

[1] *Ibid.*, pp. 38, 39.

by the land line for transmitting the message from New York to destination.

It may be observed that the transmission of a through message is not a continuous service. The message must be transferred from a land line to a cable line on the European shore and again transferred from the cable line to a land line at New York; and the defendant concedes that "so far as defendant is concerned," the messages may be regarded as originating in New York. Looking at the matter from this point of view, it is clear that we have authority under the act to require the defendant, in imposing charges for its service within this country, to avoid unjust discrimination, not only as between persons, but as between carriers.

In the cases involving the rates and practices of telephone companies which were decided by the Interstate Commerce Commission, the reasonableness of particular rates, discrimination, and the extent of the Commission's jurisdiction were at issue. The Commission found that as between subscribers to a telephone service who are similarly situated, nothing but a difference in the service rendered or facilities furnished can justify a difference in the charges exacted; that telephone calls may be classified and different rates charged for different classes of service; that a through rate for one kind of service may reasonably exceed an aggregate of intermediate rates for a different kind of service, owing to the use of different facilities; and that telephone subscribers may reasonably be required to make a cash deposit to secure the payment of bills. In one investigation on the Commission's own motion, because of protests by new subscribers that they were discriminated against as compared with old subscribers of a telephone company, it was found that the controversy related to intrastate service and hence was without the Commission's jurisdiction.[1] Several other complaints against telephone rates were filed but were dismissed for lack of prosecution or lack of jurisdiction by the Commission. In addition, a few informal complaints were adjusted satisfactorily by the Bureau of Informal Complaints. Certain complaints regarding the divisions of joint rates and physical connection between the toll lines of telephone companies were filed, but the Commission

[1] *Shoemaker v. C. & P. Tel. Co.*, 20 I.C.C. 614 (1911); *Malone v. N.Y. Tel. Co.*, 40 I.C.C. 185 (1916); *Huntington Engineering Co. v. C. & P. Tel. Co.*, 112 I.C.C. 377 (1926).

held that joint communication rates and their divisions were not within its jurisdiction, and it lacked authority over physical connections between communication companies. In no case did the Commission deal comprehensively with telephone, telegraph, or cable rates.

The general effect of the Interstate Commerce Act, as amended by the Mann-Elkins Act of 1910 and the Transportation Act of 1920, was to subject radio companies to the same regulation by the Interstate Commerce Commission as the wire communication companies, and its jurisdiction was not disturbed by the passage of the Radio Act of 1927. The principal radiotelegraph companies filed tariffs with the Commission, but this Commission was never called upon to entertain any proceedings regarding the rates and practices of these companies. In one case, complaint against the rates, charges, rules, regulations, and practices of a broadcasting company as unreasonable and unjustly discriminatory and in violation of Sec. 1 and 3 of the Interstate Commerce Act was filed, but the Commission dismissed the complaint for want of jurisdiction. The complainant was the Sta-Shine Products Company, and complaint was brought against Station WGBB, of Freeport, N. Y., and against the National Broadcasting Company. It was contended that the provisions of the Interstate Commerce Act, together with Sec. 14 of the Radio Act of 1927, gave the Interstate Commerce Commission authority to regulate and prescribe reasonable and lawful rates, charges, rules, regulations, and practices in respect to radio broadcasting. The section of the Radio Act referred to read, in part, as follows:

> Any station license shall be revocable by the [Radio] Commission whenever the Interstate Commerce Commission, or any other Federal body in the exercise of authority conferred upon it by law, shall find and shall certify to the [Radio] Commission that any licensee bound so to do has failed to provide reasonable facilities for the transmission of radio communications, or that any licensee has made any unjust and unreasonable charge, or has been guilty of any discrimination, either as to charge or as to service, or has made or prescribed any unjust and unreasonable classification, regulation, or practice with respect to the transmission of radio communications or service. . . .

The majority of the Commission held that while the provisions of the Interstate Commerce Act were undoubtedly applicable to the transmission of wireless messages by persons or concerns

engaged in the transmission of such messages as common carriers for hire, companies engaged in radio broadcasting were not specifically named in the Act. In fact, the Commission said, radio broadcasting, as now perfected, was not known when the Transportation Act of 1920 was passed; and while the method used in broadcasting is technically radiotelephony, a broadcasting company falls short of performing the service of a telephone company operating by wireless. A broadcasting company does not provide telephone facilities or service for the public, nor does it provide the services that telephone companies perform. It merely sells "time" to the public. The program is put on the air, and the broadcaster has fulfilled his contract, no service at the receiving end being performed by him. The Commission was of the opinion that since the present method of radio broadcasting was unknown in 1920, when the Interstate Commerce Act was amended to include the transmission of intelligence by wireless operation, it was not included among the common carriers over which it had jurisdiction. The differences between broadcasting and common-carrier communication services, which in the opinion of the Commission caused broadcasting to lie beyond its jurisdiction, were described in the following manner:

> In any "transmission" heretofore considered, and in any probably existing at the time of the passage of the radio act of 1927, there seems to be implied the idea of a definite sender and a definite receiver. Going, for analogy, to the transmission of intelligence by wire, we doubt if it would be insisted, or if it could be successfully insisted, that the mere clicking off of a message from one or more central stations would constitute a transmission of intelligence, and this is not based simply on the fact that such transmission is ordinarily in Morse code. There is the further element involved that the respective messages are to be delivered to the contemplated receivers of the messages. The boy in the blue uniform who rings the doorbell and who brings the message itself or his counterpart or substitute, the telephone or mail, has a part in the transmission. Unless one has a radio receiving set properly attuned, he will never get and is not expected to get the intelligence, whether it be instruction, entertainment, or advertising, sent out from the broadcasting station.[1]

Regulation of Telephone Consolidation.—In 1920, by amendment to the Interstate Commerce Act, the jurisdiction of the

[1] *Sta-Shine Products Co. v. Station WGBB*, 188 I.C.C. 271, 277, 278.

Interstate Commerce Commission over telephone companies was extended to consolidations and acquisitions of control. This amendment was enacted to permit consolidations in the telephone industry necessary for effective and economic organization, the legality of which might otherwise be questioned. Congress provided that if a telephone company engaged in interstate communication should desire to consolidate with or to acquire control of another, the matter was to be submitted to the Interstate Commerce Commission, which might issue a certificate of public convenience approving such consolidation or acquisition of control if it were convinced that the public interest would be served. The effect of this amendment was that once the Commission had approved a proposed consolidation and had issued a certificate to that effect, any act or acts of Congress which otherwise might make it unlawful would not apply.

While the regulation of telephone consolidation by the Interstate Commerce Commission was concerned mostly with the elimination of wasteful competition due to uneconomic duplication, on certain occasions other considerations of public interest were paramount. To illustrate: In 1928, the Illinois Commercial Telephone Company, the Illinois Southern Telephone Company, the Commercial Telephone Company, the Boone County Rural Telephone Company, and the Belvidere Telephone Company filed a joint application with the Interstate Commerce Commission for authority on the part of the Illinois Commercial Company to acquire the properties of the other applicants. The Illinois Commerce Commission had already entered an order authorizing the proposed consolidation, but the Interstate Commerce Commission was unable to find that it would be in the public interest and denied the application. The latter commission stated that the plan of financing proposed would increase greatly the securities outstanding in the hands of the public, apparently without the addition of any property. In spite of this adverse decision, however, the consolidation was effected under the approval of the Illinois Commerce Commission.[1] In all, 285 applications for authority to consolidate were filed with the Interstate Commerce Commission, of which 284 cases were decided, and 1 was withdrawn. There had been a steady

[1] Acquisition of Ill. Southern Tel. Co., 145 I.C.C. 43.

decrease in the number of applications filed in recent years, only six having been filed in 1933.

The amendment specifically stated that nothing contained in it was to be construed as in anywise limiting or restricting the powers of the several states to control and regulate telephone companies. Many of the state commissions have had, and have exercised, jurisdiction over the consolidation of telephone companies, and, as in the case of Federal control, state-commission control of consolidation was designed primarily to prevent the wasteful duplication of facilities which accompanies competition among telephone companies. In many consolidations, however, the purposes have been to increase the efficiency of the service in small communities, especially intercommunity service. In some cases, permission to consolidate has been refused where it was not clear that definite economies would be realized, and where the motive for consolidation seemed to be chiefly speculative. A knotty problem in consolidation concerns the value of the properties to be consolidated and the capitalization of the consolidated company. Where commissions have jurisdiction over the security issues of public utility companies, their powers usually extend to the amounts that may be issued by consolidated companies, but this does not give a commission control over the price that one party may pay for the property of another. Generally, it has been held that commissions have no jurisdiction over the sale price of public utility properties, their powers extending merely to valuation for rate-making purposes.

Cable-landing Licenses.—Licenses to land and operate submarine cables in the United States are now granted by the President, pursuant to the authority conferred upon him by the Submarine Cable Act, enacted May 27, 1921. No person may "land or operate in the United States any submarine cable directly or indirectly connecting the United States with any foreign country or connecting one portion of the United States with any other portion thereof" without a license. However, the Submarine Cable Act does not apply to cables "all of which, including both terminals, lie wholly within the continental United States." The principal clause of this Act, Sec. 2, reads as follows:

> The President may withhold or revoke such license when he shall be satisfied after due notice and hearing that such action will assist in

securing rights for the landing or operation of cables in foreign countries, or in maintaining the rights or interests of the United States or of its citizens in foreign countries, or will promote the security of the United States, or may grant such license upon such terms as shall be necessary to assure just and reasonable rates and service in the operation and use of cables so licensed: *Provided,* That the license shall not contain terms or conditions granting to the licensee exclusive rights of landing or of operation in the United States: *And provided further,* That nothing herein contained shall be construed to limit the power and jurisdiction [of the Federal Communications Commission] with respect to the transmission of messages.

This clause has an interesting and important history. Before the passage of the Submarine Cable Act, the various presidents of the United States had exercised the right to grant or refuse landing licenses for cables to connect the shores of the United States with those of foreign countries as the result of a precedent established by President Grant. The power thus assumed was never passed upon by the court of last resort, although it had been supported by various opinions of attorneys general, including those of Acting Attorney General Richards, in 1898, and Attorneys General Griggs, in 1899, Wickersham, in 1912, and McReynolds, in 1913.[1] On several occasions, however, this authority had been questioned. During President Cleveland's second administration, Secretary of State Gresbam and, later, Secretary Olney held that there was no inherent power in the Executive to regulate landing licenses, and they refused to exercise any powers in relation to submarine cables.[2] Also, at the time when hearings were being held on the bill to grant to the President necessary powers to control cable-landing licenses, the Western Union was fighting in the courts an executive ruling forbidding it to land a cable at Miami, Fla., to run to the Barbados. In addition to the cables landed under Executive permission, certain cables have been landed from time to time under direct authorization from Congress, while others have been landed without special authorization. Prior to 1921, Congress enacted nine laws having to do directly with cable

[1] Statement of Hon. Norman H. Davis, Hearings on S. 4301, 66th Cong., 3d Sess., p. 6.

[2] Statement of Newcomb Carlton, Hearings on S. 535, 67th Cong., 1st Sess., p. 37.

permits. The conditions under which legislative permits were granted did not differ materially from those stipulated by the chief executives.

The precedent established by President Grant, which was followed almost without exception by succeeding presidents until Congress definitely placed under the Executive the control of cable-landing licenses, arose out of an event which took place in 1869. In that year, a French cable company, which held an exclusive concession from the French Government for a long term of years for telegraphic communication by submarine cable between France and the United States, sought to lay a cable from France to Duxbury, Mass. President Grant, realizing that if this company were permitted to land, American companies would be barred from establishing cable communication with France during the life of the concession, resisted the landing of the proposed cable until the monopoly feature of the concession should be abandoned. In his annual message to Congress, December, 1875, President Grant referred to this incident and laid down certain conditions which, he said, in the absence of legislation, ought to be met before a license to land should be issued.[1] The principles he enunciated, with some later modifications, provided the framework under which cable-landing licenses were granted prior to 1921 and are embodied in the Submarine Cable Act. These principles were summarized, in 1898, by Acting Attorney General Richards, as follows:

1. The President, in exercising control over the relations of the United States with foreign powers, has the duty of seeing that in the exchange of comities among nations the United States gets as much as it gives. He, therefore, must not permit a cable to land upon our shores under a concession from a foreign power which does not permit our cables to land on its shores and enjoy there facilities equal to those accorded its cable here.

2. A submarine cable is of inestimable service to the government in communicating with its officers in the diplomatic and consular services and with the army and navy when abroad. The President, therefore, should demand that precedence in the use of the line be given to government communications, those of the United States equally with those of foreign governments.

[1] Extract from the President's annual message, December, 1875, Hearings on S. 6, 71st Cong., 1st Sess., Part 8, p. 355.

3. Treating a cable simply as an instrument of commerce, it is the duty of the President, in the absence of legislation by Congress, to impose such restrictions as will forbid unjust discriminations, prevent monopolies, promote competition, and secure reasonable rates.[1]

Executive authorizations of landing permits were made contingent upon the fulfillment of conditions laid down under the general principles above enunciated. Chief among such conditions has been that concerning monopoly concessions. The main purpose of this provision has been to prevent foreign companies from developing cable communication between the United States and some country with which American companies would be unable to connect owing to the possession of exclusive cable concessions by such companies. Two motives have been apparent: (1) to place American cable companies on a par with foreign companies, at least in so far as communication between the United States and the rest of the world is concerned; and (2) to foster the development of an American cable system which could be used in the diplomatic and consular services of the United States, free from foreign interference or supervision, especially in times of war or other emergency.

The practice of the different presidents in applying the antimonopoly condition was not uniform, however. It was applied more widely to foreign than to American companies. No American company was granted an exclusive concession to land cables on the shores or on any particular section of the shores of the United States; but American companies holding exclusive concessions from foreign governments were permitted to land their cables here. For example, the Central and South American Telegraph Company was issued landing permits, although it held for a long time exclusive, or preferential, concessions from many Central and South American governments.

In 1889, the antimonopoly provision was extended by Secretary of State Blaine, to include a prohibition against companies which *connected with* other companies holding exclusive concessions inimical to American interests, under the following conditions:[2]

[1] Hearings on S. 4301, 66th Cong., 3d Sess., pp. 241–242. This statement of principles was later approved by Attorneys General Griggs, Wickersham, and McReynolds.

[2] Letter to the Attorney General by W. R. Day, Department of State, May 24, 1898, Hearings on S. 6, 71st Cong., 1st Sess., Part 8, pp. 375–376.

In 1889, the Compagnie Française des Cables Télégraphiques, commonly called the French Company, applied for permission to land at Charleston, in South Carolina, a cable to connect the shores of the United States with those of Santo Domingo. The Central and South American Telegraph Company, an American organization and an ally of the Western Union, protested against the granting of this permission, on the ground that the cable from Santo Domingo to the United States was merely a link in a line of the French Company intended to connect the United States with Brazil. The French Company then held . . . from Brazil and certain other South American governments the concession of an exclusive right to land cables within their jurisdiction. The French Company therefore would not have been allowed under the old conditions to land in the United States a cable directly from Brazil.

Mr. Blaine, who was then Secretary of State, entertained the protest of the Central and South American Telegraph Company; and in order to prevent, as he maintained, the French Company from doing indirectly what it could not do directly altered the first of the standing conditions so as to exclude from the privilege of landing a cable in the United States any company which "connected" with another company having from a foreign government an exclusive privilege which would prevent the establishment and operation of the cable of an American company in the jurisdiction of such foreign government.

The French Company refused to give up its monopolies in South America, and subsequently the United States and Haiti Telegraph and Cable Company was formed for the purpose of connecting Santo Domingo with the United States at Coney Island. The State Department objected to the landing of this cable, but with the acceptance of antimonopolistic conditions a permit was granted.

The provision regarding companies that connected with other companies holding objectionable monopolistic concessions was enforced no more uniformly than the other. The Commercial Pacific Cable Company was permitted to land its cable on the Pacific Coast, although this company connected with British and Danish companies holding exclusive concessions in the Far East. On the other hand, a permit to land a cable at Miami, Fla., was for a time withheld from the Western Union Company because the proposed cable was to connect at the Barbados with a cable laid by the Western Telegraph Company, a British concern, which held an important monopolistic concession in Brazil, even though at the same time, as the Western Union Company

pointed out, the Commercial Cable Company was in connection with the same British company for the handling of North America-South America traffic at the Azores.

The apparent inconsistencies in executive policy may be best explained by recognizing such rules as it laid down to be not iron-clad ones but guiding principles to be interpreted and applied in each case in full recognition of the necessities of the case, with the interests of American communication companies at heart. The antimonopoly provision was regarded as a trading provision, to be utilized in obtaining for American companies reciprocal privileges in foreign countries. Cable communication with South American countries was developed largely under monopoly concessions. English and French companies, in exchange for the establishment of telegraphic communication between those countries and the rest of the world, in order to obtain reasonable security for their investments, demanded and received from such governments the right to develop such communications without competition. When American cable interests attempted to enter the South American field, they found most of the lucrative portions of it already under monopoly control. They, in turn, received exclusive concessions, and such concessions unquestionably were regarded by the Executive Department as necessary competitive equipment to ensure the efficiency and permanency of cable communication between the Americas by American companies. Later, when the matter of the connection between the Western Union Company and the Western Telegraph Company came up, it was viewed from the standpoint of the effect upon other American companies. This connection would provide the most direct route between North and South America and, in view of the monopoly concession held by the British Company, by which it controlled the bulk of Brazilian traffic, would place the Central and South American Company in an unfavorable competitive position. Permission to land the cable was withheld until the President was reasonably sure that no American company would be handicapped seriously by the connection.

In the Pacific, the enforcement of the principle that no cable should land on the shores of the United States owned by a company that connected with another company having monopolistic concessions would have deprived the United States of a direct

route to the Far East. As has been seen, British and Danish companies early had received monopolistic concessions from China and Japan, which left so limited a field for development by American companies that no group of businessmen, however sanguine, could have afforded to undertake the expense of laying a cable across the unproductive stretches of the Pacific with such prospects. The success of this cable was dependent upon the ability of its promoters to get into the territory already controlled by foreign interests through concessions over which the government of the United States had no control whatsoever. Faced with the alternative of going without the cable or making a virtue of necessity, the Executive Department chose the latter course, although on the face of the matter this action was contrary to the announced policy concerning monopolistic concessions. The joker in this case, however, was that the American interests in order to effect entry into the Far East were compelled to cede 75 per cent of the ownership to British and Danish interests.

The wisdom of the policy of not permitting to land and operate cables in the United States companies that held monopoly concessions or connected with those having concessions that would operate to the disadvantage of American companies was amply demonstrated during the years of active cable laying. It obtained for American companies rights and privileges which otherwise they would not have been able to obtain. In carrying out the mandate of the Submarine Cable Act since its passage, the practice has been adopted of incorporating into licenses conditions similar to those adopted by the Presidents prior to its passage, forbidding an applicant for a license to land a cable if he then possessed exclusive rights in foreign countries by reason of which American cable companies would be denied the privilege of entry into such countries. Largely as a result of this policy, during the first 8 years after the passage of the Act, in six countries provisions contained in cable concessions granting rights in the nature of a monopoly were terminated, notably the monopolies of the Western Telegraph Company in Brazil, Uruguay, and the Argentine; and those of All America Cables in Colombia, Ecuador, and Peru. In three other cases, monopolistic concessions were not renewed upon their expiration, as in the case of the monopolies of the French Cable Company in Haiti, Santo Domingo, and Venezuela. In addition, applicants for landing licenses have been

forbidden to associate with any cable company that possessed exclusive rights by reason of which American cable companies would be barred from foreign territory, this also resulting in the cancellation of certain monopolistic concessions.[1]

The Executive Department likewise has placed in cable-landing licenses provisions concerning the classification of telegrams, the order of transmission, and rates. Some of these provisions are necessary because the United States Government is not signatory to the international telegraph regulations, and American cable companies are not bound thereby. The licenses provide that classes of telegrams shall have precedence in the following order: government telegrams, service telegrams, and ordinary telegrams. Within each class, telegrams shall be transmitted in the order in which they are received.

It is provided that the government of the United States shall be granted the same or similar privileges as regards government messages as are accorded to any other government, and government telegrams are so defined. The rate on government messages is limited to one-half the rate charged for ordinary messages. With respect to ordinary telegrams, which are those offered by the general public, it is provided that licensees shall transmit such telegrams without favor or precedence as regards rates, order of transmission, or otherwise, although they may establish such subclassifications thereof at special rates and such order or precedence between subclassifications as are just and reasonable. As to rates, the license in each case provides that they shall be just and reasonable and that the licensee "shall not lease, transfer, assign, or sell the cable or consolidate, amalgamate, or combine with any other party or parties" or "enter into any agreement with any other cable or communications company or any foreign government either for regulating rates or for any other purpose" without the consent of the Department of State.

Other provisions concern the construction, laying, and maintenance of cables and the powers of the Chief Executive in times of war or other emergency. Such are the following:

1. The cable and appliances used shall be modern, manufactured in accordance with the latest approved methods, and located in the

[1] Statement of W. R. Vallance, asst. solicitor, Dept. of State, Hearings on S. 6, 71st Cong., 1st Sess., Part 8, p. 336.

territorial waters of the United States in conformity with plans approved by the Secretary of War.

2. Ample repair service shall be maintained.

3. The government of the United States has the right to assume full or partial control of the cable in time of war or during civil disturbance or when war or civil disturbance is threatened.

4. No right shall accrue to the licensee under the terms of the license which may not be rescinded, changed, modified, or amended by the President or the Congress of the United States.

5. The licensee shall at all times comply with any requirements of the President as regards the location and concealment of the cable buildings and apparatus with a view to protecting and safeguarding the cable from injury or destruction by enemies of the United States.

Certain of the conditions included in cable-landing licenses would seem to conflict with the jurisdiction over the rates and practices of cable companies formerly possessed by the Interstate Commerce and now transferred to the Federal Communications Commission. However, the Submarine Cable Act, as now amended by the Communications Act of 1934, contains a clause that provides that nothing in the Act "shall be construed to limit the power and jurisdiction of the Federal Communications Commission with respect to the transmission of messages." This retains in the hands of the Communications Commission jurisdiction over the rates and practices of cable companies, just as it had been formerly with the Interstate Commerce Commission, although the Executive Department retains the right to grant or refuse landing licenses for submarine cables. As has been shown, there has been little regulation of the rates and practices of cable companies, either by the Interstate Commerce Commission or by the Executive Department.

This brief analysis of Federal regulation of communications before 1934 shows that although the regulation of the interstate and foreign rates and service of the companies was vested in the Interstate Commerce Commission, the powers of this Commission over rates and service were lacking in certain important respects, and its activities with respect to communications were confined mostly to routine matters. Relatively few complaints came before it, and probably because of this condition, as well as the fact that it was fully occupied with railroad problems, it set up no separate organization to deal with communications.

The Interstate Commerce Commission did not at any time deal comprehensively with telephone, telegraph, or cable rates, nor did it deal formally with the rates and practices of radiotelegraph companies. With respect to radio broadcasting, it held that its jurisdiction did not extend to the rates and service of broadcasting companies. Regulation of radio communication, which has been concerned almost altogether with interference, technical, and service problems, was first undertaken by the Department of Commerce and later became the work of the Federal Radio Commission which was created by the Radio Act of 1927. An analysis of Federal regulation of radio communication is presented in succeeding chapters. There is little doubt that communication problems, whether because of inadequate powers or because of the pressure of other duties and the lack of adequate personnel of the Interstate Commerce Commission, have not received the attention of public authorities which they have merited. The need has long existed for a Federal body with adequate powers to regulate the rates and practices of communication companies and to which all Federal jurisdiction over communications would be transferred so as to enable it to deal directly with all agencies and aspects of communication. The Federal Communications Commission was established to meet this need.

CHAPTER X

FEDERAL REGULATION OF RADIO COMMUNICATION—BROADCASTING

THE ACT OF 1912

The first Federal statute relating to radio communication was the Wireless Ship Act of June 24, 1910. This act forbade any "ocean-going steamer" carrying or licensed to carry 50 or more persons to leave any port of the United States unless equipped with efficient apparatus for radio communication, in charge of a skilled person, and capable of communication over a distance of at least 100 miles. The Secretary of Commerce and Labor, who had the duty of administering the marine-navigation laws, was directed to make the regulations necessary to the proper execution of the Act, and thus regulation originally was delegated to the Department of Commerce. This Act was amended July 23, 1912, to include all vessels navigating the ocean or Great Lakes, carrying or licensed to carry 50 or more persons, including passengers or crew or both. Auxiliary power supply, independent of the vessel's main electric power plant, and two operators and a constant watch were also required, although it was specified that in the case of cargo vessels a competent member of the crew might act as operator. The provisions of the latter Act were in harmony with the regulations adopted by the Radiotelegraph Conference, held in London, in 1912. The Ship Act of 1910, as amended, still remains in force.[1]

The first law regulating radio communication other than to protect life and property at sea was enacted by Congress, Aug. 13, 1912. This legislation grew out of widespread recognition of the increasing importance of radio and the need of the United States to carry out its obligations under the Berlin Convention to which it was signatory. The Act defined radio communication in such a manner as to include both radiotelegraphy and radiotelephony, but it dealt almost exclusively with radiotelegraphy and mostly with marine radio communication. This is not surprising, since

[1] The International Convention on Safety of Life at Sea, London, 1929, which was ratified by the United States in June, 1936, supplements, and in some cases supersedes the Ship Act. See Appendix C.

the principal developments in radio had been in the marine field —radiotelephony being undeveloped, and broadcasting practically unknown. Overland radio communication had been the subject of desultory experimentation, and the practicability of transoceanic communication on a commercial basis remained to be demonstrated. There were in existence three main types of stations: United States Government stations, ship and shore stations engaged in commercial communication, and amateur stations. The government stations were exempted from the operation of the law, and the amateurs were crowded out of the bands of frequencies then considered desirable for commercial purposes into the high frequencies by a requirement in the law that no amateur should use a wave length exceeding 200 m.

The Act of 1912 provided that there should be no operation without a license granted by the Secretary of Commerce and Labor and that all radio apparatus should at all times when in use and operation be in charge, or under the supervision, of a person or persons licensed for that purpose by the Secretary, the latter provision, according to Judge Stephen Davis,[1] introducing a new principle into the regulation of interstate commerce. In so far as the provisions regarding operators' licenses applied to ship stations, they were in harmony with the requirements of the London Convention, but their application to other stations represented a distinct departure from the practice of the time in the regulation of other agencies of interstate commerce.

The Act also contained a number of regulations designed to prevent or minimize interference between stations. It stated that certain frequencies could be set aside for governmental use and included many detailed regulations concerning the character of the wave emissions, the transmission and reception of distress signals, intercommunication between ships and between ship and shore stations, restrictions upon the operations of commercial stations in the vicinity of government stations, and the maintenance of secrecy of messages. Other provisions forbade the creation of willful interference and the transmission of false or fraudulent distress signals.

Regulation under the Act of 1912.—At first, the regulation of radio in the United States was largely perfunctory. No great

[1] DAVIS, S. B., "The Law of Radio Communication," McGraw-Hill Book Company, Inc., New York, 1927.

problems of interference arose, since the number of frequencies was ample for the stations then in existence. Regulation consisted merely of safeguarding established services from unlicensed operation, inspection of radio apparatus, and checking the emissions of radio stations to see that they conformed to required standards. In 1914, with the outbreak of the World War, the United States Government, faced with the problem of maintaining neutrality, felt the necessity of establishing a measure of control over the radio stations under its jurisdiction, especially the few capable of carrying on transoceanic communication. Accordingly, on Aug. 5, 1914, President Wilson, by executive order, proclaimed that all radio stations within the jurisdiction of the United States were prohibited from transmitting or receiving messages of an "unneutral nature" and from rendering to any of the belligerents an "unneutral service." This order was followed by one on Sept. 5, 1914, which declared that all high-powered stations capable of transatlantic communication would be taken over by the government and used or controlled by it during the continuance of hostilities. During the war, transatlantic radio communication was carried on by the government, as was transpacific for a time. The radio stations were returned to their owners by executive order Feb. 13, 1920.

Even before the outbreak of the World War, a situation arose which disclosed a defect in the Act of 1912 and foreshadowed the ultimate breakdown of the law. The Atlantic Communication Company applied for a license to operate a station at Sayville, Long Island. The applicant was organized under the laws of the state of New York, but the Secretary of Commerce had reason to believe that it was really controlled by German capital. Since Germany did not permit similar American-owned corporations to operate in that country, the Secretary objected to German ownership of an American station and submitted to Attorney General Wickersham the question whether, under the 1912 Act, he had authority to refuse the license on this ground. The Attorney General replied that he did not, the Act reposing in him no discretionary power in the matter of issuing licenses if the applicant came within the class to which licenses were authorized to be issued. This interpretation was later affirmed by the Court of Appeals of the District of Columbia, the Court holding that the Secretary had no right to withhold a license from

a qualified applicant even on the ground that it was using a type of apparatus that caused serious interference with other communications.[1]

Until 1921, the principal use made of radio was for marine and point-to-point communication; but in that year, the first broadcasting stations were established; and by 1923, the number had grown to several hundred. There had been no special provision of wave lengths for broadcasting, and so the Secretary of Commerce selected 833 kc. and, later, 750 kc. as suitable for broadcasting and licensed all such stations to operate upon one or the other of these frequencies. But with increase in the number of stations, the situation became so chaotic that the Secretary of Commerce called conferences of various radio interests in Washington, in Feb., 1922, and Mar., 1923, at which it was decided to assign separate channels to each station, although the 1912 Act neither made nor authorized any distribution of wave lengths among individual stations.

The plan suggested at the National Radio Conference of 1923 involved a principle fundamental to radio regulation. Without the authority to assign frequencies, divide time, limit power, etc., the Secretary of Commerce would have been helpless to prevent utter chaos in broadcasting. In Oct., 1924, at the Third National Radio Conference, in order to carry out the policy of assigning particular frequencies to stations, the radio spectrum was divided up, and bands of frequencies allotted to the various services. To broadcasting was assigned the band of frequencies from 550 to 1,500 kc.—96 channels in all, including the two end frequencies 550 and 1,500 kc., respectively, each channel separated by 10 kc. Of these, 6 were set aside for the exclusive use of Canada, thus leaving 90 channels for use within the United States.

The Secretary of Commerce followed the recommendations of the national conferences by assigning particular channels to stations within the band of frequencies allotted to the group to which each station belonged. Within the broadcasting band, however, many difficult problems arose. Since there were more stations than available channels, the Secretary attempted to accommodate them all by enforcing time divisions and by limiting the power of stations so that several could operate

[1] *Hoover v. Intercity Radio Co.*, 286 F. 1003.

simultaneously on the same channel. But the stations increased in number so rapidly that by the time of the calling of the Fourth National Radio Conference, in November, 1925, there were in the United States 578 broadcasting stations, 197 of which were using 500 watts or more power, and there were 175 applications for new stations. Every channel in the broadcasting band was occupied by at least one station, and many by several stations. The only way in which new stations could be accommodated, therefore, was by extending the broadcast band or by imposing further time divisions. To the widening of the broadcast band there were two main objections: (1) The broadcast band could be extended only by taking channels from other services; and (2) most receiving sets were capable of covering only the band of frequencies originally assigned to broadcasting. Objection to further time divisions came on the ground that it would result in inferior service to listeners. The Conference frowned upon either of these methods and appealed to Congress to remedy the situation through legislation, since, under the Act of 1912, the Secretary of Commerce could not deny a qualified applicant but must find room for him in the ether.

The situation which was recognized as grave in 1925 was still further aggravated by a court decision in the following year. The Court of Appeals of the District of Columbia, in the Intercity case,[1] had held that the Secretary of Commerce, although he could not deny a license to a qualified applicant, possessed the discretionary power to assign wave lengths, since the issuing of a license was not dependent upon the fixing of a wave length but merely a restriction entering into the license. It was this decision upon which the Secretary relied in assigning frequencies to stations that for a time saved radio broadcasting from chaos. However, many broadcasters were dissatisfied with the assignments that they received from the Secretary of Commerce, and early in 1926 a Chicago station (WJAZ), owned by the Zenith Radio Corporation, which had received an assignment of 2 hr. every Thursday evening on the same channel as a station in Denver, "jumped" to a Canadian exclusive channel and started operating full time without authority.

The Federal Government prosecuted the owner of the station under Sec. 1 of the Act of 1912, which forbade the operation of a

[1] *Ibid.*

radio station except under and in accordance with a license issued by the Secretary of Commerce. Judge Wilkerson decided the case in favor of the company, holding that prosecution was wrongfully brought under Sec. 1. The importance of this decision, however, lay in an intimation made by the court that if the Secretary of Commerce had power to impose restrictions as to frequency and hours of operation, the statute might have to be construed as unconstitutional for failure to provide a standard to control the Secretary's discretion. The popular interpretation of this decision was that the Secretary no longer possessed such discretionary powers. The decision was rendered on Apr. 16, 1926. Soon thereafter, the Secretary of Commerce referred the question as to the extent of his discretion under the Act of 1912 to the Department of Justice; and on July 8, 1926, Acting Attorney General Donovan rendered an opinion to the effect that the Secretary had no power to determine or restrict the frequency, power, or hours of operation of a radio station or even to limit the term of its license. The next day, the Secretary of Commerce issued a statement virtually abandoning regulatory control of radio communication. He urged, however, that broadcasting stations impose upon themselves the obligations that the law failed to impose in order that interference might be avoided in so far as possible.

The request of the Secretary of Commerce had little effect, however. During the period from July, 1926, to Feb. 23, 1927, when Congress enacted a new law to regulate radio communication, nearly 200 new broadcasting stations came into existence, bringing the total up to 733. The new stations selected whatever frequencies they chose and operated upon them with any desired power regardless of the interference that they happened to create for existing American or Canadian stations. Existing stations that were dissatisfied with their assignments jumped to other frequencies and increased power and hours of operation at will. The result was a chaos in broadcasting which has been properly termed the "breakdown of the law."

The need for new radio legislation was universally appreciated and especially because under existing laws there was no way by which established stations could be protected from piratical new stations. On Nov. 17, 1926, an opinion was rendered in the Circuit Court of Cook County, in a case in which an established

broadcasting station sought to restrain a station that had jumped to its frequency so as to cause interference, in which the court held that, as between two broadcasting stations, priority in time creates priority in right and decided in favor of the complainant. However, the court carefully qualified its statement by saying that when Congress should exercise its plenary power over radio communication, neither station would have any rights as against the power of the United States to regulate.[1]

Attention was called to the generally chaotic situation in radio broadcasting by President Coolidge, in his message to Congress, Dec. 7, 1926. In recommending radio legislation, the President said:

> Due to the decisions of the courts, the authority of the department under the law of 1912 has broken down; many more stations have been operating than can be accommodated within the limited number of wave lengths available; further are in course of construction; many stations have departed from the scheme of allocation set down by the department; and the whole service of this most important public function has drifted into such chaos as seems likely, if not remedied, to destroy its great value. I most urgently recommend that this legislation should be speedily enacted.

On Dec. 8, 1926, Congress passed a joint resolution limiting licenses to a 90-day period and stipulating that no license or renewal be granted unless the applicant should execute in writing "a waiver of any right or of any claim to any right, as against the United States, to any wave length or to the use of the ether in radio transmission because of previous license to use the same or because of the use thereof."[2]

This was merely an emergency act, however; and on Feb. 23, 1927, Congress enacted the law that, with its amendments, constituted the statutory basis for the regulation of radio communication within the United States until the passage of the Communications Act of 1934.

PROVISIONS OF THE RADIO ACT OF 1927 AND ITS AMENDMENTS RELATING TO BROADCASTING

The Radio Act of 1927, in the first place, repealed a number of existing statutes and resolutions governing radio communication.

[1] *The Tribune Co. v. Oak Leaves Broadcasting Station*, recorded in *Congressional Rec.*, vol. 68, Part 1, pp. 216–219.

[2] 44 Stat. 917.

These included the Act of 1912; a joint resolution of June 5, 1920, authorizing the operation of government-owned radio stations for the general public, as amended in 1922 and in 1925; and the joint resolution of Dec. 8, 1926. The provisions of the law were broad and sweeping in scope; they established machinery for the regulation of radio in as drastic a fashion as any ever imposed upon American industry. Drastic action was necessary, however. Nothing short of it could have saved radio communication, especially broadcasting, from chaos, the broadcasting industry having demonstrated its utter incapacity to regulate itself.

General Purposes.—The Act of 1927 was designed to regulate all forms of interstate and foreign radio transmissions and communications within the United States, its territories, and possessions, except the Philippine Islands or the Canal Zone; to maintain control by the United States over all the channels for interstate or foreign radio transmission; and to provide for the use, but not the ownership, of such channels by private individuals, firms, or corporations. "Radio communication" was defined to mean "any intelligence, message, signal, power, pictures, or communication of any nature transferred by electrical energy from one point to another without the aid of any wire connecting the points from and at which the electrical energy is sent or received and any system by means of which such transfer of energy is effected." Radio communication wholly within a state was exempted from the operation of the law, except where the effects of such communication should extend beyond the borders of that state, in which case it was made subject to the law. The effect of the latter provision was to place all radio transmission under Federal control, since even though the effective range of a radio station might not extend beyond the limits of a state, its interference range would in all probability do so, and a transmitting station might interfere with incoming signals from another state.

The Licensing Authority.—Congress placed the administration of the law in the hands of a commission, known as the Federal Radio Commission, to be composed of five members, appointed by the President, by and with the consent of the Senate. The President was limited in his choice of commissioners by the following restrictions: (1) Each commissioner must be a citizen of the United States; (2) the commissioners must be appointed one from each of five zones into which the United States was

divided for the purposes of the Act, it being required that each commissioner be an actual resident of a state in the zone for which appointed at the time of appointment; (3) not more than three commissioners should be members of the same political party; and (4) no member of the commission should be financially interested in the manufacture or sale of radio apparatus or in the transmission or operation of radiotelegraphy, radiotelephony, or broadcasting.

One of the most important sections of the law was that which outlined the powers of the commission. Having in mind the defects in the preceding system of radio regulation under which the licensing authority had been unable to prevent the creation of intolerable interference, Congress gave to the commission quite complete powers over the granting and denying of licenses for radio communication. These powers may be summarized as follows:

To classify radio stations.

To prescribe the nature of the service to be rendered by each class of licensed station and each station within any class.

To assign bands of frequencies or wave lengths to the various classes of stations and assign frequencies or wave lengths for each individual station and determine the power that each station shall use and the time during which it may operate.

To determine the location of classes of stations or individual stations.

To regulate the kind of apparatus to be used with respect to its external effects and the purity and sharpness of the emissions from each station and from the apparatus therein.

To make such regulations not inconsistent with law as it may deem necessary to prevent interference between stations and to carry out the provisions of the law.

To establish areas or zones to be served by any station.

To make special regulations applicable to radio stations engaged in radio broadcasting.

To make necessary rules and regulations.

To hold hearings and make investigations.

The Federal Radio Commission was created for one year only, at the end of which time its duties and powers were to revert to the Secretary of Commerce. However, the life of the Commission was subsequently extended year after year by special enactments of Congress; and on Dec. 18, 1929, a law was passed providing that the Commission should retain the powers and duties vested in it "until otherwise provided for by law." The

Secretary of Commerce retained certain important functions under the Act of 1927, mostly of a technical, supervisory nature. They included the prescribing of qualifications for radio operators; the suspension of radio operators for (1) the violation of provisions of the laws or treaties of the United States; (2) refusal to carry out orders of the master of a ship, willfully damaging, or permitting to be damaged, radio apparatus; (3) the transmission of superfluous radio communications or signals or radio broadcasts containing profane or obscene words or language; and (4) willfully or maliciously interfering with other radio communications; the inspection of all transmitting apparatus to ascertain whether in construction and operation it conformed to the requirements of the law and the rules and regulations of the licensing authority; and the designation of call letters of all stations. The Radio Division of the Department of Commerce, its activities, and personnel were transferred in July, 1932, to the Federal Radio Commission.

Licenses.—The Act of 1927 forbade the operation without a license of any radio station within the United States engaged in interstate or foreign radio communication and provided that all licenses issued by the Secretary of Commerce should terminate within 60 days of the effective date of the Act, in all about 20,000 licenses. The purpose of the latter provision was to give to the Commission effective control over the wave lengths, power, time divisions, etc., of these stations, which in the absence of regulation they had determined for themselves. Thus, all stations that were desirous of continuing operation were compelled to seek new licenses granted under, and subject to, all the provisions of the Act of 1927.

The law provided that applicants for licenses must furnish such information as the licensing authority should require as to the citizenship, character, and financial, technical, and other qualifications of the applicant; the ownership and location of the proposed station; the frequencies to be used; the time of operation; the purposes for which the station was to be used; and such other information as it might require. Each license was to contain a statement that "the station license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies beyond the term thereof nor in any other manner than authorized therein," and no station license might

be granted until the applicant therefor "shall have signed a waiver of any claim to the use of any particular frequency or wave length or of the ether as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise." The latter provisions incorporated into the Radio Act the provisions of the joint resolution of Dec. 8, 1926, which retained ownership of the radio channels by the government and gave to the licensees the right to use them only subject to the law and the rules and regulations of the regulating authority.

The Act of 1927 limited the term for which a license might be issued to 3 years for a broadcasting station and 5 for any other class of station. The object of this provision was to provide more effective control over radio communication. It was thought that if licenses were granted for limited periods, the regulating authority would be enabled to weed out undesirable stations more readily, and with less difficulty, periodically at the expiration of licenses than by attempting to deprive a station of its license during the term of the license, although the law provided that licenses might be revoked for violations of the law or of the rules and regulations of the licensing authority. In 1928, station licenses were issued for 3-month periods for broadcasting stations and for 1-year periods for other stations; but at present, broadcasting licenses are issued for 6 months, and other licenses for 1 year. The principal objection to a short license period is that it introduces an element of uncertainty into radio communication, placing as it does the security of the investment of station owners in the hands of the Commission.

Construction Permits.—To prevent the wastage of capital in the construction of radio stations which could not later be licensed owing to the interference that they might create, the Act provided that "no license shall be issued under the authority of this Act for the operation of any station the construction of which is begun or is continued after this Act takes effect, unless a permit for its construction has been granted by the licensing authority upon written application therefor." The law further provided that such permit would be automatically forfeited "if the station is not ready for operation within the time specified or within such further time as the licensing authority may allow, unless prevented by causes not under the control of the grantee" and that

the rights under a construction permit should not be assigned or transferred to another party without approval of the licensing authority.

The Licensing Standard.—The Act of 1927 introduced the element of public interest into radio communication. Under the Act of 1912, a license was required for the operation of a radio station; but once the applicant had met the specified conditions regarding citizenship and had given certain facts necessary for proper registry, it was not within the power of the Secretary of Commerce to refuse a license or to remove a station already operating. The Act of 1927 provided that an applicant for a license, or the renewal of a license, not only must be able to satisfy the expréss conditions of the law regarding the issuance of licenses but must prove to the satisfaction of the Commission that present, or contemplated, operation would serve the "public interest, convenience, or necessity." The importance of the adoption of this principle is that it required applicants to meet a standard of public interest that was superior to private interest and enabled the Commission to see to it that the limited number of radio channels would be used only by those best fitted to serve the public. The first official expression of the principle of public interest in broadcasting was made by Secretary Hoover at the Third National Radio Conference, held in Washington in 1924;[1] and the Fourth National Radio Conference, held the following November, adopted this principle in its recommendations for the regulation of radio.

Equalization of Broadcasting Facilities.—One problem to which Congress addressed itself concerned the distribution of broadcasting facilities throughout the United States. Broadcasting had developed more rapidly in some sections than in others, and Congress hoped to prevent the monopolization of the limited number of facilities by any particular section of the United States at the expense of other sections. It provided in Sec. 9 of the law, therefore, that

> . . . in considering applications for licenses and renewals of licenses, when and in so far as there is a demand for the same, the licensing authority shall make such a distribution of licenses, bands of frequency of wave lengths, periods of time for operation, and of power among the

[1] DAVIS, *op. cit.*, pp. 57–62.

different States and communities as to give fair, efficient, and equitable radio service to each of the same.

In 1928, Congress, believing that the Commission had not then accomplished all that it might have toward the equitable distribution of broadcasting facilities, amended Sec. 9 to impose upon the Commission definite obligations with regard to the distribution of such facilities. This amendment, the so-called Davis amendment, read as follows:

> It is hereby declared that the people of all the zones established by Sec. 2 of this Act are entitled to equality of radio broadcasting service, both of transmission and of reception, and in order to provide said equality the licensing authority shall as nearly as possible make and maintain an equal allocation of broadcasting licenses, of bands of frequency or wave lengths, of periods of time for operation, and of station power, to each of said zones when and in so far as there are applications therefor; and shall make a fair and equitable allocation of licenses, wave lengths, time for operation, and station power to each of the States, the District of Columbia, the Territories and possessions of the United States within each zone, according to population. The licensing authority shall carry into effect the equality of broadcasting service hereinbefore directed, whenever necessary or proper, by granting or refusing licenses or renewals of licenses, by changing periods of time for operation, and by increasing or decreasing station power, when applications are made for licenses or renewals of licenses: *Provided*, That if and when there is a lack of applications from any zone for the proportionate share of licenses, wave lengths, time of operation, or station power to which such zone is entitled, the licensing authority may issue licenses for the balance of the proportion not applied for from any zone, to applicants from other zones for a temporary period of 90 days each, and shall specifically designate that said apportionment is only for said temporary period. Allocations shall be charged to the State, District, Territory, or possession wherein the studio of the station is located and not where the transmitter is located.

Appeal Provisions.—The Act provided that appeal from the decisions of the Commission might be taken to the Court of Appeals of the District of Columbia. The original section (Sec. 16) provided that on appeal from decisions of the Radio Commission, the court was to "hear, review, and determine the appeal" upon the record made before the Commission and upon such additional evidence as it might receive. It was empowered to "alter or revise the decisions appealed from and enter such

judgment" as to the court might seem just. This provision made the court "a superior and revising agency" in the administration of the Act and led inevitably to conflict and confusion. Furthermore, the decisions of the court with respect to radio communication were not judicial judgments and were not reviewable by the Supreme Court of the United States. To correct these defects, Congress amended Sec. 16 of the Radio Act of 1927 expressly to limit the review of the court to "questions of law," the findings of the Radio Commission to be conclusive unless it should clearly appear that they were "arbitrary or capricious." Under this amendment, the court could no longer revise the Commission's decision or enter such judgment as it might think proper, and questions of law could be taken to the Supreme Court for final determination.

Administration of the Radio Act of 1927—Broadcasting.—In administering the Radio Act of 1927 with respect to broadcasting, the Federal Radio Commission was faced with two main types of problems: (1) the allocation of the facilities so as to eliminate objectionable interference and to provide an equitable distribution of the facilities as between the different sections of the United States; and (2) the application of the statutory standard of public interest, convenience, or necessity to individual applicants for facilities. The broadcasting situation when it took office was utterly chaotic. There were 733 stations attempting to operate upon the 90 channels available for use without the limitations upon frequency assignment, power, and time of operation necessary for satisfactory operation. In spite of the technical necessity for 10-kc. separation between channels and the observance of an orderly sequence of channel designation (the Secretary of Commerce before the breakdown of regulation had assigned stations to channels in multiples of 10 kc.), 129 stations were clogging the ether by operating on split channels. There were also 41 stations operating on, or overlapping, the 6 channels set aside for the exclusive use of Canada. In addition, in the same geographical area, where at least a 50-kc. separation was desirable to avoid objectionable cross-talk interference, stations were operating with 20-, 10-, 5-, and even 2-kc. separations. Finally, there were in existence a number of portable broadcasting stations, ruinous to the service of established stations in congested areas.

Allocation of Broadcast Facilities.—The Radio Commission attacked immediately the problem of interference. All stations were required to return to channels of even multiples of 10 kc.; the Canadian exclusive channels were cleared; and the power of stations operating on the 11 Canadian-shared channels was limited to avoid interference with Canadian stations. Meanwhile, the Commission made a study of the situation and promulgated an order effecting, as of June 15, 1927, a reallocation of the broadcasting facilities, which reduced materially the amount of interference in the broadcast band.[1] This reallocation reduced especially the interference due to congestion in the larger metropolitan areas by maintaining, so far as possible, 50-kc. separations between stations operating in the same locality; but it did little to remedy the situation with respect to interference which results from the simultaneous operation of two or more stations on the same channel not separated by sufficient geographical distances. This type of interference was particularly objectionable to rural listeners located far from the station transmitters.

In the fall of 1927, the Commission attempted to clear the air for rural listeners. On Nov. 14, it promulgated an order[2] designating the band of channels from 600 to 1,000 kc. as exclusive clear channels. Up to this time, no broadcasting station in the United States possessed a channel exclusively; but the Commission decided that the way to eliminate interference for the benefit of rural listeners was to establish a number of cleared channels, upon each of which only one station might operate at night. The initial step of the Commission's plan of clearing these channels called for the transfer, effective Dec. 1, 1927, of approximately 25 stations which hitherto had caused most of the interference on these channels, thus clearing 25 channels. Some 10 additional channels were to be rendered free of interference by Dec. 31, 1927, either by cooperation among the broadcasters or upon the basis of public hearings. The Commission did not specify any particular method by which these channels might be cleared, whether by division of time, reduction of power, synchronized operation, or transfer to other channels, but it did indicate that it would take action unless the problem were solved by the broadcasters themselves. These measures reduced

[1] F.R.C. Gen. Order 11, amended by Gen. Order 13.

[2] F.R.C. Gen. Order 19.

interference materially, but little was done to reduce the total number of stations, in spite of the fact that there were more stations than could operate satisfactorily. During the period from Mar. 15, 1927, to June 30, 1928, a few stations were deleted by the Commission, and 47 broadcasting stations voluntarily surrendered their licenses, but 32 construction permits for new stations were granted.

The Commission in its early allocations did not deal with the problem of the equitable distribution of facilities as between the different sections of the United States, and there was a general feeling in Congress that it had been remiss in this respect. Accordingly, Sec. 9 was amended so as to make it mandatory that the Commission equalize facilities as between the zones established and, so far as possible, between the states within the zones on the basis of population. Faced with this problem, the Commission realized that further assignment of facilities to individual stations would have to be in harmony with some general plan formulated to carry out the requirements of the Davis Amendment. But before making an allocation, it was necessary to determine first the number of stations that should be allowed to continue operation and to decide upon those which should be eliminated, as it was generally felt that there were too many stations.

The Commission decided to eliminate first the portable stations. The Davis Amendment, the Commission said, contemplated fixed broadcasting stations and contained a mandate that could not be carried out if roving stations were permitted. Furthermore, migratory transmitters would result in objectionable interference with fixed broadcasting stations, and supervision of them would be difficult. This decision of the Commission was contested, but the Court of Appeals of the District of Columbia upheld the Commission.[1] In all, 13 stations were affected.

In addition to the portable stations, the Commission felt that there were other broadcasting stations the operation of which was not in the public interest. On May 25, 1928, it promulgated General Order 32, requiring 164 of the less important stations to appear and make a showing that their continued operation would serve the public interest, convenience, or necessity. Hearings were held as a result of which 81 of the 164 stations cited escaped

[1] *Carrel v. Federal Radio Commission*, 36 F. (2d) 117.

adverse action by the Commission, 12 were substantially reduced in power, 4 were placed on probation, and 5 were left on the air as the result of consolidations with other stations. All told, 62 stations were deleted—4 as the result of surrender of license, 26 as the result of action by the Commission, and 32 through default.[1] On June 30, 1928, there were in operation in the United States, including 13 portable stations and a few others which were forced to cease operation on July 1, 1928, 696 broadcasting stations—128 in the first zone, 112 in the second zone, 116 in the third zone, 206 in the fourth zone, and 134 in the fifth zone.[2]

The Allocation of Nov. 11, 1928.—Meanwhile, the Commission held many hearings and conferences in connection with a reallocation of broadcasting facilities under the Davis Amendment. Such an allocation, it was realized, would have to conform to engineering principles, but economic considerations favored an allocation that would disturb as little as possible the then existing broadcast setup. Various proposals were made by radio engineers, including the Broadcasting Committee of the Institute of Radio Engineers, and by other parties directly interested, such as the National Association of Broadcasters, the Federated Radio Trades Association, and the Radio Manufacturers' Association. The foregoing associations recommended that (1) about 700 stations be provided for, (2) the average power be maintained at some figure at least equal to the existing amount, and (3) the number of changes made in the initial establishment of the new allocation be kept at a minimum.[3] The plan of allocation which the Commission drew up and made effective Nov. 11, 1928, followed rather closely the recommendations of the engineers. In favor of the plan, and in the interest of broadcasting, it was pointed out that the plan would provide a definite basis of station assignments for each zone and locality; it could be improved whenever interference was found to exist without disturbing the allocation as a whole; it would eliminate heterodyne interference on 80 per cent of the listener's dial; and it recognized essentially different requirements of local, regional, and national service.[4]

[1] 2d annual report of the Federal Radio Commission, 1928, p. 16.

[2] *Ibid.*, p. 12.

[3] Discussion of proposals by Dr. J. H. Dellinger, 2d annual report of the Federal Radio Commission, p. 143.

[4] *Ibid.* p. 215.

The allocation of Nov. 11, 1928, provides the structure which is basic to the present broadcasting setup in the United States. Of the 90 available channels, 40 were set aside as "clear" channels, upon each of which only one station was to be permitted to operate at night, with minimum power of 5,000 watts and maximum to be determined by the Commission. Four frequencies were allocated each for use by not less than two zones, with broadcasting stations in those zones being permitted to operate simultaneously, each station to have an authorized power not to exceed 5 kw. Thirty-five frequencies were allocated for use by not less than two or more than three zones, the broadcasting stations in those zones being permitted to operate simultaneously and to have an authorized power not to exceed 1,000 watts, except that, where interference would not be caused, four or five zones might share these frequencies. Five frequencies were allocated for use in all five zones with broadcasting stations permitted to operate simultaneously, each station to have an authorized power not to exceed 1,000 watts. Six frequencies were allocated for use in all five zones by broadcasting stations in simultaneous operation with an authorized power not to exceed 100 watts. Individual stations were given assignments in conformity with the plan of allocation, and throughout the whole allocation wide geographical spacings between stations on adjoin-

TABLE 14.—SUMMARY OF BROADCASTING ASSIGNMENTS, ALLOCATION Nov. 11, 1928

	High power 5 kw. and up	Regional	Limited service		Local	Total
		500–1,000 watts	5 kw.	1,000 watts	10–100 watts	
Number of channels	40	35	4	5	6	90
Station assignments per channel	1	2½*	2½*	5	25	
Number of station assignments in United States	40	90	10	25	150	315
Number of station assignments in each zone	8	18	2	5	30	63

* Approximate average.

Source: 2d annual report of the Federal Radio Commission, p. 216.

ing channels were observed in order to eliminate objectionable "cross talk." A summary of the allocation plan is shown in Table 14.

The allocation was based upon nighttime conditions. Besides the classes of stations shown in Table 14, a number of "daytime" and "limited-service" stations were added on some of the channels. The latter were allowed to operate during the day or during certain time (after late evening in the East by western stations) temporarily not used by the station assigned the channel. Daytime stations were allowed to operate only in the daytime and were required to cease operation at sunset local time.

This basic plan of allocation has been maintained in its general features to the present time. Minor changes in assignments have been made from time to time; stations have been deleted, and new stations licensed, but always within the pattern laid down. Many changes have reduced still further the amount of interference between broadcasting stations. Regular broadcasting is confined to the band 550 to 1,500 kc., although following the North American Conference in Mexico City in 1933, the Federal Radio Commission allocated three frequencies for experimental high-fidelity broadcasting in the band extending from 1,500 to 1,600 kc., namely, 1,530, 1,550, and 1,570 kc. Opinions of competent technicians differed regarding the usefulness of frequencies in this range for broadcasting, and it was decided to make practical tests of this band.

A major shift in frequency assignments of clear channel stations was ordered, effective Apr. 30, 1930, but it was held up by the Court of Appeals of the District of Columbia on the ground that assignments of broadcasting stations might not be changed unless the parties affected had been accorded prior hearing. The reason for the proposed change was to reduce the amount of interference between clear-channel stations due to insufficient geographical separation between stations operating on adjacent clear channels. The proposed plan would have increased the average mileage separation between stations operating on adjacent clear channels from 522 to 1,117 miles.

In keeping with the trend toward the use of higher power in broadcasting, the Commission granted increases in power to many clear-channel stations. In the allocation of Nov. 11, 1928, the Commission limited maximum power on clear channels

to 25,000 watts regular and 25,000 watts additional experimental. On June 16, 1930, however, yielding to many demands for higher power, the Commission decided to permit the use of 50,000 watts power on 20 of the 40 clear channels.[1] Many requests for increases in power came also from regional and local stations, but such requests, as a rule, were granted only where it clearly appeared that no objectionable interference would follow from the use of higher power. A marked trend may be noted in the granting of increased power to regional stations for daytime operation. Some criticism had been made of the Radio Commission's practice of permitting daytime operation on clear channels by stations other than the dominant one on the ground that the service to rural areas is rendered less satisfactory; and soon after its establishment, 13 stations, fearing the breakdown of the clear-channel system, asked the new Federal Communications Commission to investigate the situation thoroughly and to take appropriate action. On the whole, it may be said that the Commission, while attempting to grant applicants the best assignments possible, did not unduly sacrifice engineering principles for economic or other considerations.

In determining the conditions under which objectionable interference may arise, the Engineering Division of the Commission made many detailed studies of transmission and reception conditions in the United States and drew up empirical standards to govern the allocation of broadcasting facilities. In this work, the Engineering Division was assisted greatly by the Radio Division of the Department of Commerce, which later was transferred to the Commission, and all other available sources of information were utilized. Interference was defined, and the field intensities necessary for stations of various classes to render good, fair, and poor service determined. Other matters concerning which standards were gradually being developed included the geographical separation of stations operating on adjacent frequencies and the location of transmitters. Such standards were followed by the Engineering Department in making recommendations to the Commission and in giving testimony at hearings, although they were changed from time to time owing to the advancement of the art and to greater familiarity with the phe-

[1] Rules and Regulations of the Federal Radio Commission, Par. 118.

nomena of transmission and reception and the requirements of the average listener.

The Commission also undertook to develop standards governing broadcasting apparatus and transmission. It issued many orders affecting such matters, and it held licensees up to the standards established by its engineers, at least to the extent of requiring licensees of the limited number of facilities available to keep their equipment up to a standard consistent with good engineering practice. Chief among these was the regulation requiring licensees to maintain assigned frequencies within 50 cycles of the assignment. This requirement materially reduced the interference between stations and increased the service area of all stations operating on frequencies used at night by more than one station. It compelled many stations to modernize their transmitting apparatus, and a further order required all stations not having one to install an approved frequency-monitoring device. Other interference problems regulated by the Commission included the synchronized operation of two stations on the same frequency and many peculiarities of individual station operation.

The work of the Radio Commission in reducing interference in broadcasting was its outstanding achievement, reception conditions having been immensely improved as compared with the chaos that prevailed when it came into being. The work of its technical staff in cooperation with the broadcasters also aided materially in improving the quality of broadcasting. The total number of stations was reduced from 733 to 632 on Feb. 26, 1936, but congestion still remains in certain sections of the country. The total number of broadcasting stations by classes in operation on Feb. 26, 1936, is shown in Table 15.

Application and Interpretation of the Davis Amendment.—The Davis Amendment required that the Commission "shall as nearly as possible make and maintain an equal allocation of broadcasting licenses, of bands of frequency or wave lengths, of periods of time for operation, and of station power" to each of the five zones created by the Radio Act of 1927 and "shall make a fair and equitable allocation of licenses, wave lengths, time for operation, and station power to each of the states . . . within each zone, according to population." The aim of this amendment was to provide equality of radiobroadcasting service,

TABLE 15.—REGULAR BROADCAST STATIONS IN THE CONTINENTAL UNITED STATES

Class of station	Mar. 1, 1928	Feb. 26, 1936
Unlimited-time clear-channel stations	23	30
Sharing-time clear-channel stations	34	14
Simultaneous unlimited-time high-power stations	0	7
Day- and limited-time stations over 250 watts on clear channels	5	40
Total frequencies used	37	40
Unlimited-time regional-channel stations (250 to 1,000 watts night)	150	170
Unlimited high-power regional-channel stations	11	8
Sharing-time regional-channel stations (all powers)	146	72
Daytime regional-channel stations (all powers)	2	28
Total frequencies used	82	44
Unlimited-time local-channel stations (150 watts or less)	190	97
Unlimited-time local-channel stations (100 watts night, 250 watts day)	2	62
Sharing-time local-channel stations (150 watts or less)	99	56
Sharing-time local-channel stations (100 watts night, 250 watts day)	0	15
Daytime local-channel stations (150 watts or less)	10	30
Daytime local-channel stations (250 watts)	1	3
Total frequencies used	55	8
Total frequencies used for all classes	90	90
Total stations all classes	673	632

both of transmission and of reception, in all sections of the United States. Under the original Act, the only purpose served by the division of the country into zones was to provide a basis for the appointment of the five members of the Commission; but by the Davis Amendment, the zones became an important factor in the allocation of broadcasting facilities.

The Radio Commission did not attempt to apply too strictly the terms of the Davis Amendment. It was apparent in its allocation of Nov. 11, 1928, that exact mathematical equaliza-

tion of facilities was not possible, and difficulties in applying the terms of the Amendment increased rapidly. The amendment, as we have seen, required "an equal allocation of broadcasting licenses, of bands of frequency or wave lengths, of periods of time for operation, and of station power" to each of the five zones and a "fair and equitable allocation of licenses, wave lengths, time for operation, and station power to each of the states . . . within each zone, according to population." The Commission adopted a "quota" system, in 1928, showing the number of full-time station assignments of each of the three classes of stations due each state; but these figures nearly all came out in fractions, showing the impossibility of an exact allocation among states on the basis of population. Moreover, if a state were "underquota" in one class of service and "overquota" in another, it was not practicable to determine the total value of the three classes of assignments so that one could be balanced against another to determine whether or not a state were actually under- or overquota in total radio facilities. To solve the latter problem, the Commission developed a "unit system" for the evaluation of broadcasting stations, based upon the type of channel, power, hours of operation, and all other considerations required by law.

The "unit system" developed by the Commission[1] was made effective by General Order 92, adopted June 17, 1930. A full-time, 1-kw. station operating on a regional channel was given the value of 1 unit, and the values of other stations were related to this, those values varying from a maximum of 5 units for a clear channel station of 5 kw. or more to a minimum of 0.2 unit for a local station of 100 watts or less, part-time stations being given proportionate values. General Order 92 further provided that each of the five zones should have broadcasting stations of

[1] A fundamental change in the quota system was made recently by the Federal Communications Commission by dividing the broadcast quota into two parts, "night quota" and "day quota." This is based upon recognition of the fact that interference caused by stations at night is different from that caused by day. The night quotas, due and assigned, do not differ materially from the night proportions of the present system; but the day quotas due each zone and state have been increased to permit the establishment of new day stations or increases of facilities for daytime operation by established stations. The maximum daytime power on the regional channels was increased to 5,000 watts.

equal total value in units and that within each zone the unit values should be fairly and equitably allocated to the states according to population. The maximum number of units for the United States was set at 400, and these were classified as among clear channels, regional channels, and local channels, each class to be distributed equally to each zone, making a total of 80 units per zone. The unit system first was based upon estimated 1928 population figures; but on Aug. 8, 1930, the preliminary census figures as announced by the Bureau of Census were adopted for the computation of quotas; and on Sept. 14, 1930, the Commission adopted the figures officially released by the Census Bureau for 1930 for the determination of quota allocations.

On Jan. 8, 1931, the Commission adopted a further series of regulations governing its administration of the Davis Amendment. At that time, the first and second zones were underquota, and the three remaining zones overquota. Also, there were a number of states over-, and a number underquota, and since there were then pending before the Commission a number of applications from underquota states which, under the law, were entitled to their prorata shares of radio facilities, and in order to bring about an equalization of these facilities, it promulgated General Order 102, which contained the following regulations:

1. Where a zone has already in use its prorata share of facilities, the Commission will not allocate any further radio facilities to that zone, which would increase its quota.

2. Applications from underquota states in zones which have already allocated to them their prorata share of radio facilities should be for a facility already in use in that zone by an overquota state.

3. Likewise, where a state is already overquota, the Commission will not allocate any further radio facilities to that state, which would increase its quota.

4. Applications from states which now have their quotas, or from states which are overquota, should be for facilities already in use in that state.

5. An applicant from an underquota state in an underquota zone may apply either for facilities in use in an overquota state in that zone or an overquota state in an overquota zone.

The regulations embodied in General Order 102 indicated a belief on the part of the Commission that a rigid interpretation

of the Davis Amendment was required by its provisions. Under this interpretation, hundreds of applications for new or additional facilities were refused. Appeals were taken to the Court of Appeals of the District of Columbia in which questions were raised, first, as to the justification of a rigid interpretation, especially where the undisputed evidence showed that the grant of increased facilities would cause no interference or prejudice to others and that the public interest would otherwise be served by granting the applications; and, second, as to the constitutionality of the Davis Amendment if strict construction of its provisions were necessary. The Court, however, upheld the constitutionality of the Amendment and the Commission's interpretation of it.[1]

A rigid interpretation of the Davis Amendment created so much dissatisfaction and litigation, however, that both the Commission and the Court adopted a more liberal construction. The Commission amended General Order 102 so as materially to modify the severity of its regulations and in its decisions adopted a more liberal attitude. The new rules were designed to permit the granting of facilities, which otherwise would be in the public interest, regardless of the requirements of exact mathematical equalization.

The new regulations provided:

1. When the application is from an underquota state and is for facilities which, if granted, would not cause additional interference with any station, or stations, now licensed, then the above paragraphs may be disregarded.
2. Since the act provides for the equalizing of radio facilities among zones and among states "as nearly as possible," the Commission may allow a slight departure, plus or minus, from an exact mathematical estimate.

The Commission had not always held to a strict interpretation, however. Even before the adoption of the modified rules, it had held the requirements of the Davis Amendment secondary to other considerations involved in the administration of the

[1] *Durham Life Ins. Co. v. Federal Radio Commission*, 55 F. (2d) 537; *Pacific Development Radio Co. v. Federal Radio Commission*, 55 F. (2d) 540; *WHB Broadcasting Co. v. Federal Radio Commission*, 56 F. (2d) 311, and *Woodmen of the World Life Ins. Assn. v. Federal Radio Commission*, 57 F. (2d) 420.

Radio Act. In one case, involving the application of a station in an underquota state in an underquota zone for additional facilities where it was contended that the Davis Amendment imposed upon the Commission the mandatory duty of establishing and maintaining equality without reference to the statutory standard of public interest, convenience, and necessity, the Commission held that the proposed operation would cause interference with other stations on the same and on an adjacent frequency and denied the application. On appeal, the Court upheld the Commission, saying that it would not be "consistent with the legislative policy" to bring about equalization by unnecessarily injuring already established stations and that the public interest, convenience, and necessity are after all "the paramount consideration."[1]

A most important issue was raised as to the right of the Radio Commission, in applying the Davis amendment, to deprive a licensee of his facilities in order to grant them to another party. In order to effect a more equitable distribution of facilities between the States of Indiana and Illinois, both located in the fourth zone, the former being 22 per cent under its quota, and the latter 55 per cent over its quota in total facilities, the Commission deprived stations WIBO and WPCC, both in Chicago, of their facilities and granted station WJKS, Gary, Ind., the right to operate full time on the frequency formerly shared by those stations. The decision was appealed, and the District of Columbia Court of Appeals reversed the Commission, holding that since the only apparent reason for its action was that Indiana was underquota, the circumstances furnished no substantial justification of the Commission's decision. The Court called attention to the liberal interpretation allowed in the case of *Reading Broadcasting Co. v. Federal Radio Commission, supra*, and held that there would have been more justification for granting the application in the former than in the present case, since in the former case the application was from an underquota state in an underquota zone and would have affected stations in an overquota state in an overquota zone, whereas the present decision affected parties all in one zone. The Court made a point of the fact that whereas the law required equalization between zones, *as nearly as possible*, it required only a *fair and*

[1] *Reading Broadcasting Co. v. Federal Radio Commission*, 48 F. (2d) 458.

equitable allocation as between the states within a zone. This, the Court said, was due to anticipation on the part of Congress "that greater difficulty would arise in undertaking to equalize allocations to the several states within a zone," and it quoted the House Committee report on the Amendment in support of a liberal interpretation.[1]

This case was carried to the Supreme Court of the United States, which decided several long-standing issues. In the first place, it declared that Congress under the commerce clause had the power to regulate radio communication, thus upholding the constitutionality of the Radio Act of 1927, a point that had not been finally settled until then. The Supreme Court upheld also the constitutionality of the Davis Amendment and the right of the Commission under it to bring about an equalization of broadcasting facilities. Specifically, it held that the Commission in making allocations of frequencies to states within a zone had the power to license operation by a station in an underquota state on a frequency theretofore assigned to a station in an overquota state, provided that it did not act arbitrarily or capriciously; that the authority granted to it to effect equitable distribution of facilities as between states plainly extended to the deletion of existing stations if necessary to produce an equitable result; and that Congress had the power to give this authority to delete stations, in view of the limited radio facilities available and the confusion that would result from interference. The attempt to distinguish between "equal" allocation between zones and "fair and equitable" allocation as between states the Court held to be without basis. "To construe the authority conferred, in relation to the deletion of stations," the Court said, "as being applicable only to an apportionment between zones and not between states would defeat the manifest purpose of the Act." The court held, further, that the question of the merit of the individual stations deleted was not the only point at issue but the apportionment of facilities between states required in the law. In answer to the contention that the Commission had violated its own rules by ignoring the fact that both Indiana and Illinois were underquota in regional station assignments, the former having even more of these than the latter, the Court

[1] *Nelson Bros. Bond & Mfg. Co. v. Federal Radio Commission*, 62 F. (2d) 854, 856.

said that the Act demanded no such equality between states with respect to every type of station but a fair and equitable allocation of all facilities. An interesting statement was made with regard to the statutory standard of "public interest, convenience, or necessity." The Court said:

> In granting licenses, the Commission is required to act "as public convenience, interest, or necessity requires." This criterion is not to be interpreted as setting up a standard so indefinite as to confer an unlimited power. Compare *N. Y. Central Securities Co. v. U. S.*, 287 U. S. 12, 24. The requirement is to be interpreted by its context, by the nature of radio transmission and reception, by the scope, character, and quality of services, and, where an equitable adjustment between states is in view, by the relative advantages in service which will be enjoyed by the public through the distribution of facilities. In making such an adjustment, the equities of existing stations undoubtedly demand consideration. They are not to be victims of official favoritism. But the weight of the evidence as to these equities and all other pertinent facts is for the determination of the Commission in exercising its authority to make a "fair and equitable allocation."[1]

The decisions of the courts clearly upheld the Davis Amendment and the powers of the Commission to effect an equalization under its provisions; but in practice, its provisions were difficult to enforce. The Radio Commission was not able to adhere consistently to either a strict or a liberal interpretation. While broadcasting facilities had been fairly well equalized between zones by June 30, 1934, when the Federal Radio Commission was abolished, equitable distribution among the states had not been accomplished, as can be seen from the summary of facilities due and assigned in Table 16. But the assignment of facilities as between the zones created bore no necessary relationship to the equalization of broadcasting service throughout the United States when viewed from the standpoint of reception. The zones that had been assigned the smallest proportions of the total facilities were not lacking in broadcast service, while there was need for additional service in the large third and fifth zones, which already were overquota. An attempt was made in the Communications Act of 1934 to correct the disparity in broadcasting service by permitting the Communications Commission to license new stations of not more than 100 watts power

[1] *Federal Radio Commission v. Nelson Bros. Co.*, 289 U. S. 266.

where interference with established stations would not result, regardless of quota restrictions; but this alone will not solve the problem. In the sparsely settled regions of the United States, there are relatively few communities in which advertising revenues and available talent would be sufficient to support broadcasting stations. According to a statement released recently by the Communications Commission, a review of existing stations in small centers of population reveals that a majority of them have great difficulty in operating with adequate programs, maintenance, and personnel. In many cases, applicants apply for a limited facility in the hope of obtaining later a material increase in that facility. The Commission has stated that new broadcasting stations will be licensed under this section of the law only after it has been shown that the applicant is financially and technically qualified to operate the station requested, that program material is available such that programs can be built that will be of service and interest to the listeners, and that the applicant will be able to provide adequate talent, personnel, and properly maintained equipment. Listeners in rural sections, accordingly, are and are likely to remain, dependent for service upon distant stations.

The Davis Amendment, with its requirement of equalization of broadcasting facilities, is not well-designed to accomplish its second objective, an equalization of broadcast-reception service. The emphasis must be placed either upon equality of transmission or upon equality of reception, for with state lines, and hence zone lines, as they are, and the unequal concentrations of population with accompanying inequalities in availability of program and financial resources, both objectives are not susceptible of simultaneous achievement. Zone lines must be made to conform more nearly to the actual conditions under which broadcasting stations must be operated, both technical and economic, or the zone system must be abandoned. The proper distribution of broadcasting facilities is essentially an administrative matter. It cannot be solved by a blanket rule laid down by Congress but only in determinations of the need for broadcasting service in individual cases. The power has already been given to the Communications Commission to license or refuse to license or relicense stations when in its opinion the proposed operation would, or would not, be in the public interest, and there is no

TABLE 16.—SUMMARY OF BROADCASTING FACILITIES ASSIGNED TO ZONES AND STATES
(June 30, 1934)

Zone	State	Quota due	Units assigned	Quota units under or over	Percentage under or over
1	Conn.	4.48	4.14	− 0.34	− 8
	Del.	0.67	0.53	− 0.14	− 21
	D.C.	1.35	1.60	+ 0.25	+ 19
	Me.	2.22	2.21	− 0.01	− 0
	Md.	4.55	5.55	+ 1.00	+ 22
	Mass.	11.84	11.46	− 0.38	− 3
	N.H.	1.29	0.93	− 0.36	− 29
	N.J.	11.26	9.36	− 1.90	− 17
	N.Y.	35.07	39.24	+ 4.17	+ 12
	R.I.	1.91	1.40	− 0.51	− 27
	Vt.	1.00	0.72	− 0.28	− 28
	P.R.	4.30	1.10	− 3.20	− 74
	V.I.	0.06	.....	− 0.06	−100
	Total	80.00	78.24	− 1.76	− 2
2	Ky.	7.50	8.50	+ 1.00	+ 13
	Mich.	13.89	11.02	− 2.87	− 20
	Onio	19.07	20.94	+ 1.87	+ 10
	Pa.	27.63	27.41	− 0.22	− 0
	Va.	6.95	10.55	+ 3.60	+ 52
	W. Va.	4.96	5.83	+ 0.87	+ 18
	Total	80.00	84.25	+ 4.25	+ 5
3	Ala.	7.37	7.02	− 0.35	− 5
	Ark.	5.16	7.42	+ 2.26	+ 44
	Fla.	4.09	9.00	+ 4.91	+120
	Ga.	8.10	9.11	+ 1.01	+ 12
	La.	5.85	10.90	+ 5.05	+ 86
	Miss	5.60	3.40	− 2.20	− 39
	N.C.	8.82	10.35	+ 1.53	+ 17
	Okla.	6.67	8.54	+ 1.87	+ 28
	S.C.	4.83	3.05	− 1.78	− 37
	Tenn.	7.29	13.70	+ 6.41	+ 88
	Tex.	16.22	24.29	+ 8.07	+ 50
	Total	80.00	106.78	+26.78	+ 33
4	Ill.	22.52	27.98	+ 5.46	+ 24
	Ind.	9.56	8.97	− 0.59	− 6
	Iowa	7.30	12.93	+ 5.63	+ 77
	Kan.	5.55	6.54	+ 0.99	+ 18
	Minn.	7.57	9.35	+ 1.78	+ 24
	Mo.	10.71	12.79	+ 2.08	+ 19
	Neb.	4.06	7.83	+ 3.77	+ 93
	N.D.	2.01	3.30	+ 1.29	+ 64
	S.D.	2.05	2.89	+ 0.84	+ 40
	Wis.	8.67	8.74	+ 0.07	+ 1
	Total	80.00	101.32	+21.32	+ 27
5	Ariz.	2.83	2.68	− 0.15	− 5
	Calif.	36.86	40.87	+ 4.01	+ 11
	Colo.	6.72	9.59	+ 2.87	+ 43
	Idaho	2.89	3.25	+ 0.36	+ 12
	Mont.	3.49	4.05	+ 0.56	+ 16
	Nev.	0.59	0.70	+ 0.11	+ 19
	N.M.	2.75	4.03	+ 1.28	+ 47
	Ore.	6.19	9.91	+ 3.72	+ 60
	Utah	3.30	6.60	+ 3.30	+100
	Wash.	10.15	15.76	+ 5.61	+ 55
	Wyo.	1.46	0.80	− 0.66	− 45
	Alaska	0.38	0.48	+ 0.10	+ 26
	Hawaii	2.39	1.94	− 0.45	− 19
	Total	80.00	100.66	+20.66	+ 26

reason why the Commission should not be permitted to work out in its own way the purposes underlying the Davis Amendment. If the Davis Amendment were stricken from the law, no radical change would need be expected in the broadcasting setup. This is governed mostly by economic and natural laws. On the other hand, it would enable the Commission to bring about equality of broadcasting service from the standpoint of reception without being bound by the requirements of the equalization of transmission facilities.[1]

Application of the Standard of Public Interest, Convenience, or Necessity to Broadcasting.—Although the Federal Radio Commission during a large part of its existence was concerned mostly with problems of interference and the equalization of broadcasting facilities, it was to no small extent concerned with the character of the broadcasting service. The Radio Act specifically denied it the power of censorship over radio programs, but impressed upon the Commission was the duty of seeing to it that only those who would serve the public interest would be permitted to use broadcasting facilities and that such use would be primarily in the public interest. This meant, where there were more applicants than facilities, that the Commission was compelled to choose between different applicants for the same facilities and to decide as among various types of program service those that in its opinion were the most meritorious. To serve as a guide in making such important determinations, the Radio Act provided nothing more than the vague phrase that broadcasting must serve public interest, convenience, or necessity.

The phrase "public interest, convenience, or necessity," as used in the Radio Act of 1927, was borrowed by Congress from similar phrases used in state and Federal statutes governing the regulation of railroads and other public utilities. Such laws have nowhere indicated specifically what the phrase implies but always have left its interpretation to the bodies whose task it has been to administer the laws. As a practical matter, the phrase is not susceptible of exact definition. The interest, convenience, or necessity of the general public, as distinguished from that of an individual or any group of individuals, is the matter at issue, and the determination must rest upon considerations of sound public policy. Each case must be decided after

[1] By Act of Congress, June 5, 1936, the Davis Amendment was repealed.

due consideration of all relevant facts affecting the public as well as the individual or individuals concerned; and since circumstances vary with cases, judgment must be exercised. The Federal Radio Commission repeatedly was urged to give a precise definition to this phrase, but it contended, and rightly, that precise definition which would foresee all eventualities could not be made. What was or was not in the public interest, the Commission said, could be determined only in individual cases after the exercise of judgment on the basis of the facts of record. The constitutionality of the Radio Act was attacked on the ground that acts of the Commission under such an indefinite standard were arbitrary and capricious; but, as we have seen, the Supreme Court upheld the law.

General Principles.—Although the phrase public interest, convenience, and necessity was not defined in the law, it was inevitable that the Federal Radio Commission should develop general principles for its guidance. Because the number of assignments available for broadcasting was absolutely limited, and because certain assignments were better than others, the lack of principles susceptible of rather general application would have made uniformity of decision and justice difficult, if not impossible, of achievement. Furthermore, the establishment of at least certain basic principles was essential in order that broadcasters might have some means of gauging their rights and duties and that needless controversies between them and the public might be avoided. The principles developed by the Commission were empirical ones, produced in the crucible of experience, but many of them were not new except in application. They were similar to principles that had been developed in the field of public utility regulation generally.

The principle basic to all the Commission's determinations with respect to broadcasting was that the public interest would be served by the establishment of the best possible reception conditions throughout the entire country. This principle involved the setting aside of a definite band of frequencies solely for the use of broadcasting (in this matter, the Commission's actions were subject to the requirements of law and international agreement) and the elimination, in so far as possible, of interference from the broadcast band. It involved also the recognition of the need for different classes of stations, stations capable

of furnishing service to rural listeners over considerable distances, as well as those capable only of serving urban areas. The Commission's allocations of broadcasting facilities and its regulations governing interference had as their purpose the carrying out of this fundamental principle. It should be recalled here that the allocations of facilities by the Federal Radio Commission were subject also to the requirements of the Davis Amendment. The Commission believed, however, that the Davis Amendment did not abolish the standard of public interest, convenience, or necessity but rather that equalization was to be brought about in so far as possible without sacrificing the standard.

A second paramount principle was that the interests of the listening public were superior to those of the broadcasters and that in cases of conflict the latter must yield to the former. This principle was clearly implied in the spirit and purpose of the provisions of the Radio Act pertaining to broadcasting. The only place in the law where recognition of any right with respect to transmission was even implied was in the Davis Amendment, which stated that all the zones were entitled to "equality of broadcasting service, both of transmission and of reception." However, this reference to transmission applied to the general allocation of broadcasting facilities and bore no implications as to the rights and obligations of individual broadcasters. Placing the emphasis upon the rights of the listeners made of broadcasting a public service. It meant that broadcasting stations were licensed to serve the public, not the interests solely, or even primarily, of the owners of the stations or of those using the stations to further private ends. It meant also that the quality of the broadcasting service was the primary consideration, not the rights of all to broadcast and to broadcast what they should please. Broadcasting, the Commission said, is not analogous to other forms of communication, such as the telephone and the telegraph, where a message is sent to a particular individual, and the service must be made available to all who have messages to send. Messages from a broadcasting station are addressed to and received by the general public. To pursue such an analogy, with the usual obligations which attend the furnishing of these services, a broadcasting station would have to accept and transmit for all persons on an equal basis and without discrimination as to charges; that is, the licensee of a broadcasting station

would have to broadcast anything and everything that anyone willing to pay the rates might desire to broadcast, whatever the nature of the program and regardless of the likes and dislikes of the listening public. Under such a conception, with the emphasis placed upon transmission, the public would be deprived of the self-imposed censorship exercised by the managers of broadcasting stations who of necessity, for the sake of the popularity and standing of their stations, select programs that they believe will be of interest to the listening public. Placing the emphasis upon the rights of the listeners, the Commission believed, assimilated broadcasting stations with the group of utilities purveying commodities to the public, such as heat, water, light, and power companies. As in the case of these utilities, the government is interested mainly in the quality of the service; and just as it does not tell an electric light company that it must obtain its fuel and other materials from all comers on equal terms, so the government is not interested in the sources from which station licensees derive their programs so long as they are in keeping with the standard of public interest. The apparent exception to this interpretation in Sec. 18 of the Radio Act of 1927, that a licensee must afford equal opportunities for the use of his station to candidates for public office, supported rather than undermined this point of view in that the law did not require any licensee to allow the use of his station by any such candidate.[1]

A third general principle was that the standard of public interest, convenience, and necessity must be applied as a comparative rather than an absolute one. For the most part, the Commission was called upon to choose between two or more applicants for the same facilities and to place the program service of one over against that of the other. It was recognized that all applicants would furnish more or less good service, and the Commission deemed it its duty to choose those who in its opinion could best serve the public, sacrificing those who would give least for those who would give most, the interests of the listening public being paramount.

Principles Underlying the Evaluation of Broadcasting Stations. While the standard of public interest was construed by the Com-

[1] In the matter of the application of Great Lakes Broadcasting Co., etc., 3d annual report of the Federal Radio Commission, 1929, pp. 32–33.

mission mostly as a comparative one, on numerous occasions it was called upon to decide whether or not the service of a particular station, without reference to other parties, was up to standard. In this way, certain practices of broadcasting stations were held not to serve the public interest. The cases that the Commission decided, therefore, fall roughly into two categories: (1) those in which disciplinary or penal action was taken by the Commission which did not concern parties other than those disciplined or penalized; and (2) those in which the Commission was compelled to choose between two or more applicants for the same facilities, whether established stations or parties seeking privileges at the expense of existing stations. It is in the second category of cases that the Commission had greatest difficulty in developing principles of general application.

Under the first category of cases fall those in which the Commission deprived licensees of facilities or instituted penal action because of violations of the law or of the Commission's regulations. Violations of the law consisted of such acts as the use of obscene, indecent, or profane language by means of radio communication, unlicensed operation of a radio station, and operation of a station by persons other than licensed operators. Violations of the Commission's regulations included the use of power higher than that authorized, deviation from the assigned frequency by more than the tolerance allowed, failure to make full use of the frequency, the use of equipment not conforming to modern standards or the requirements of the Commission, and assignment of a license or the transfer of rights under a license without the consent of the Commission.

But the Commission went much further than such negative guides would indicate in its evaluation of broadcasting stations. From time to time, it objected to various features of programs and deleted stations because their programs were not up to its conception of the public interest. Features called objectionable by the Commission included the broadcasting of personal disputes, astrological talks, fortune telling, excessive direct advertising and direct selling, midwife advertising, intimidation of public officials, personal attacks, and many others. In one case in which a licensee was deprived of his facilities, the Commission objected to attacks on the American Medical Association because they were not carried on in a "high-minded way" and accused

the licensee of riding over the air "a personal hobby, his cancer-cure ideas and his likes and dislikes of certain persons and things."[1] In another case, the Commission held that the practice of a physician, in conducting a medical question box over the radio, of prescribing for patients whom he had never seen and basing his diagnoses upon the descriptions of symptoms in their letters, was "inimical to the public health and safety" and "for that reason" not in the public interest.[2] In still another case, a licensee was deprived of its license chiefly because of the utterances of the principal speaker, who attacked several religious organizations in such a manner as "to promote religious strife and antagonism," who made attacks upon public officials and courts which were not only "bitter and personal in their nature" but often based upon ignorance of facts without attempt to ascertain the truth thereof, and who in the absence of knowledge attacked individuals and institutions by the well-known method of innuendo.[3]

Such activities of the Commission, while they indicated a desire on its part to establish at least minimum standards of broadcast service, smacked of censorship, a power that was specifically denied it by Sec. 29 of the Radio Act. The issue of censorship was squarely presented in a case in which the Commission refused to renew the license of a station chiefly because certain of its programs were deemed by the Commission not to be in the public interest. The licensee appealed the case to the Court of Appeals of the District of Columbia, contending that in passing upon the merits of programs, the Commission was violating the provisions of the law regarding the censorship of radio programs. The Commission contended that in reaching a decision as to whether or not a broadcast license should be renewed, it must consider the merits of the program service already given and decide that the service rendered was or was not in the public interest and that this did not constitute censorship. This view was upheld by the Court of Appeals, the Court declaring that there had been no attempt on the part of the

[1] *Case of Norman Baker, licensee of station KTNT*, Docket 967.

[2] *KFKB Broadcasting Association v. Federal Radio Commission*, 47 F (2d) 670.

[3] *In re Application of Trinity Methodist Church South (station KGEF)*, Docket 1043.

Commission to subject any part of the appellant's programs to scrutiny prior to their rendition but had merely considered the past conduct in determining whether or not continued operation would serve the public interest, which was not censorship.[1]

This interpretation of the censorship provisions of the Radio Act enabled the Commission to delete stations whose service, in its opinion, did not serve the public interest and indirectly to affect the standards of all broadcast service. It made of the right of freedom of speech in broadcasting, a right that the censorship provisions were designed to ensure, a qualified right subject to such reasonable control as the Commission might deem consistent with the primary consideration of the public welfare. It clearly established that the right to broadcast is a privilege which gives rise to correlative rights and obligations and not an absolute right to be exercised when once obtained in perpetuity and in accordance with the whim and caprice of the individual licensee. Concerning the right of freedom of speech in broadcasting and the predominant character of the public interest, the Court of Appeals of the District of Columbia made the following significant statement:

> If it is to be considered that one in possession of a permit to broadcast in interstate commerce may, without let or hindrance from any source, use these facilities, reaching out, as they do, from one corner of the country to the other, to obstruct the administration of justice, offend the religious susceptibilities of thousands, inspire political distrust and civic discord, or offend youth and innocence by the free use of words suggestive of sexual immorality, and be answerable for slander only at the instance of the one offended, then this great science, instead of a boon, will become a scourge, and the nation a theater for the display of individual passions and collision of personal interests.
>
> This is neither censorship nor previous restraint, nor is it a whittling away of the rights guaranteed by the first amendment or an impairment of their free exercise. Appellant may continue to indulge his strictures upon the characters of men in public office. He may just as freely as ever criticise religious practices of which he does not approve. He may even indulge private malice or personal slander—subject, of course, to be required to answer for the abuse thereof—but he may not, we think, demand, of right, the continued use of an instrumentality of commerce for such purposes, or any other, except in subordination to all reasonable

[1] *KFKB Broadcasting Assoc. v. Federal Radio Commission*, 47 F (2d) 670.

rules and regulations Congress, acting through the Commission, may prescribe.[1]

While the Radio Commission on occasion indicated in a more or less specific manner program features that it considered undesirable, it avoided the promulgation of regulations banning objectionable matter from broadcasts on the ground that this would not be taking note of a station's past conduct but would constitute a most effective form of censorship. One request came to the Commission urging the promulgation of such a regulation banning the broadcasting of so-called lottery, or gift, programs, but the petition was denied. Similarly, the Commission refused to approve or disapprove any particular program before it was broadcast, although in more than one instance, where it objected to certain types of programs, in renewing licenses the Commission relied upon assurances of the licensees that programs of the particular type would not be broadcast in the future.[2] Such an attitude was necessary to evade the censorship prohibition, but it placed broadcasters in the unenviable position of being subject to the loss of their facilities for broadcasting programs which the Commission might later declare undesirable but of the undesirability of which they possessed no advance knowledge.

Attention should be directed at this point to the censorship exercised by station owners and managers, an important matter concerning which the Radio Commission took no official action. Many complaints were filed with the Commission, and others are of record, where licensees had refused facilities to persons obnoxious to themselves or their patrons or had deleted from addresses to be given over the air material obnoxious to those same parties, indicating that in actual fact a measure of censorship was being exercised by station licensees. The law placed no prohibition upon the exercise of such censorship by licensees of broadcasting stations, except to forbid it in the case of speeches given over their stations by qualified candidates for public office; and in practice licensees were compelled to maintain control over their programs, since both the Commission and the courts held them as well as the speakers liable for matter broad-

[1] *Trinity Methodist Church South v. Federal Radio Commission*, 62 F. (2d) 850, 852, 853.

[2] Dockets 1553 and 1569 and other cases.

cast over their stations;[1] but this privilege clearly was not above abuse.

With respect to more positive standards of broadcasting service, the Commission said that the basic formula for the evaluation of broadcasting stations might well be the principle of nondiscrimination between various groups of the listening public.[2] This principle of nondiscrimination is of general application in the field of public service. It implies that all who apply for service who are willing to pay the rates and subscribe to reasonable conditions must be served and that no consumer shall be charged more than another for the same service. The principle obviously must have a different application in the broadcasting field, however, since a station cannot serve one and not another in its territory where all are equipped with suitable reception apparatus, and no charges are levied upon the listeners. Its application to broadcasting means that the entire listening public within the service area of a station is entitled to service from the station and that where likes and dislikes differ, programs must be well-rounded so as to include features that will be of interest to all substantial groups represented in the listening public. The Commission was careful to avoid any attempt at setting up a rigid schedule specifying the amount of time that should be devoted to any particular type of program or the hours of the day or night when certain programs should be broadcast, but it did indicate that a well-rounded program would include music of both classical and lighter grades, religion, education and instruction, important public events, discussions of public questions, weather and market reports, news, and matters of interest to all members of a family. In choosing among applicants for the same facilities, and in evaluating the programs of a single station where no other parties were involved the Commission considered always the merits of programs from this point of view.

Manifestly, if the Commission had adhered strictly to the requirement that the programs of a broadcasting station must

[1] *In re W. B. Schaeffer (KVEP) v. Federal Radio Commission*, No. 5228, filed in D. C. Court of Appeals, June 24, 1930; also, *Sorenson v. Wood and KFAB Broadcasting Co.*, 243 N. W. 82.

[2] In the matter of the application of Great Lakes Broadcasting Co., etc., *supra*, 3d annual report of the Federal Radio Commission, p. 34.

be well-rounded, it would not have granted facilities to so-called propaganda stations, that is, stations operated by religious or social organizations whose programs are for the most part designed to appeal to a particular group in the listening public. The Commission, however, was faced with a very practical situation. Many such stations were in existence when it came into power, and it hesitated to deprive them of all right to operation. The Commission said that if the question had been raised before it for the first time, it would not have licensed any propaganda station, at least to a favored position. In view of the situation that existed, it dealt with propaganda stations on a comparative basis, assigning them mostly limited facilities.

The Commission's objections to propaganda stations were based upon a sound conception of the public nature of broadcasting. In the first place, enough facilities are not available to enable every conceivable school of thought, religious, political, social, or economic, to have a mouthpiece in the ether; yet if one were to be granted facilities, the Commission could not with consistency deny others. In the second place, a propaganda station is used for a good part of its time for a purpose essentially private, and such programs favor the interests and desires of a certain portion of the listening public at the expense of the rest. In the third place, propaganda stations for the most part do not have the financial resources, and they do not have the standing and popularity with the public, necessary to obtain the best results in programs of general interest, even though they might be able to accompany their messages with music and other program features of interest to the general public. In answer to an assertion frequently made that to follow out this viewpoint is to make unjustifiable concessions to what is popular at the expense of what is important and serious, the Commission expressed its confidence in the sound judgment of the listening public as to what types of programs are in its own best interest.[1]

A vexatious problem was that of the quantity and quality of advertising matter appearing in sponsored programs. The Commission nowhere attempted to limit the quantity of advertising matter in programs or to indicate the proportion of its total time, or the particular hours, that a station should devote to commercial broadcasts. Besides stating that broadcast advertising should

[1] *Ibid.*, pp. 34–35.

be incidental to the performance of a public service and that advertising should be presented as such, on the same principle that newspapers must not present advertising as news, the Commission did little but object to certain grosser forms of radio advertising. The attitude taken by the Radio Commission with respect to advertising, as with respect to radio programs in general, was that the responsibility for programs, their composition, and presentation must rest primarily upon the licensees and managers of broadcast stations. The Commission recognized that without advertising, the present system of broadcasting could not continue; and it felt that the listeners would not wholly be at the mercy of the broadcasters, since they could exercise a most effective censorship in turning their dials and in communicating their likes and dislikes to the station managers. The licensee of a station, dependent for success upon the popularity of his station, could ill afford to antagonize his audience or fail to provide programs that would have a general appeal. But if he should fail to do so, the Commission would have occasion both in connection with renewals of his license and in connection with applications of others for his privileges to review his past performances and to determine whether or not the service rendered complied with the standard. Other powers than these with respect to radio advertising the majority of the Commission believed that it did not possess. In response to a direct question put to it in a resolution of the United States Senate a majority of the Commission[1] said that

> . . . any plan to reduce, limit, and control the use of radio facilities for commercial advertising purposes to a specific amount of time or to a certain per cent of the total time utilized by a station must have its inception in new and additional legislation which either fixes and prescribes such limitations or specifically authorizes the Commission to do so under a general standard prescribed by that legislation.[2]

The Federal Radio Commission was much criticized for its alleged failure to deal positively with radio advertising, and it was taken to task frequently because of its grants of limited facilities to educational broadcasting stations and to others

[1] The minority believed that the provisions of Sec. 4 of the Radio Act of 1927 gave the Commission the necessary authority to limit and control the amount of time used for commercial advertising purposes.

[2] Commercial Radio Advertising, *Sen. Doc.* 137, 72d Cong., 1st Sess., p. 33.

interested in broadcasting from noncommercial motives. While some of this criticism came from parties not wholly disinterested, a great deal of it originated with people who sincerely believed that radio broadcasting, which they felt could be made into a great cultural and educational medium, was being misused for commercial advertising purposes. The dissatisfaction with the existing use of radio facilities became so widespread and so vociferous that in January, 1932, the United States Senate adopted a resolution requiring the Commission to make a survey of commercial radio advertising and to report to it on 15 specific questions.[1] Of these questions, several were of considerable importance. The Commission was required to report upon the recognition that it had given to the applications of educational institutions for broadcasting facilities, the changes that had been made in the grants to such institutions, the extent to which the Commission had given licenses to commercial stations for facilities applied for by educational institutions, and the extent to which commercial stations allowed the free use of their facilities for use by schools and public institutions.

In answering these questions, the Commission reported that from Feb. 23, 1927 (when it took office), to Jan. 1, 1932, it had granted radio-station licenses to 95 educational institutions, 51 of which had been classified as public, and 44 as private.[2] Of these stations, 44 were in operation as of Jan. 1, 1932, the licenses of 23 having been assigned voluntarily at the request of the educational institution to a person or corporation engaged in commercial enterprise, 18 having been deleted by reason of voluntary abandonment, and 10 having been deleted for cause.[3] During this period, the Commission had considered 81 applications from educational institutions for additional and more effective radio facilities, of which 32 were granted in full and 27 in part. Ten were denied after having been designated for public hearing; 10 were dismissed at the request of the applicant after having been designated for public hearing; and 2 were retired to files for lack of prosecution after having been designated for public hearing.[4] In no case had an educational station been

[1] Sen. Resolution 129, 72d Cong., 1st Sess.

[2] As defined in the Federal Office of Education bulletins.

[3] Commercial Radio Advertising, *op. cit.*, p. 50.

[4] *Ibid.*, pp. 55–56.

granted the exclusive use of a clear channel, although three educational stations had been authorized to share time on clear channels, and four others to operate on clear channels during certain hours specified in the licenses.[1] In two instances, the Commission granted licenses to commercial stations for facilities applied for by educational institutions; in four, it granted applications filed in behalf of educational stations for facilities used by commercial stations; and in six cases, it denied applications filed in behalf of educational stations for facilities used by commercial stations.

As to the extent to which commercial stations allowed the free use of their facilities for broadcasting programs for use in schools and public institutions, the Commission reported that 521, or 97.75 per cent, of the 533 stations that submitted reports to it had offered their facilities to local educational institutions. In all but a few cases, the facilities were offered free or at cost of operation. In some cases, while the facilities were offered free, it was specified that the programs must be meritorious, of high quality, and in the public interest; that they be restricted to talks; or that they be presented according to a regular schedule. The Commission reported that only 367 out of 540 stations, or 67.96 per cent, had received requests for facilities from educational institutions; and that of 538 stations, 343 reported the use of their facilities fairly regularly, 103 occasionally, and 92 not at all. About 95 per cent of the stations reported that local educational institutions did not use all the time that they were willing to provide. The Commission reported that in view of the attitude of broadcasters, it was of the opinion that educational programs could safely be left to the voluntary gift of the use of facilities by commercial stations.[2]

The conclusion of the Radio Commission that educational broadcasting could safely be left to the commercial broadcasters has been attacked vigorously not only by those more or less directly connected with educational stations but by many prominent educational leaders interested primarily in improving the quality of American broadcasting from educational and cultural viewpoints. The report itself has been attacked variously as being inadequate and failing to represent truly the

[1] *Ibid.*, p. 64.

[2] *Ibid.*, pp. 88–106.

actual situation with respect to educational broadcasting; but the real sources of disagreement lay much deeper. There has long been in the United States a group of people who believe that if broadcasting is to be developed as an educational or cultural medium, it must be divorced as completely as possible from control by advertising interests. In the first place, it is said, the radio audience is in reality composed of groups of minorities with definite likes and dislikes which are known or may be discovered, but to serve whom is in conflict with the interests of commercial broadcasters who depend upon advertisers for their revenues, who, in turn, are interested only in programs of mass appeal. In the second place, educational programs to be worthy of the name require definite planning and permanency of arrangement. They must be presented according to definite schedules and at times most suitable to the listeners for whom they are intended, and they must be free of even the suspicion of commercial censorship. These objectives, it is contended, cannot be attained where educational broadcasts are subject to the whims or the needs of stations that because of the nature of their operations must give precedence to the demands of commercial sponsors.

This group has always felt that the Radio Commission had subordinated the interests of educational stations, and they have made insistent demands upon Congress that the rights of educational broadcasters be protected and that some fixed proportion of broadcasting facilities be set aside and retained permanently for the use of educational, religious, and other nonprofit stations. Bills incorporating such provisions have been introduced into Congress from time to time, but they all have failed of passage. The issue was raised when the committees of Congress were considering legislation to set up a commission on communications, but Congress avoided it for the time by merely requiring in the Communications Act of 1934 that the Communications Commission investigate the proposal that Congress by statute allocate fixed percentages of broadcasting facilities for nonprofit enterprises and report to Congress its findings not later than Feb. 1, 1935.

In the second category of cases—those in which the Commission was called upon to choose between applicants for the same facilities or privileges—few principles of general application

were developed. One controlling principle was that of priority; that is, as between two broadcasting stations with otherwise equal claims for privileges, the station that had the longer record of continuous service had the superior right. This principle was applied by the Commission not only to proposed stations but in reducing the number that it found in existence. The Commission made clear that this was not a principle of vested rights or an extension of property rights to the ether, the Radio Act of 1927 negativing any possible claim to such rights. It was a principle firmly fixed in public utility law that an established business giving good service is not to be made to surrender or curtail its privileges in behalf of a newcomer, the latter having no superior right because he is a newcomer, or simply because it may be desirable that there be no vested rights.[1] Situations in which the principle of priority had to yield to more important considerations included cases where more equal distribution of broadcasting facilities was affected according to the requirements of the Davis Amendment and cases in which engineering principles and the needs of the public for different classes of stations were paramount.

Where two or more applicants for the same facilities or privileges did not have equal claims, the principle of priority became less and less important with increasing disparity in the claims. It was essential in order to avoid a "frozen" condition in the broadcast band, and to provide for the improvement of the broadcasting service, that those offering the superior service should be granted the facilities. In comparing or contrasting the relative merits of different applications, the Commission gave weight to two classes of considerations: first, the size of the population to be served, the amount and quality of the service already being given in the territory involved, the service needs and requirements, interference problems of the cities and communities concerned, and quota restrictions; and, second, the relative merits of each of the applicants with reference to financial responsibility, technical equipment, past, present, and proposed programs, and the service proposed in relation to the need. Where two or more applicants competed for stations located or to be established in the same community, considerations of the

[1] In the matter of the application of the Great Lakes Broadcasting Co., *supra*, p. 32.

second type only were involved; but where different communities were affected, many factors other than the relative merits of the applicants of necessity were considered.

The Davis Amendment required equalization by zones and states, and the Commission extended this principle in certain cases so as to provide a better distribution of facilities as between cities in the same state. Of primary importance were the relative needs of different communities for broadcasting service. As a general rule, the Commission favored applications from poorly served communities at the expense of those better served. This attitude was reflected also in the many cases in which the Commission refused to permit a station to move from a smaller to a larger community where such a change of location would result in the loss of a service needed in the smaller community. Similarly, the Commission frequently refused to increase the facilities of stations in better served communities where such increase would involve the complete or partial deprivation of facilities from communities not so well-served. Important considerations in this connection, however, were the financial resources of the applicants and the availability of talent in smaller communities. The Commission believed that no public purpose would be served by the grant of broadcasting facilities, which might be used in some other community, to applicants that in its opinion, because of a lack of financial resources or available talent, could not look forward with reasonable assurance to successful operation.

Cases in which there were two or more applicants for the same facilities in the same community arose where some newcomer desired the facilities of an existing station or where, as in the case of time divisions, one party applied for the whole or a part of the time allotted to another station. The only guides to a decision were the relative financial resources and technical equipment of the different applicants or the relative merits of past, present, or proposed program service. It was relatively simple to determine which of two or more applicants was best qualified from a financial or a technical standpoint; but to determine the relative merits of different programs, the Commission was forced to rely upon its conceptions of public policy in broadcasting. The competition among applicants often assumed a vicious, cutthroat nature, but the Commission laid

down the wise rule that an applicant would not be granted the facilities of another station merely upon the showing of improper use of such facilities but that each application would have to stand upon its own merits and not depend upon the defects of another station's operation. Although such matters might be taken into consideration in choosing between applicants, the Commission said, each applicant would have to prove that the proposed future operation would be in the public interest, since the proceeding in its ultimate analysis was not between this individual station and that individual station but between the applicant, or licensee, and the general public.[1] The issue thus presented comprehended the abilities of various applicants to serve the public.

In cases of this type, the Commission, especially in its early years, was deluged with evidence as to the comparative popularity of existing stations, consisting of polls of listener preference, affidavits, signed petitions, letters, and telegrams. The Commission was not long deceived by the untrustworthy nature of such evidence, however, and it soon came to realize that in most cases such evidence resulted only in an encumbrance of the record without any particular significance. As a consequence, for the most part, it was forced to rely upon its own judgment of the relative merits of programs arrived at from a consideration of them from an objective point of view, in spite of the fact that the ultimate test of the satisfactoriness of broadcast service was in its opinion the reaction of the listening public. Naturally, those who were adversely affected by the decisions rendered accused the Commission of being arbitrary and capricious. Conflicts of judgment also arose, both within the Commission itself and, during its early years, between the Commission and the Court of Appeals of the District of Columbia, that court until July, 1930, so far as radio cases were concerned, being merely a super-administrative body. Inevitably, however, where tastes differed so radically, as well as fundamental conceptions of the purposes for which broadcasting facilities should be used, there were conflicts of judgment. The Commission found, as must be clearly recognized, that the evaluation of the relative merits of broadcast programs cannot be reduced to a mathematical formula.

[1] Statement of facts and grounds for decision, No. 5204, filed May 19, 1930.

In summary, it may be said that the initial problems of Federal regulation of radio communication were those associated with broadcasting, although it is not implied that no regulatory problems have been faced in connection with the radio services other than broadcasting. These will be discussed in the following chapter. The principal reason for the enactment of the Radio Act of 1927 was to remove the chaos which then existed in broadcasting, and a large part of the activities of the Federal Radio Commission during the period of its existence centered around the establishment of a stable and permanent allocation of broadcasting facilities such that the maximum of service would be afforded with a minimum of objectionable interference. That from a technical viewpoint this has been accomplished in a remarkably satisfactory manner few will question. However, it was inevitable that the Radio Commission would have become deeply involved in other than technical matters, since the number of available broadcasting assignments is limited, and there always have been more applicants than facilities. In numerous cases, the Commission was forced to undertake the evaluation of the program service of stations, yet in such a matter, as we have seen, few guiding principles could be established. The preference of one applicant over another, of commercial over educational and propaganda stations, was justified by the Commission always on the basis of the superior service that would be afforded. It was to be expected that in these matters there would be differences of opinion, in the Commission as well as between the Commission and various groups of listeners, for the evaluation of broadcasting service is subjective, rather than objective. On the whole, it may be said that the Commission leaned toward conservatism in dealing with standards of program service, but this is not altogether to be deplored. Because the broadcasting service must be adapted to the varied and multitudinous likes and dislikes of the listeners, full opportunity must be given the owners and directors of broadcasting stations for the display of ingenuity and showmanship in the preparation and presentation of programs. The regulation of broadcasting under the present system, therefore, has been, and must be, confined for the most part to control over technical matters and the correction of recognizable abuses in program service.

CHAPTER XI

REGULATION OF RADIO-COMMUNICATION SERVICES OTHER THAN BROADCASTING

PROVISIONS OF THE RADIO ACT OF 1927 RELATING TO RADIO COMMUNICATION OTHER THAN BROADCASTING

The main reason for the enactment of the Radio Act of 1927 was to relieve the interference and congestion in broadcasting, but the law was made to apply to all radio communication. The licensing authority was given the power to assign frequencies to the various classes of stations, commercial as well as broadcasting, and to assign frequencies to, and determine the power and times for operation of individual commercial stations, since the efficiency of commercial radio communication depends as much upon the control of such matters by the licensing authority as does the efficiency of broadcasting. But the Act contained many provisions pertaining especially to the licensing and the operation of stations other than broadcasting. Certain ones, for example, concerned the operation of ship and shore stations designed to further safety in navigation. These related to the transmission and reception of distress signals, the interchange of messages between ship stations and between ship and shore stations, and the secrecy of commercial messages.

Section 13 directed the licensing authority to refuse a station license or permit to any person, firm, company, or corporation or any subsidiary thereof

> . . . which has been finally adjudged guilty by a Federal court of unlawfully monopolizing or attempting unlawfully to monopolize, after this Act takes effect, radio communication, directly or indirectly, through the control of the manufacture or sale of radio apparatus, through exclusive traffic arrangements, or by any other means or to have been using unfair methods of competition.

The object of this provision was to prevent the monopolization of radio communication, especially by manufacturers and distributors of radio equipment, but the powers of the Commission

under it were never clear. Section 17 forbade the combination of radio with cable, wire telegraph, or telephone, a provision designed to prevent the stifling of radio development by established communication agencies. Aside from avoiding the effects upon rates of the establishment of monopoly conditions in communication, Congress hoped that competition among the various services would tend to bring out the special qualities of each service and would stimulate more rapid scientific development.

Section 30 regulated the use of United States Navy stations in the conduct of commercial communications. Naval stations were then, and are now, carrying a considerable amount of commercial traffic in the absence of other facilities. This section authorized the use of naval stations

> . . . (*a*) for the reception and transmission of press messages offered by any newspaper published in the United States, its Territories, or possessions or published by citizens of the United States in foreign countries, or by any press association of the United States, and (*b*) for the reception and transmission of private commercial messages between ships, between ship and shore, between localities in Alaska, and between Alaska and the continental United States:

provided that the rates for such messages, other than press messages, should not be less than the rates charged by privately owned and operated stations for like messages and service. It provided, further, that the right of such stations to perform such services should cease whenever privately owned and operated stations should have become capable of meeting the normal requirements of such services.

Radio stations belonging to and operated by the United States Government were not subject to the requirements as to licenses and were not subject to the regulatory authority as to assignments of wave lengths, power, times of operation, etc. Such stations use frequencies assigned to each station, or to each class of station, by the President. However, government stations, except those on board naval and other government vessels while at sea or beyond the limits of the continental United States, when transmitting radio communications or signals other than those that relate to government business, were to conform to such rules and regulations designed to prevent interference as the regulating authority might prescribe. Radio stations on board

vessels of the United States Shipping Board or the United States Shipping Board Emergency Fleet Corporation or the Inland and Coastwise Waterways Service were made subject to the provisions of the Act.

The law reserved exclusively to American citizens the right to develop and use radio-communication facilities within the United States. It provided that licenses should not be granted to, or transferred in any manner, either voluntarily or involuntarily, to:

> Any alien or the representative of any alien.
>
> Any foreign government or the representative thereof.
>
> Any company, corporation, or association organized under the laws of any foreign government.
>
> Any company, corporation, or association of which any officer or director is an alien or of which more than one-fifth of the capital stock may be voted by aliens or their representatives or by a foreign government or representative thereof or by any company, corporation, or association organized under the laws of a foreign country.

Radio communication other than broadcasting includes a variety of services conducted over frequencies in the radio spectrum both above and below those of the broadcast band. The low- and medium-frequency (long-wave) bands include the frequencies from 10 to 550 kc.; and the high-frequency (short-wave) band includes the frequencies from 1,500 to 23,000 kc. and above, classified 1,500 to 6,000 kc. as medium high frequency, 6,000 to 30,000 kc. as high frequency, and above 30,000 kc. as very high frequency. The broadcast band, as has been explained, includes the frequencies between 550 and 1,500 kc. Regulation of radio communication over the low and the high frequencies by the Federal Radio Commission was subject to the terms and conditions of the treaty and regulations adopted at the International Radiotelegraph Conference held in Washington in 1927, later superseded by the convention and regulations of Madrid, ratified by the United States. The legislative standard for the guidance of the Commission was that licenses should be granted to applicants only when the Commission considered that the public interest, convenience, or necessity would be served thereby.

Low and Intermediate Frequencies.—The regulation of services located in the low-frequency and intermediate-frequency bands presented no special problems to the Commission. This

band of frequencies had been in use long before 1927, and, in prescribing the allocations to the various services, the International Radiotelegraph Conferences adhered closely to existing practice in the use of the frequencies. In the low-frequency band (10 to 100 kc.), stations are of higher power, no duplication on the same channel being permissible throughout the world. Because of the international character of communication in this band, the Commission made a study of foreign assignments before making allocations. It was the Commission's policy to consider established fixed stations operating on frequencies between 10 and 75 kc. with power in excess of 10,000 watts to have a prior right to such frequencies. The low-frequency band is for fixed (point-to-point) service.

Communication on the intermediate frequencies (100 to 550 kc.) is carried on with transmitters of less power than on the low frequencies; consequently, duplication of assignments may be allowed on certain of these frequencies whenever it is certain that the ratio of power to distance is such that no interference will result between stations. For example, ships operating in the Pacific may use the same working frequencies that are assigned to ships operating in the Atlantic. In this band are found a large proportion of the frequencies designated for ship use, including channels for distress signals. All radiobeacon and radiocompass services are likewise located in this band, primarily because of the peculiar characteristics of high frequencies which render them not sufficiently dependable for these services. Most of the radiobeacon stations, however, are operated by the United States Government and thus were not subject to regulation by the Commission. In addition, certain aeronautical stations are licensed to use intermediate frequencies. Also, under the treaty, provision is made for broadcasting stations now using low frequencies in the bands of 160 to 224 kc. This applies only to Europe, however, where such stations were already in existence. The number of channels in the low-frequency and intermediate-frequency bands is limited, and they are used practically to full capacity. Applications for new facilities in these bands come mostly from ships. The tendency of general communication companies is to seek facilities in the high frequencies.[1]

[1] 3d annual report of the Federal Radio Commission, 1929, p. 15.

High-frequency Band.—Prior to 1927, practically all commercial radio communication was carried on at low or medium frequencies. Much experimentation had been undertaken in the high frequencies, but their peculiar characteristics—skip-distance effects, fading, etc.—and technical difficulties in the construction of apparatus had led to the conclusion that they were not dependable for communication purposes. Later, but before the practicability of high frequencies had been fully demonstrated, it was thought that the number of channels in the high-frequency band (1,500 to 30,000 kc.) far exceeded the potential demand for them; consequently, licensing was done without reference to the character of service, priority as between classes of service, or any other orderly plan. However, by the time of the establishment of the Radio Commission, the high frequencies had come to be considered extremely valuable, their characteristics were known, and satisfactory apparatus had been developed for practical use. It was found that with these frequencies, communication was possible over great distances with the use of comparatively low power. Accordingly, applications for licenses to use high frequencies began to pour in upon the Commission; and by the fall of 1927, it became apparent that the actual and potential demand surpassed the number of frequencies available. The Commission saw that before further licensing could be done, it would be necessary to evolve a scientific and orderly plan, based upon a knowledge of the properties of these frequencies, their adaptability to various types of service, the comparative characteristics of bands of frequencies within the high-frequency band, the needs and merits of the types of service seeking accommodation in the band, and the application of the legislative standard of public interest, convenience, or necessity.

January 17, 1928, the Commission held a public hearing on applications for high-frequency channels, at which the following groups were represented and made pleas for accommodation in these bands:[1]

Newspaper services.
Communication companies, domestic and transoceanic.
Airplane, operating companies.
Navigation companies.
Motion-picture producers.
Police and fire-alarm systems.
Forest and watershed patrols.
Ranch owners.
Remote resorts and hotels.

[1] 2d annual report of the Federal Radio Commission, 1928, p. 27.

Railroads.
Department-store chains.
Electric railways.
Interurban bus systems.
Electric power-transmission systems.
Lumber companies.
Farm cooperative organizations.
Operators of facsimile-transmission services.
Radio manufacturers.
Mining and oil companies.
Packers and shippers.
Geologists.

One of the technical questions concerning which much difference of opinion developed among the experts, and one of singular importance because upon its determination depends the number of channels available, was as to the proper separation necessary between channels in the high-frequency band. Some contended that a separation of 0.1 per cent of the average frequency of each band, with the requirement that stations stay on their frequencies with maximum permissible deviation of 0.05 per cent, would be ample; but others contended that at least 0.2 per cent separation was necessary. This matter was finally decided by the Commission by the promulgation of General Order 62, Apr. 5, 1929, which provided that channel widths in the high-frequency band should be as follows:[1]

Frequency, kilocycles	Channel width, kilocycles	Frequency, kilocycles	Channel width, kilocycles
1,500 to 2,198	4	8,210 to 10,980	20
2,200 to 3,313	6	10,990 to 16,405	30
3,316 to 4,400	8	16,420 to 21,960	40
4,405 to 5,490	10	21,980 to 32,780	60
5,495 to 8,202.5	15		

This channeling system was based upon an approximate 0.2 per cent separation between channels. A visual broadcasting channel was made not more than 100 kc. in width; a commercial telephone channel below 3,313 kc., 6 kc.; and a relay broadcast channel between 6,000 and 9,600 kc., 20 kc. in width. In granting licenses, the Commission said that it would specify the frequency in the center of the particular channel to be used and that the licensee might then occupy the center frequency

[1] 3d annual report of the Federal Radio Commission, p. 19, 1929. General Order 62 was repealed by General Order 88, but the same channel widths were retained.

and, in addition, such adjacent frequencies as might be permitted by the frequency maintenance tolerance and required by the type of emission that the station was authorized to use. Also, licensees of fixed stations which had been granted the use of a channel for communications with specified points might, upon application to the Commission for licenses, be granted the use of the same channel for communication with other points on the condition that the public interest, convenience, and necessity would be served.

The Commission announced that the assignment of frequencies to stations could, under no circumstances, be construed as a gift or grant of such a thing as a "channel." The Commission believed that in the field of high-frequency communication, the public interest required a degree of permanence and certainty, but it did not take the position that the designation of a frequency was the grant of a facility. The Commission believed that its powers extended only to the issuance of a license for the conduct of a specific communication service for a limited period of time, not to exceed one year, and that it designated frequencies and power to be used by individual transmitters in order to prevent interference, these being matters over which the licensing authority must always retain control.[1]

As a result of the recommendations of the first C.C.I.R. Conference, the Commission on Sept. 3, 1931, adopted a 0.1 per cent channeling system, which was placed in effect on Feb. 1, 1932. This system is basically still in effect and was reiterated by the Communications Commission in its Rule 229.

The Transoceanic High-frequency Band.—Following the high-frequency hearing of January, 1928, the Commission concentrated its activities in the high-frequency band on the transoceanic channels (6,000 to 23,000 kc.). This frequency range is primarily suitable for long-distance international communication because of the skip-distance effect characteristic of the higher frequencies. With substantial power, only one station may operate on a channel, since the interference range is world-wide. Some measure of urgency existed with regard to the distribution of these frequencies in order that they should not be appropriated by other nations to the disadvantage of the United States. Under the Washington and Madrid regulations, each frequency

[1] *Ibid.*, p. 19.

must be notified by the nations that use it, and no signatory nation may establish under its jurisdiction a station that would cause interference with a previously established service of another nation. On May 14, 1928, the Commission held a public hearing preliminary to the allocation of these channels, direct communication between the Atlantic and Pacific seaboards also being included because of the great distances between coasts. At this hearing, the following interests were represented:[1]

Western Union Telegraph Company.
United States Navy.
United Press.
Radio Corporation of America.
Chicago Tribune.
Postal Telegraph Cable Company.
American Telephone and Telegraph Company.
Mackay Radio and Telegraph Company.
Radio News Magazine.
S. P. Radio Company, Inc. (International Quotations Company).
Geophysical Research Corporation
New York Times.
American Publishers' Committee.
Radio Protective Association.
Pacific Communication Syndicate of San Francisco, Calif.
Washington Post.

On May 18, 1928, the Commission considered an engineering memorandum setting forth general principles to be followed in allocating fixed services in the transoceanic band. These principles were as follows:

1. Licenses can be granted only to those agencies that will operate in the public interest, convenience, and necessity.

2. Competition is necessary to insure the advance of the art and its maximum value to the public.

3. Companies having demonstrated their fitness to serve and their ability should have prior consideration in so far as possible, bearing in mind that competition is necessary.

4. The same technical standard should be required for all applicants, and extra channels for relaying should not be granted to one company if another company is granted channels for direct communication without necessity for relaying.

5. The number of competing companies should be limited to two for parallel services. This is necessary in order that the United States may use its limited quota of frequencies to best advantage in maintaining contact with all nations.

6. The value of high frequencies increases with the distance; therefore, the most desirable frequencies should be assigned for circuits of maximum distance.

7. Frequencies should be assigned in blocks to individual agencies as far as practicable in order to permit the more progressive agencies to increase

[1] 2d annual report of the Federal Radio Commission, 1928, p. 242.

the number of channels within their respective blocks as rapidly as their skill permits.

8. Licenses shall state for which circuits each frequency is licensed.

9. If the United States grants licenses to competing interests to communicate internationally, definite assurance should be obtained that these competing interests will not be so keen in their efforts to obtain foreign contracts that the domination of communications, as between the United States and other nations, will not pass into the control of foreign nations which do not permit competition.

10. All licenses should be nontransferable. This is necessary to prevent traffic in sale of frequencies.

11. Licensees shall be required to present copies of their specifications and contracts for radio stations and of service contracts with stations with which they will communicate (if not owned by them) within 90 days from date of granting license. Failing in this, licenses should be revoked. This latter procedure is necessary; otherwise, there will be danger that the channels that the United States has registered in the international bureau may be appropriated by another nation.[1]

On May 24, 1928, the Commission allocated 74 high-frequency channels for transoceanic service, for which construction permits were issued. The construction permits were issued subject to the following rigid conditions:

All construction permits issued for transoceanic high-frequency communications are to be for public service point-to-point stations.

The grantee shall:

1. At any time designated by the commission satisfy the commission of its financial ability to construct the said station and to do the work contemplated under the said permit.

2. Within 60 days of the date of issuance of construction permit, submit to the commission satisfactory evidence of arrangements made for the purchase of transmitting equipment which, in the opinion of the commission, will be capable of transmitting on the assigned frequency to the points designated in the said permit.

3. Within 90 days of the issuance of the said permit, submit to the commission a report showing the progress made in establishing receiving and transmitting stations at the points named therein. (In the event a satisfactory showing is not made, the commission reserves the right, in its discretion, to immediately cancel the said permit.)

4. Within 6 months of the date of the issuance of said permit, complete the construction of the station authorized therein and be ready to commence operation thereof.

[1] *Ibid.*, p. 242.

The Commission may, in its discretion, extend the date on which the grantee is required to show progress or complete construction.

The specific frequency assigned or to be assigned is subject to the right of the United States to assign the same for public service and is, or will be, assigned only for the license period. At the end of any license period for the particular frequency, it may be assigned to other public service stations, in the judgment of the licensing authority.[1]

In making its allocations, the Commission adopted the principle that competition should be maintained between stations operating in the transoceanic band, a principle stated as follows:

That competitive service be established where there are competing applications or an application or applications to compete with already established service; and that in the grant of competing licenses, fairness of competition be established, except that as to an isolated country, which, in the judgment of the commission, will not afford sufficient business for competing wireless lines, only one grant of license shall be made, preferably the first application in priority.[1]

As a result of its allocations, the Commission felt that the foregoing principle was carried out, in that enough companies were licensed to assure competition but not so many as to cause difficulty to the public in making use of the systems. All channels assigned were notified to the International Bureau at Bern, Switzerland. The Commission realized, however, that in order to protect the assignments, it would be necessary for the licensees to complete the construction of their stations and begin operations at the earliest possible date, and it exercised considerable vigilance in this regard. As to the proportion of total channels available to the world and not in use, which the United States would be justified in appropriating, opinions varied, and no final decision was made.

The table[1] on page 297 shows the allocation of the transoceanic channels by the Commission as of May, 1928. No allocations were made in this band for services wholly within the United States.

The Commission adhered steadfastly to the principle that the transoceanic frequencies should not be granted for private usages but solely on a public utility basis. The Robert Dollar Steam-

[1] 2d annual report of the Federal Radio Commission, p. 30.

ship Company, for example, applied for permits for radio stations to be constructed at San Francisco and New York to provide communications in connection with the operation of its "Round the World" passenger and other passenger and cargo services. The facilities were granted by the Commission only on the condition that this company maintain a public utility point-to-point service, in which messages would be accepted from and delivered to the general public. The Dollar Company, accordingly, organized Globe Wireless, Ltd., a communications company, to take over its radio operations and to operate on a public utility basis.

Company	Then using	Applied for	Approved	Total assigned
Pacific Communications Company	..	8		
Robert Dollar Company	..	15	8	8
Tropical Radio Telegraph Company	..	12	7	7
American Telegraph and Telephone Company	3	9	9	12
American Publishers	..	22	20	20
The Mackay Company	22	19	15	37
Radio Corporation of America	50	55	15	65
Total	75	140	74	149

Where other means of communication were lacking, or where their use would occasion considerable delay and expense, the Commission at times granted facilities to corporations whose business primarily was not communication, because in such instances radio furnished by far the most economical means of communication. These facilities, however, always were granted on a public utility basis for the use of the general public as well as the private corporations concerned. Such were the grants to the Firestone Tire and Rubber Company of Akron, Ohio, for a transoceanic service to Liberia, Africa, where it has a rubber plantation; and to the Southern Radio Corporation, a subsidiary of the Standard Oil Company of New Jersey, for the maintenance

of radio communication with its properties in South America. In the case of the latter grant, radio was made to perform one of its most important services to humanity—that of bringing isolated, almost inaccessible regions into contact with the rest of the world. Formerly, communication between the Standard Oil Company and its remote properties had been carried on by cable, then by uncertain land wire, and finally by mule.

Press International Radio Communications.—One of the most important groups that appealed to the Commission for transoceanic frequencies was the American press. The importance of this group is due not alone to the quantity of communications carried on by and for them but to the fact that their communications ultimately are for the benefit of the general public. Various newspaper organizations, as has been seen, were early in the field of radio communication; and after the World War, many others carried on their own communications on a limited scale. At the hearing on the transoceanic high-frequency channels, so many press interests applied for facilities that the commission realized that it would have to adopt a definite policy regarding allocations to the press.

Early in 1928, the Commission held a series of hearings to determine the advisability of recognizing a class of radio stations to be known as "public service, point-to-point stations, engaged in the transmission of press communications" and later authorized the grant of permits for general service stations in the transoceanic service to a trustee who would be required to furnish the Commission with satisfactory evidence that such stations would represent the entire press of the United States for radio communication. August 1, 1928, these construction permits were issued to Joseph Pierson as trustee for the American Publishers' Committee, for the construction of stations on 20 transoceanic channels allotted to the press. Later, certain press organizations applied to the Commission for assignment of frequencies to individual applicants, but this request was denied by the Commission on the ground that it would be unwise to parcel out the frequencies piecemeal.

November 26, 1928, the American Publishers' Committee presented to the Commission a plan of organization and allocation of the 20 transoceanic channels allotted to it for the use of the press as a whole, which contemplated assignment of the

channels to 11 newspapers and press associations. It provided for authorization of such assignments by the Commission and for the use of the radio network thus set up for the benefit of all the press. The following organizations were to receive assignments:

American News Traffic Corporation.
Consolidated Press Wireless, Inc.
New York Times Wireless, Inc.
New York Herald-Tribune Wireless, Inc.
Press Publishing Company Wireless, Inc.
San Francisco Chronicle Wireless Corporation, Ltd.
United Press Wireless, Inc.
Scripps-Howard Wireless, Inc.
Universal Service Wireless, Inc.
Los Angeles Times Wireless, Inc.
Chicago Tribune Wireless, Inc.

The various press organizations, however, could not agree as to these allocations; and at a hearing on Mar. 8, 1929, press representatives proposed a new arrangement to handle the transmission of news which would waive the requirement of public service corporations to handle news traffic. This plan pleased neither the Commission nor many press organizations. Accordingly, June 20, 1929, the Commission suggested the creation of a single public utility corporation to provide "a bona fide public service open to all agencies of the American press on a fair and equitable basis," by employing the 20 transoceanic channels allotted to the press. The Commission gave the following as its reasons for this action:[1]

1. It will permit the constant lessening of frequency separation as radio science develops and hence most economically exploit the use of radio facilities.
2. It will promote more efficient management of press communication.
3. It will provide the only means for flexibility of frequency use to take care of changing situations of important news events.
4. It will prevent uneconomic duplication of facilities.

[1] Statement of facts and grounds for decision by the Federal Radio Commission in *Universal Service Wireless v. F.R.C., U. S. Daily*, Aug. 1, 1929.

5. It will prevent ruinous competition between communication agencies of the same character while at the same time creating an agency of sufficient strength to engage in healthy competition with other radiocommunication companies.

6. It will be the only means of preserving a reserve of radio facilities for use in case of important news events or great need for emergency communication.

7. It will guarantee neutrality of use and will prevent the otherwise certain monopoly of a subsidiary's facilities by the parent newspaper company.

8. It will avoid congestion on some frequencies and idleness on others by a proper distribution of traffic.

9. It will provide for the assignment of radio facilities from a national standpoint as distinguished from a local assignment based upon needs of individual newspapers.

10. It will provide the only practical guarantee that radio facilities will be available for newspapers and press associations which desire to use them.

11. It will provide increased facilities for multidirectional transmission to large numbers of newspapers served by press associations.

12. It will afford an opportunity for the participation of agencies prevented by their charters from forming subsidiary public utility companies.

13. It will provide the only method for grouping adjacent frequencies in one transmission to give to newspapers the advantage of facsimile transmission by radio.

Following the order of the Commission, a corporation was organized, as we have seen, to be known as Press Wireless, Inc., to succeed the American Publishers' Committee, its purpose being to furnish American newspapers with wireless communication on a public utility basis. Its organization was approved by the Commission July 9, 1929. To it were allotted the 20 transoceanic channels; but for a long time, 7 of these were not available owing to court stay orders. In January, 1931, these stay orders were lifted; and on the nineteenth of that month, the full 20 channels were released for use by Press Wireless, Inc. As a result, the larger part of international radio communication for the press is conducted by this one corporation. At present, several newspapers are stockholders in it; but under its grant from the Commission, it must accept the news traffic of all accredited American press interests. The American press still, however, handles a

large part of its international communications through established commercial wire and radio companies, but the possession of its own radio facilities is of immense importance.

Relay Broadcasting.—Relay broadcasting, which is defined as the transmission on high frequencies over long distances of broadcast programs from one broadcasting station to another such station or stations that rebroadcast the program to the public on the regular broadcast frequency of the receiving stations, is conducted on frequencies located in the transoceanic high-frequency band.

The frequencies set aside for relay broadcasting were not designated exclusively to licensees but were to be shared jointly by the licensees authorized to operate experimental relay broadcast transmitters. The Commission required detailed reports from licensees as to the use made of these frequencies and the results accomplished. Based on these reports, the Commission granted licenses for 6 months or for longer periods, as it saw fit. Licenses were issued only to applicants who were qualified to operate experimental relay stations over long distances strictly for relay broadcast use or experimental relay broadcasting. Priority of assignment was given to applicants who presented satisfactory evidence that they would provide: (1) adequate power for transoceanic distribution, (2) satisfactory programs for transoceanic distribution, and (3) adequate and regular reception and distribution of their programs.

The frequencies set aside for relay broadcasting were assigned to stations only if the broadcasting was destined for foreign countries and arrangements were made for reception in those countries. General Order 68 provided that no station engaged in relay broadcasting should grant authority to any radio station within the United States to rebroadcast its programs without first obtaining the written consent of the Commission; and the Commission did not grant licenses for domestic rebroadcasting. It felt that domestic relay broadcasting would utilize for short distances radio frequencies that should be reserved primarily for long distances and would be a duplication of a possible service available by wire lines. Licenses were granted only to those seriously engaged in improving the technique of the art, who showed satisfactory evidence of being able to contribute substantially toward its progress. Licenses issued for relay broad-

casting were on an experimental basis. Such stations were not licensed to conduct message traffic of any kind, their purpose being primarily the advancement of the radio art. The early orders and policies of the Federal Radio Commission in connection with relay broadcasting were subsequently reiterated by the Federal Communications Commission.

Maritime Services.—Radio communication for maritime purposes is conducted on high, low, and medium frequencies. Licenses long had been granted for ship and coastal stations by the Secretary of Commerce; and the Radio Commission early granted applications as they were filed, without a regular plan. But because of the number of applicants and the limited amount of facilities, the Commission soon found that it would have to adopt a systematic plan also for the allocation of facilities to maritime services. Accordingly, on May 10, 1929, the Commission approved a maritime-mobile allocation plan listing facilities for the various ship and coastal stations. This plan comprehended allocations to all maritime stations—ocean-going vessels, Great Lakes vessels, and coastal stations. Following the adoption of the plan, the Commission modified all existing maritime radio licenses to conform to its provisions.

Experience demonstrated, however, that the plan of May 10, 1929, was not entirely satisfactory, since the inauguration of public telephone service between passenger vessels at sea and the shore necessitated the allocation to this service of additional frequencies free of radiotelegraph interference. A conference was held, beginning Jan. 14, 1930, for the purpose of considering amendments to the plan which was attended by representatives of commercial companies and government engineers. As a result of this conference, a committee was formed to assist the Commission in the formulation of a new plan. The objectives of the work of the Committee were:[1]

1. To make more efficient use of the frequency space by arranging shore and ship channels in groups so as to permit the greatest possible operating efficiency in conformity with the technical limitations.
2. To provide for new services and expansion of old ones, especially for ship and shore telephony and telegraphy.
3. To provide for the elimination of interference between maritime and aircraft services.

[1] 4th annual report of the Federal Radio Commission, 1930, p. 65.

4. To provide for the necessary technical relationship between telephone and telegraph channels on the same ship.

5. To form the basis of a plan that might be submitted by the United States at the next international radio conference.

The committee devised a new plan of allocation more in accord with the technical requirements of fitting so many stations into so limited a number of channels.

Radio Communications in Alaska.—The Signal Corps of the United States Army has the task of assuring reliable communications between the United States and Alaska and within Alaska by means of the Signal Corps radio network. This radio system is one of the oldest in existence. It provides facilities not only for the Territorial Government but for many commercial, fishing, and canning industries. Quite early, these commercial companies had set up their own radio systems, but the Commission decided that after Dec. 31, 1929, it would not allocate radio frequencies to private commercial radio circuits between Alaska and the United States. At that time, there were some 120 point-to-point radiotelegraph stations in Alaska, maintained by 33 canning and other Alaskan companies, employing about 30 intermediate frequencies. The Commission decided that it would allocate frequencies only to public service communication companies which would handle communications for any and all industries and individuals in Alaska. It set aside specific frequencies for point-to-point communication, for coastal communication with ocean-going vessels, and for short-range coastal communication with small craft, the latter channels specified for radiotelephone communication between the shore and small fishing boats off the coast.

The various packing companies (including, among others, Libby, McNeill & Libby, Pacific American Fisheries, Alaska Packers Association, and Northwestern Fisheries) contended, however, that they must operate their communications independently because of competition among them. Radio Communication, they said, is absolutely essential to the conduct of their business, since cables and wire do not reach the little outposts where the fishing operations are based, and which must have contact with the canneries so that their operations may be coordinated with the size of the catches. As a result of an intensive study of the commercial situation, with the cooperation

of the Signal Corps officials, who have had direct supervision of radio communications in Alaska in the past, the Commission, on Dec. 20, 1929, promulgated General Order 79, which set forth a definite licensing policy whereby the commercial operation of stations fitted in with the Signal Corps plan.

The policy adopted by the Commission provided adequate service at all times, without discrimination, for the general public, and all nongovernmental radio communication was required to cooperate with the Army Signal Corps. The main features of the plan, reaffirmed by the Federal Communications Commission, were:

1. Nongovernment stations licensed pursuant to this general order must provide adequate service at all times without discrimination for the general public.

2. Applications for construction permits or licenses for the construction or operation of nongovernment stations must be filed with the supervisor of radio at Seattle, Wash., who shall send them to the "officer in charge, Washington-Alaska Military Cable and Telegraph System." This officer shall recommend by indorsement the type of equipment, frequencies, etc., necessary for efficient operation with the Alaska system and shall forward them to the Chief Signal Officer of the United States Army. The latter officer shall approve or amend the recommendations and forward them to the chief of the Radio Division, Department of Commerce, who, in turn, shall forward them to the Commission.

3. Licensees using transmitters employing damped-wave emissions are required to install transmitters employing continuous waves.

4. Frequencies are designated for point-to-point communication between government and nongovernment stations in Alaska; for short-distance point-to-point communication between nongovernment stations, provided that power shall not exceed 100 watts and upon the condition that no interference will result to other services; and for the use of stations engaged in ship-to-shore or coastal communications, with power limited to 200 watts.

THE CONTINENTAL HIGH-FREQUENCY BAND

The continental high-frequency band includes the frequencies 1,500 to 6,000 kc. Whereas the frequencies above 6,000 kc. carry better to great than to certain short distances, frequencies in the continental band have much shorter ranges. Between 2,000 and 3,000 kc., the frequencies are suitable for distances of 100 miles by day and several hundred by night; and between 3,000 and 6,000 kc., a few hundred miles by day and 1,000 or more miles by night.[1] Obviously, nearly all the former channels may be used by the United States regardless of their use else-

[1] These distances vary diurnally, seasonally, annually, and in accordance with sun-spot cycles.

where; and the latter frequencies may be used freely by day, although their use in other parts of the world must be considered when nighttime transmission is desired.[1] Owing to these facts, therefore, the Commission felt that the allocation of the continental frequencies presented no urgent problems. The first problem to which it addressed itself was the determination of the channels that would be available for the use of the United States. This matter was settled by an agreement among the United States, Canada, and the other North American nations.

When the Commission turned to a consideration of allocations in the continental band, however, it found many intricate problems to be solved. Among the services requesting facilities were:

Point-to-point fixed services.
Communication between airplane and ground stations.
Communication between ships and coastal stations.
Police services.
Marine-calling frequencies.
Experimental services.
Geophysical services.
Railway communication.
Scientific expeditions and yachts.
Portable stations.
Power-company emergency communications.
Television.
Picture transmission.
Amateurs.
State, municipal, and semi-governmental services.

A number of hearings were held in which two conflicting interpretations of the legislative standard of public interest, convenience, or necessity were presented. One interpretation was that, in general, the public utilities test should be so applied that no applicant would be licensed unless it had a legal status such that it would be obliged to serve the entire public on an equal basis. The strict application of this interpretation by the Commission would have led to the licensing only of services of such a character as to duplicate present wire systems by competitive radio systems between the larger cities, and the chief benefit to the public would have come through such competition. The other interpretation argued that radio should be employed

[1] Discussion of high-frequency spectrum by Dr. J. H. Dellinger, 2d annual report of the Federal Radio Commission, 1928, pp. 231–233.

primarily for services that, as a practical matter, could not be duplicated by wire systems. The Commission did not follow strictly either of these interpretations.

General Domestic Radio Communication.—At the hearings on the continental wave band, several parties applied for facilities for the establishment of general communication systems by radio similar to, and in competition with, established wire systems. These applicants were the Universal Wireless Communication Company, the press, Western Radio Telegraph Company, Intercity Radio Telegraph Company, Wireless Telegraph and Communications Company, Mackay Radio and Telegraph Company, and R.C.A. Communications, Inc. The Universal Company was a new corporation, organized for the purpose of establishing a radio system to serve 112 cities scattered throughout the United States. The Intercity Company was already engaged in ship-to-shore communication on the Great Lakes. It proposed to serve 21 cities in 14 states, the most westerly proposed station being in eastern Texas, with no proposed services to the Pacific Coast, the Northwest, and the Rocky Mountain Region or to most of the Midwest, New England, and the Southwest. The Wireless Telegraph and Communications Company proposed to serve 29 widely scattered cities in 23 states and the District of Columbia. The Western Radio Telegraph Company planned to serve 13 towns in Texas, Oklahoma, and New Mexico, the territory being an oil-producing region in urgent need of communication facilities, wire communications being inadequate and in some cases altogether lacking. This company was a general public communications company organized to take over the radio stations of the Marland Pipe Line Company, the Phillips Petroleum Company, the Texas Pipe Line Company, and the Skelly Company. The Radio Corporation of America proposed to serve 29 cities in 19 states and the District of Columbia. One of the principal reasons for its request of facilities was the desire to establish pickup and delivery services for its transoceanic network, reliance upon wire communication companies being unsatisfactory and burdensome. The Mackay Company, which had already established a radiotelegraph system on the Pacific Coast, hoped to extend this system and to establish a coordinated service with its affiliated wire system (the Postal Telegraph system) which would make possible the continuance

and extension of the number of contacts with small towns, where telegraph stations are, or would be, unprofitable. The press, as in the case of the transoceanic services, desired to establish separate radio services for their own uses.

A. Principles in Allocating Facilities for Domestic Radiotelegraph Systems. 1. SEPARATE FACILITIES FOR THE PRESS.—The Commission realized that an important part of domestic radio communications would consist of news and that unless there were separate facilities for the press, the practice would develop, as in the case of the wire-communication companies, of leasing circuits to the newspapers. The Commission felt, however, that the assignment of wave bands to radio companies to be leased in turn to the press would constitute an objectionable practice, since any such lease inevitably would involve a compensation to the lessor not only for apparatus and personnel but for the use of the channel, and the medium for radio communication is not created by communication companies. The Commission believed, therefore, that radio facilities should be granted separately to the press.

Allocation of separate domestic facilities to the press was justified also on the ground that it would enable greater flexibility in the handling of news. The Commission stated this advantage as follows:

> The situs of important news events changes from day to day and from hour to hour. An important governmental event in Washington may be followed by a noteworthy sporting event in New York City, to be in turn supplanted in the public eye by local floods, tornadoes, or earthquakes. The proper utilization of radio in the collection and distribution of news will thus require a rapid shifting of the number of operating station bands from point to point entirely from a standpoint of news values. The general public service communications company, with its requirements for constant availability of facilities throughout its system, is unable to accommodate itself to news events. The economies of utilization thus indicated as available through press assignments will benefit both the press and the general communication companies, relieving the latter of the necessity for complying with heavy and sporadic demands for service at individual localities. The public must benefit both as a user of the general communication service and as a "consumer" of news.
>
> Another consideration indicates the desirability of a reasonable designation of facilities to the press. Radio is a multidirectional service;

the wires are not. Press associations, distributing news to hundreds of member and subscriber newspapers, can take extensive advantage of this natural phenomenon by the multidirectional distribution of news service to innumerable newspapers which are unable to obtain those services by wire because of excessive expense. This can only be accomplished by the designation of station bands for the use of the press—if leased circuits are to be avoided—inasmuch as general communications companies are compelled to keep their facilities open for the demands of undirectional traffic.[1]

2. THE STATUTORY STANDARD MUST BE APPLIED FROM A NATIONAL POINT OF VIEW.—The standard of public interest, convenience, and necessity must be applied from a national point of view. In the first place, the number of channels is limited, and the interference effect of transmissions in the band 3,000 to 6,000 kc. is nation-wide. The scarcity of channels requires that the utmost utilization be made of facilities to accomplish the greatest possible communication both in distance and in geographical breadth. In the second place, the utility to the public of a radio communication system increases in geometric proportion as the number of communities are increased. (For example, a system between two cities *A* and *B* provides two services—*A* to *B* and *B* to *A*. But if the circuits are doubled, by adding cities *C* and *D*, the range of the system for public use is increased by the multiple 6—services from *A* to *B*, *A* to *C*, *A* to *D*, *B* to *A*, *B* to *C*, *B* to *D*, *C* to *A*, *C* to *B*, *C* to *D*, *D* to *A*, *D* to *B*, *D* to *C*.) Consequently, it is desirable that systems of comprehensive scope be established. It being true, however, that the geometric increase of service range involves also a similar increase of the amount of traffic handled, a system using a restricted number of channels cannot increase the number of cities served beyond the point at which the channels would be completely saturated. A communication system is thus limited by the amount of traffic available at the cities chosen for station locations and by the number of stations the system is able to operate upon a standard channel because of technical ability, duplication, and shifting of channels. In the third place, the comprehensiveness of the system must be scrutinized to determine its effect upon other services, its reasonableness, and its choice

[1] 3d annual report of the Federal Radio Commission, 1929, pp. 38–39.

of cities with respect to other factors to be considered in determining the requirements of public interest.

3. EXISTING COMMUNICATION FACILITIES MUST BE CONSIDERED. Early in its history, the Commission took the position that applications would not be granted for services that would duplicate those already furnished by landwire companies. One reason for the adoption of this principle was the desire on the part of the Commission to conserve the limited number of frequencies available for domestic service until it could determine the most provident allocation that might be made. A second reason was its desire to prevent radio companies from taking the cream of the message traffic from wire companies without furnishing a correspondingly comprehensive service. The costs of wire circuits between small communities are not always justified by the income from the traffic of such communities. Offices in these communities are maintained to provide a nation-wide service, and a portion of the costs of maintaining such offices is met by the charges levied upon message traffic on the profitable circuits between large centers of population. The Commission, therefore, from the standpoint of the public welfare, believed that it should not encourage the establishment of radio-communication systems based solely upon the selection of the most profitable points of communication. In the first place, such radio systems would not furnish a nation-wide communication service; and, in the second place, since they would be enabled to offer reduced rates on such profitable circuits and thus to obtain a large share of the message traffic, such radio companies would make it more difficult, if not impossible, for wire companies to maintain service on the unprofitable circuits. Thus, the Commission felt that it must favor a comprehensive radio-communication system offering service on a nation-wide basis, as against a selective one offering service only on the profitable circuits. Upon the basis of similar considerations, the Commission believed that it should not grant the limited radio facilities to companies that would rely chiefly upon handling at reduced rates the bulk traffic of individual large corporations to the exclusion of the less profitable occasional traffic of the general public, especially since wire-communication companies are prevented by law or regulation from such preferential or discriminatory arrangements. However, the preceding considerations, the Commission said, should

be weighed in the light of the desirability of proper competition between radio- and wire-communication companies.

4. THE INTERNATIONAL COMMUNICATIONS OF AN APPLICANT FOR DOMESTIC SERVICE MUST BE CONSIDERED.—As has been said, there was a certain amount of urgency in allocating radio facilities for transoceanic communication, in order that the channels might not all be appropriated by other nations. Thus, certain companies were granted facilities for international radio communication before the Commission took up the matter of domestic radio systems. International facilities, however, must usually be supplemented by domestic feeders. A transoceanic communication agency could not subsist on the traffic to and from seaboard cities alone. Its success depends upon its ability to afford contacts with the many interior points to and from which international communication might take place. The Radio Corporation of America, for example, has had to rely upon the wire-communication companies for pickup and delivery services in connection with its transoceanic communications. The Commission felt, therefore, that companies established in the transoceanic field were entitled to consideration in the allocation of facilities for domestic radio communication.

5. COMPETITION BETWEEN RADIO SERVICES MUST BE CONSIDERED.—The Commission did not favor a monopoly of domestic radio-communication facilities but, on the contrary, believed healthy competition between radio services desirable. It felt, however, that factors of competition must be considered from a broad point of view, not from an individual or local one; and that they must not be considered controlling to the exclusion of other considerations of the public interest. The establishment of too many competing radio services in the same localities for a limited volume of traffic would not serve the public interest, since the income would not be ample to support them all, and the development of radio communication thereby would be impaired. The establishment of a competitive ideal, therefore, could be approached only to the extent that proposals for radio systems satisfactory in other respects would be made.

6. A PROPOSAL SHOULD CONFORM GENERALLY TO SOUND ECONOMIC PRINCIPLES.—An applicant for domestic radio facilities should be able to demonstrate his financial ability to carry out the proposal. It was necessary that the Commission consider

this matter to forestall economic waste through the installation of expensive apparatus by companies unable to support the burden of loss during the development period and to assure the continuous operation so essential to the performance of a public service. The mere fact of loss, the Commission said, must not interfere with efficient operation if public interest is to be served; and in all likelihood a domestic radio-communication company would suffer losses in its early operations. Various other factors to be taken into consideration in determining the economic feasibility of a proposed system were proposed rate schedules; the availability of message traffic and the demand for service; the location of the circuits with respect to railroads, waterways, and air routes; and similar matters.

7. TECHNICAL CONSIDERATIONS.—The technical program of an applicant must be carefully scrutinized. The Commission believed that this should apply not only to the program of an applicant that had operated on a large scale in the past but especially to plans outlined by new enterprises. To grant licenses only to those who had demonstrated their capacities in practice, the Commission said, would be to create an undesirable "frozen" condition which might not admit of the introduction of new devices. The rapid development of the radio technique, the patent situation, and many other matters would have to be considered in this connection. To aid it in the consideration of technical matters, the Commission had its own technical staff, as well as access to the experts attached to the Army, the Navy, and the Bureau of Standards. The following were accepted as principles governing technical matters:

a. Other factors being equal, that applicant should be favored whose plan would provide the highest ratio of service to a number of station bands. This principle was of great importance because of the scarcity of channels.

b. Proposed systems should present possibilities for growth and development. In the first place, such growth should be internal; that is the capacity of the facilities should increase with the increase in traffic. There should be provision for decreasing frequency separation (or some similar expedient) as traffic increases, thus increasing the number of usable channels within the band assigned; or the system should provide for such growth originally. The Commission would favor the plan that promised to be most economical of channels. In the second place, growth should be external. The plan should provide for a geographical growth by the reasonable addition of new points of communication as they might be required for the efficiency

of the system and the needs for service. No plans should be made for the growth of one system at the expense of another. The merit of a system in this connection should lie in its ability to grow within the band of frequencies assigned it.

c. The applicant should make a showing of technical ability to carry out its proposal, taking into consideration the actual installation and establishment of facilities and their operation. The Commission should consider the personnel of the applicant, its ability to obtain the apparatus and equipment necessary for proper installation and operation of its system, and its rights under patents or licenses to make use of apparatus.

d. The plan should be technically feasible. In determining this matter, such points should be considered as the geographical location and hours of operation, directional communication, multiplexing, power, ship-distance effect, and the possibility of shifting channels from one point to another as traffic needs may require.

e. The operation plan of the applicant should be coherent. The Commission's engineers had discussed proposed plans with applicants and had indicated apparent defects and made suggestions when consistent with policy; but the Commission did not consider itself in a position to draw up operation plans for applicants. It felt that it might deny an application or grant it, or grant it in part, but that the applications should stand on their own bases. Preference should be given to that plan which was presented as a complete and coherent entity over that which was incoherent, inconsistent, or haphazard. The technical problems that required solution in any plan of operation should be solved by the applicant, not by the Commission.[1]

B. Allocation of Facilities for Domestic Radiotelegraph Systems.—Of the channels set aside for domestic radiotelegraph systems, the Commission allocated 40 to the Universal Wireless Communication Company, 20 to the press, 20 to the R.C.A. Communications, Inc., 5 to Mackay Radio and Telegraph Company, and 4 to the Western Radio Telegraph Company. No channels were allocated to the Wireless Telegraph and Communications Company, and no additional channels to the Intercity Radio Telegraph Company. This allocation was contested by R.C.A. Communications, the Mackay Company, and the Intercity Company; and stay orders were issued by the Court of Appeals of the District of Columbia. The Universal Wireless Communication Company, which received a large share of the channels, was declared bankrupt in the fall of 1930 and ceased all operations, having placed some 13 stations in operation. In January, 1931, the Commission revoked the

[1] For a fuller discussion of these principles, see 3d annual report of the Federal Radio Commission, 1929, pp. 37–43.

licenses and construction permits issued to this company. Meanwhile, the Intercity Company was placed in the hands of receivers, and the Commission revoked its licenses and construction permits. Thus, the attempt to establish a comprehensive domestic radiotelegraph system came to naught. The only important domestic radiotelegraph services now in existence are those of R.C.A. Communications and the Mackay Company, which so far reach only a few large cities; and the Western Radio Telegraph Company located in the mid-continent oil region.

The channels set aside for the press were not made available for use for about two years. These channels, like the other channels for domestic communication, were placed under the jurisdiction of the Court of Appeals of the District of Columbia by stay orders, and were not released until Jan. 16, 1931. On that date the Court relaxed its stay orders to permit the use of these channels. On Jan. 19, 1931, the Commission issued appropriate construction permits.

An interesting development in press domestic radio communication was a project to perform a press service of a far different type. In March, 1930, the American Radio News Corporation, a subsidiary of the King Features Syndicate, Inc., of New York City, applied for, and later received, construction permits to establish a multiple-address printer service. This service is not a point-to-point service, like other commercial services, but is more nearly comparable to broadcasting except for the type of emissions. The stations emit code telegraphic signals which actuate a number of automatic receiving printers installed in various parts of an area 250 to 500 miles from each transmitter. Stations are constructed in various parts of the country and are connected with one another by wires, so that news may be made available over the whole country. The service is open to all press interests, the corporation accepting all messages filed for the "Multiple Address Printer System Service." This system, however, is operated on low- rather than high-frequency channels, to avoid the "skip-distance" effect of the latter. The service was later supplemented by licenses from the Commission for point-to-point services on high frequencies.

Aviation Radio.—Aviation radio is discussed under the continental high-frequency band, because the bulk of the frequencies used for aviation purposes lie in this band. Certain

intermediate frequencies, however, are used in aviation, which include the calling and working frequency from ground stations to itinerant aircraft, the international air-calling frequency, the radiocompass frequency, the international calling and distress frequency for ships and aircraft over the seas, frequencies for aircraft and stations on chains desiring to use intermediate frequencies except where interference may be caused with other services, and working frequencies for aircraft on sea flights desiring intermediate frequencies. Also, certain of the transoceanic high-frequencies have been made available for limited use in aviation.

Because of the importance of radio to aviation and the number of companies using or planning to use radio communication, the Commission felt that it would have to adopt a comprehensive plan for the allocation of frequencies to aviation companies. It was evident that the limited number of suitable frequencies available for aviation was not sufficient to meet the demands of all operating companies without coordination and cooperation. Accordingly, a conference was held by the Commission on Mar. 11, 1929, for the purpose of coordinating the views of the various operating companies and others interested in aviation radio. As a result of this meeting and subsequent conferences with aviation officials, the Commission on Sept. 9, 1929, adopted an aviation operating plan. After further study and trial, the plan was amended several times; and on Oct. 27, 1930, the Commission adopted General Order 99, later a part of the Commission Rules and Regulations, which made minor revisions to the plan and incorporated all amendments to the original plan. Under the present organization, there are seven major chains of communication—the Northern Transcontinental chain and feeders: from New York to San Francisco via Chicago and Salt Lake City; from San Diego to Seattle via San Francisco; from Salt Lake City to Seattle, with a branch to Spokane; and from Billings, Mont., to El Paso via Cheyenne and Albuquerque; the Mid-Transcontinental chain and feeders: from New York to Los Angeles via Kansas City and Amarillo, with branches from Pittsburgh to Chicago and Kansas City to Chicago; and from Los Angeles to Great Falls, Mont., via Salt Lake City; the Southern Transcontinental chain and feeders: from Boston to Los Angeles via New York, Washington, Nashville, Fort Worth, and El Paso;

from New York to Montreal via Albany; from Washington to Chicago via Charleston, W. Va., and Indianapolis; from Boston to Fort Worth via Albany, Buffalo, Chicago, St. Louis, and Oklahoma City; from New York to Buffalo and from Buffalo to Nashville via Cleveland and Columbus; the Eastern Continental chain and feeders: from New York to Miami via Washington, Richmond, Va., Charleston, S. C., and Jacksonville, Fla.; from Chicago to Jacksonville via Indianapolis, Nashville, and Atlanta; from Richmond to New Orleans via Atlanta; and from Charleston to Dallas via Atlanta and Jackson, Miss.; the Northwestern Continental chain and feeders: from Chicago to Seattle via Saint Paul, Fargo, and Bismarck, N. D., and Butte, Mont.; from Bismarck to Kansas City via Sioux Falls, S. D. and Omaha, Nebraska; from Saint Paul to Sioux Falls, S. D.; and from Fargo, N. D., to Winnipeg, Manitoba; the Mid-Continental chain and feeders: from Chicago to New Orleans via St. Louis, Memphis, and Jackson, Miss., and from Chicago to Brownsville, Tex., via Kansas City, Wichita, Kan., Dallas, and San Antonio; the Southern Intercontinental chain and feeders: from Miami to Central and South America; from Brownsville, Tex., to Central and South America via Mexico City; from El Paso to Central and South America via Mexico City; from Los Angeles to Central and South America via Mexico City; from Oakland to the Philippine Islands via Hawaii and Guam. These routes have shorter routes which connect with the main ones. In addition, regular routes have been established in Alaska and among the Hawaiian Islands.

This plan was developed in the knowledge of the fact that the use of continental high-frequency channels for aviation in the United States might interfere with the use of frequencies for similar purposes in Canada, and vice versa, and that coordination of airways communications and radio aids to aviation in Canada and the United States was desirable. At a conference held in New York Apr. 10, 1930, representatives of the two countries adopted a set of resolutions designed to facilitate the operation of the two systems. These resolutions, which serve as guides to the regulating authorities, set aside certain frequencies for exclusive use by one country or the other, establish the conditions for operation on shared frequencies, and govern many matters of detail where cooperation is essential.

Police Radio.—The demonstrated effectiveness of radio as an aid in the apprehension of criminals led municipalities everywhere to seek facilities for the establishment of police radio stations. At first, police stations were operated on frequencies within the broadcast band, but this proved unsatisfactory. It reduced the efficiency of the system in that it was not sufficiently private. The Commission soon recognized the necessity of setting aside for police purposes a few of the frequencies in the continental high-frequency band, but because of their limited number, and in view of the likelihood of the more than 500 cities of 20,000 population or over applying for police stations, it realized that it would have to adopt a comprehensive plan.

On Apr. 8, 1930, the Federal Radio Commission promulgated General Order 74, designating eight frequencies exclusively for police radio services. This order defined emergency police service as the broadcasting of emergency communications from central police headquarters to squad cars or other mobile units. Licenses were authorized only for municipally controlled stations. No specific frequency was assigned for the exclusive use of any licensee, but the same frequency could be shared by a number of municipalities in the same geographical area. It was believed that this plan of employing a common channel in a specific area would lend itself to the accomplishment of a more efficient service, for the reason that all squad cars or other mobile units in the area would receive all of the emergency messages originating from any municipality in that general area and thus coordinate the police activities in adjacent cities. Police stations were to be operated only for the purpose of transmitting dispatches of an emergency nature to squad cars or other mobile units, except for test purposes. A similar plan was devised to take care of state police radio, and several states are already licensed for this service. Later, additional frequencies were allocated for both municipal and state police on a nation-wide plan.

Geophysical Exploration.—In addition to the preceding services, several others have been granted facilities in the continental high-frequency band. Mention has already been made of the allocation of channels to the Western Radio Telegraph Company, operating on a public utility basis in an oil-producing territory in the Southwest. The Commission announced the policy that radio facilities also would be made available to all

"responsible applicants" for scientific explorations in oil by geophysical process. Five frequencies were set aside, and power limited to 10 watts, except in cases where it could be shown by the applicant that exceptional conditions prevailed, in which case power not exceeding 50 watts would be assigned.

Emergency Service for Power Companies.—Provision also has been made for the use of radio by power companies. Power companies were enabled to use radio for emergency purposes when all forms of wire communication failed. One frequency was set aside for this purpose, with power limited to 500 watts. Such stations, however, may be used only for emergency communications during times when such traffic cannot otherwise be delivered because of the breakdown of established means of communication, except that the frequency may be used for testing purposes not to exceed 2 hr. per week, provided that before testing the station shall ascertain that the frequency is clear and that no interference will result to other stations and services.

Emergency Fire Service.—Another emergency service for which provision was made is that of emergency communication with fire boats. All requests to establish such a service were granted, one frequency having been set aside for this purpose. The Commission did not consider that there was sufficient justification for the establishment of emergency communications with mobile fire-department units on land or between fixed stations of municipal fire departments, since such service can best be rendered by coordination with police departments using radio or by wire communication.

Experimental Visual Broadcasting.—From the first, visual broadcasting was designated by the Commission to include both television broadcasting and picture broadcasting, or moving-picture broadcasting and still-picture broadcasting. All licenses issued for these services were of an experimental nature. As early as October, 1928, the Commission made provision for a limited amount of visual broadcasting within the broadcast band, subject to the following conditions: (1) that the band of frequencies occupied by any such transmission was not to be wider than 10 kc.; and (2) that such picture and television broadcasting be limited to periods of not more than one hour per day at a time of day other than between 6:00 and 11:00 P.M. This order covered the period until Jan. 1, 1929. Considerable interest

was displayed in visual broadcasting experimentation, but the problem was one of finding frequencies for this service in the broadcast band. It has been demonstrated that successful visual transmission, both as to the field of view of the picture and as to its clarity or fineness of detail, is dependent upon a channel width of several thousand kilocycles.

Today, assignments for visual broadcasting are for experimental use and are subject to the conditions governing all experimental stations which require the filing of regular reports showing the technical progress made by the stations. Certain applications have been granted, but many others denied because of the scarcity of channels. A large part of the experimental work can be done in the laboratory; hence before the Commission permits a station to go on the air for experimentation, it requires evidence of laboratory research. In December, 1930, the Radio Commission held a television conference, after which a reallocation of the 18 visual broadcasting stations in the bands then in use (2,000 to 3,000 kc.) was made. Experimentation in the ultra-high frequencies (above 30,000 kc.) probably holds the only hope for the expansion of visual broadcasting activities. As of Jan. 1, 1936, 26 stations were licensed for experimental visual broadcasting.

Temporary Service for Motion Pictures.—On Nov. 25, 1930, the Commission set aside three frequencies of the continental band for temporary use in connection with the production of motion pictures. They are available for use of all responsible applicants who need them for this class of service but only at such times as the frequency is actually needed to supply communication between points where other communication facilities cannot be used. Applications, therefore, must specify the exact geographical points between which communication is desired, together with a statement as to the availability of other forms of communication. No licenses for this service are issued for periods longer than 90 days or for power in excess of 250 watts. The purpose of such grants is to provide communication facilities in remote areas where other means are not available.

From time to time, the Commission received applications from various other industrial and commercial enterprises for radio facilities: packing houses, department stores, coal companies, railroads, etc. The general rule which the Commission applied

to such applications was that the limited amount of radio facilities should not be granted for private uses, except in isolated cases where wire lines were not available. Radio undoubtedly would be of immense service to any particular applicant; but the channels are absolutely limited, and where they are limited they must be allocated in such ways as to produce the maximum public service. Radio channels are not private facilities; they belong to the public; and the Commission's duty in making allocations was to see to it that the recipients of facilities were those which are best able to serve the public.

In addition to these services, the Federal Radio Commission adopted, and the Communications Commission has followed, the practice of licensing stations for bona fide research in the advancement of the radio art. Among these are the stations licensed for experimental visual broadcasting, to which reference has been made, experimental broadcasting, and facsimile radio transmission. Other licenses granted on an experimental, noncommercial basis are those assigned to short-wave relay broadcasting.

In the regulation of radio communication, other than broadcasting, the Federal Radio Commission was faced with two principal types of problems: the allocation of bands of frequencies to different classes of service and the allocation of these frequencies to individual applicants within the different classes of service. In allocating bands of frequencies to different classes of service, where international considerations were involved, the actions of the Commission necessarily were subject to the provisions of international agreements to which the United States was a party; but in allocating other frequencies—those in the so-called continental band—the Commission had to consider the relative importance of the various demands for facilities as well as the suitability of various bands of frequencies for particular types of communication service. The demands for radio facilities, especially in the continental band, were greater than the number available; and the Commission followed the wise policy of not disposing of these limited facilities for uses that were largely, if not wholly, private. Any other policy would have resulted in a less efficient use of them from the point of view of the general public or in discrimination between private uses, since many industrial and commercial enterprises could, and would if permitted,

make use of radio communication to serve their own private ends. In the allocation of frequencies to individual applications, their technical and financial qualifications and the needs for the proposed services were paramount considerations.

The general framework of the allocation of frequencies for radio services other than broadcasting laid down by the Radio Commission has been maintained without substantial modification by the Communications Commission.[1] The body of detailed rules and regulations which it developed and perfected in the light of experience serve as invaluable guides in dealing with current problems. Recently, the Communications Commission took action that indicates that it is also going to see to it that those who have been granted the facilities are making use of them in the public interest. In November, 1935, this Commission set for hearing in part the applications for renewal of licenses filed by a number of radiotelegraph and radiotelephone companies. The parts set for hearing covered points outside the United States to which, according to the Commission's information, no traffic was transmitted during the preceding license period. Vigilance of the Commission in such matters is of importance, because developments in radio technique take place rapidly, and new uses for radio are continually being found. The mere grant of facilities should not be binding upon the Commission for periods longer than those covered by the licenses, and facilities not being used by those to whom granted should be at the disposal of the Commission to meet new worthy demands when they arise.

[1] In June, 1936, the Federal Communications Commission eliminated all experimental visual broadcasting in the 2,000 to 3,000 kc. band of frequencies on the basis that the consensus of engineering opinion and the inspection of reports submitted by visual broadcast stations reveal that these frequencies are not particularly suited for television, and that there is at present no indication that these frequencies will ever be adequate for the transmission of visual broadcast programs which will be of sufficient quality to command public interest. The frequencies thus released were made available to government departments, intercity police communication services and to point-to-point telegraph stations. Two new classes of police stations were established, zone and interzone, which are authorized for the radiotelegraphic exchange of information among police agencies throughout the nation. The United States has been divided into zones, the boundaries coinciding with state boundaries. Stations within a zone, in general, may communicate only with each other. If a message is to be transmitted to a point within another zone, its normal channel is through a central station within the zone, known as the interzone police station, to the interzone police station in the zone of destination for final delivery.

CHAPTER XII

STATE REGULATION OF COMMUNICATIONS

Communication companies also are subject to the jurisdiction of the public service commissions in most states, although the scope of such jurisdiction varies with the states. It is broadest in the case of the telephone companies, commission jurisdiction with respect to telephone communication usually embracing most of the powers commonly granted such commissions with respect to other public utility services. These include principally control over accounts and reports, rates and charges, service, the issuance of securities, and the issuance of certificates of public convenience and necessity. Chief among the regulatory powers which state public service commissions possess are the powers over rates and service, for the two tests of the satisfactoriness of telephone service, as of all public utility service, are the reasonableness of the rates and the quality and dependability of the service. These will be examined in detail. It is not to be implied, however, that other commission powers are not important or that effective regulation of rates and service could be had without such powers. The aim of public utility regulation is, and should be, to assure to the consumers the best, the most dependable service at the lowest cost consistent with fair treatment of the owners and managers of the enterprises; and in order to achieve this desired objective, the powers of regulatory commissions must be comprehensive.

Fundamental to all effective regulation is control of the accounting practices of the regulated companies and the prescription of uniform accounting systems. Without proper accounting procedure, the facts necessary to the economical conduct of business would not be disclosed; and without commission control, even though the accounts might be satisfactory to a particular management, they would not show to the commission the facts essential to a proper exercise of its powers over rates and service. Accounting control is essential to ensure proper cost accounting and

proper charges for depreciation and reserves. Uniform accounting procedure makes possible comparisons between different companies which are of value in determining whether or not the properties are honestly and efficiently managed; it simplifies accounting procedure where two or more parts of an integrated system operate under different jurisdictions; it confirms for investors the fidelity of public utility accounts and improves public relations; and it makes reports more meaningful and illuminating.

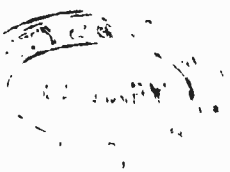
In the telephone industry, more than in any other public utility, uniform accounting procedure has been adopted. This is due primarily to the work of the Interstate Commerce Commission, which, from 1910 to 1934, had jurisdiction of telephone companies engaged in interstate commerce. In 1912, this Commission promulgated a uniform system of accounts for telephone companies subject to its jurisdiction, classifying them as A, B, and C companies according to their size and making appropriate differences in the accounting systems for the respective classes. This system became effective for A and B companies on Jan. 1, 1913, and has remained in effect ever since, with such minor changes as experience has shown to be desirable. The system was revised effective Jan. 1, 1933, for class A companies; and Jan. 1, 1934, for class B companies; but the fundamental features of the original system of accounts and reports were not disturbed. It contains the provision that the accounts prescribed may be subdivided to the extent necessary to secure the information required by any state commission having jurisdiction over the telephone companies. The accounts prescribed by the Interstate Commerce Commission generally have been adopted by the state commissions which have prescribed systems of accounts for telephone companies, although the New York Commission has recently prescribed a new system of uniform accounts for the telephone companies subject to its jurisdiction which differs somewhat from the system prescribed by the Federal Commission.

With respect to the necessity for state commission control over the security issues of telephone companies, as well as over those of other utility companies, opinions differ. This is primarily due to the belief on the part of many that the test of the reasonableness of rates is whether or not the rates charged yield a fair return upon the physical value of the property; that there is

no necessary relationship between physical value and capitalization; and that the regulation of security issues is primarily in the interest of the investor. There is no particular relationship between capitalization and rates, they say, and regulation of security issues in the interests of investors should be undertaken, if at all, by state authorities other than the public service commissions. Granted that the latter contention is sound, it can readily be shown that there is still need for security regulation in the interests of ratepayers.

That the amount and the form of the capitalization of public utility corporations affect the ratepayers either through the rates that they pay or through the quality of service that they receive is hardly open to question. In so far as the capitalization consists of bonded indebtedness, the rates must cover fixed charges, or the corporation will be forced into receivership or ultimate liquidation. If bonds are issued in excess of the value of the property used or useful in the furnishing of service, there is placed upon the property an unnecessary burden of fixed charges which must be met from income. Overcapitalization through stock issues does not affect the service to the same extent as overcapitalization through bond issues, but overcapitalization in any form inevitably affects the ratepayers. In rate cases, utility companies always point to the capitalization and show how little is left for the stockholders after total expenses are paid. The stock, they say, has been lawfully issued and even where excessive in amount is in the hands of innocent purchasers who in many cases are dependent upon the income from it. Arguments like these, as many commissioners have admitted, influence decisions as to the fair value of the property or a fair return, and in either case they affect directly the rates that the consumers must pay. Also, where capitalization is outstanding, every effort will be made to pay a return upon it; and if the rates are not sufficient and there is little likelihood that they may be raised, the pressure upon the management forces them to defer maintenance unduly or in many ways to lower the quality of service rendered.

The amount of the capitalization affects ratepayers in still another way. It is becoming recognized generally that public utilities must be allowed a return ample to attract the capital necessary for extensions and improvements. In bidding for



capital, these companies must compete with other companies which also have demands for capital; and in such competition, the particular elements of strength or weakness of the industry as a whole as well as of the particular corporation have an important bearing upon the facility with which a given corporation may obtain capital and the rates that it will have to pay. In this respect, the cost of capital affects directly the rates that consumers must pay. Even where there is acknowledged overcapitalization, and where commissions have jurisdiction over security issues, new issues often must be approved for necessary capital purposes. In every case, consumers must pay more for service than would be necessary if the corporation were more conservatively capitalized. Concerning the necessity for the regulation of security issues of public utility corporations, Joseph B. Eastman, an outstanding authority on regulation, has said recently:[1]

> Now, the essential test of whether these railroads and utilities are being paid enough, it seems to me, is their ability under honest and good management to attract the new capital which is constantly necessary if they are to meet the needs of a growing community. Massachusetts grasped this idea many years ago, before even the "fair-value" rule was enunciated. It proceeded on the theory that it would regulate the securities issued by these companies and see to it that no more were issued than the demands of the business justified and that they represented the actual investment of capital. This done, it endeavored to regulate rates so that earnings would be sufficient to attract investors in these securities.
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> If such a policy of regulation had been followed throughout the country consistently from the beginning, we would have no valuation problem. The origin of that problem can be traced directly to the watered stock and exploitation by construction companies which accompanied the building and development of many of our railroads and utilities in the absence of any proper public regulation. It is that fact which is the source of our difficulties now. The securities of such companies obviously cannot be taken as the basis for rate regulation.
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> I have often heard it argued, and sometimes in very respectable quarters, that the overcapitalization of railroads and utilities is of no

[1] Address before Associated Industries of Massachusetts; authorized summary in *U. S. Daily*, Oct. 24, 1930, pp. 1, 10.

concern to the public, and still less the overcapitalization of the superimposed holding companies, for the reason that the basis of rate regulation is not outstanding securities but the fair value of the railroad and utility properties. . . . If experience in public regulation has taught me anything, it is that overcapitalization of railroads and utilities, direct or indirect, is a dangerous and often effective obstacle to proper public regulation and the furnishing of good service at reasonable rates.

Once inflated securities are outstanding in the hands of investors, every effort will be made to make good on them; and if these efforts fail, the maintenance, service, and credit of the underlying properties in the long run are bound to suffer. . . .

Not more than half of the state commissions have jurisdiction over security issues of public utility companies, and the Interstate Commerce Commission never had jurisdiction over the securities of communication companies. As a consequence, only a portion of the telephone securities outstanding and none of those of other communication companies have been passed upon by public regulatory authorities.

The total capital structure of the American Telephone and Telegraph Company, the associated telephone companies Bell Telephone Laboratories, Bell Telephone Securities Company, Transpacific Communication Company, and 195 Broadway Corporation, but excluding the Bell Telephone Company of Canada, Cuban American Telephone and Telegraph Company, and Western Electric Company on Dec. 31, 1932, aggregated $5,210,354,760, including premiums on capital stock and excluding long-term advances from the parent to the associated companies. Of this amount, public agencies have passed upon the issuance of $1,265,620,502 of share capital and $129,881,551 of mortgage bonds, together comprising only 26.78 per cent of the total capital structure. With respect to telegraph and cable companies, no public agency has ever taken action concerning the securities of the Western Union, the International Telephone and Telegraph Corporation, All America Cables, Commercial Pacific Cable Company, and the Mackay Companies. Nor has any public agency passed upon the securities of the Mackay Radio and Telegraph Company or those of the Radio Corporation of America and its communication subsidiaries.[1]

[1] Preliminary report on communication companies, H. R. 1273, 73d Cong., 2d Sess., pp. 16, 85.

State Regulation of Telephone Rates.—All but six of the state commissions having jurisdiction over telephone companies have control over their rates. Rate regulation involves two fundamental problems: (1) the prevention of unjust discrimination between consumers and (2) the establishment of rates reasonable as a whole. State statutes do not indicate what practices are discriminatory, nor do they establish specific rates. The laws establish administrative commissions and merely state general principles, delegating to the commissions powers of administration. In most states, the commissions are empowered to prescribe the absolute rates; although in a few, their powers extend only to the fixing of maximum rates.

Discrimination in telephone charges may arise from the following principal sources: (1) through the establishment of too few or improper classifications of subscribers; (2) through the use of flat rather than measured rates; (3) through lower charges to stockholders and owners of equipment than to other subscribers; (4) through free service between exchanges; (5) through free service to municipalities under franchise contracts; (6) through improper adjustment of toll rates, relative to exchange rates; and (7) through improper adjustment of the rates for the various exchanges of a state-wide telephone utility.[1] The state commissions in cooperation with the rate departments of the telephone companies have eliminated most of these sources of unjust discriminations between telephone subscribers. Many of those which were quite common in the early days of telephone history have been eliminated altogether, and as a general rule it may be said that at present the total cost of the telephone service is distributed fairly equitably among the users of the service, although certain sources of discrimination still remain.

Many unjust discriminations in telephone charges, as in the case of so many other public utility charges, arose out of conditions that in the beginning created no serious inequities but that with the development of the service came to work hardship upon certain classes of subscribers. The inequities following from the universal use of flat rates soon were recognized, and the service came to be classified, and in large cities measured, so

[1] For an excellent discussion of discrimination, see C. O. Ruggles, Discrimination in Public Utility Rates, *Jour. Polit. Econ.*, vol. 32, pp. 191–206, 1924.

as to distribute the burden more equitably among the different subscribers. For similar reasons, special rates to stockholders and to the owners of equipment were eliminated with the growth in size and financial strength of the companies. Free service between exchanges, which discriminated against subscribers who made little use of the interexchange service, also has been practically eliminated, as has for the most part free service to municipalities. With free service, calls made by city officials tend to increase unnecessarily and thus to throw added burdens upon other subscribers. This practice, where it exists, is a survival of the franchise regulation of utilities which preceded commission regulation, municipalities in exchange for the franchise being accustomed to demand free service.

The problem of establishing levels of exchange or toll rates such that each bears a proper proportion of total costs is always a complex one because, as we have seen, much of the same equipment and many of the operating personnel are used jointly in the performance of both services. It gives rise to different theories of allocation, as well as to fundamental differences of opinion as to where the toll service begins and ends. The American Telephone and Telegraph Company, for example, has held consistently that for the most part the toll rates should cover costs only from toll board to toll board. Its long-distance rates are established on this basis, and it does not compensate its subsidiary operating companies for the use of exchange facilities required to establish connection between an exchange station and the toll board. Courts and commissions in a general way have held that the toll service should compensate the local exchanges for costs incurred by them in handling toll messages, but in most cases they do not say where this service begins and ends or what costs shall be included. Some commissions have held, however, that the toll service begins and ends with the subscribers' stations and have attempted to determine the toll portion of exchange costs on the basis of the relative amounts of use made of exchange property and personnel in furnishing each service.[1]

Most telephone companies operate exchanges in more than one community, and consequently the levels of the rates that prevail in the various exchanges relative to each other are matters of

[1] See especially various decisions of the Kansas, Minnesota, Missouri, South Dakota, and Wisconsin commissions.

importance from the standpoint of discrimination. The question is, Should a telephone company be permitted to charge low rates in one municipality and recoup itself for "losses" in such a place by charging higher rates in other municipalities? This problem is not confined to the telephone utility. Analogies to it may be found in electric and gas utilities, especially with the consolidation of local utilities into larger operating units; it is analogous also to the strong and weak branches of a railroad system. During the period of keen competition between the independents and the Bell companies, before the adoption of the policy of division of territory between them, a state-wide company would adopt lower rates in a municipality in which it had a competitor as a fighting competitive policy, recouping itself by higher rates in municipalities where no competition existed. With competition gone, and rates generally under the control of state commissions, such problems no longer exist, but others have come to take their place.

There are two generally recognized principles of telephone rate regulation where a telephone company operates a system throughout a state. One of these is known as the "local-area" theory, whereby rates are fixed on the basis of the property, revenues, and expenses apportioned to a particular community, without regard to the effect of those rates upon other areas. The other is commonly known as the state-wide or company-wide plan. The latter plan is in favor with many state commissions,[1] and it has been urged upon commissions by several Bell companies. Objections offered by various state commissions to the use of the local-area theory may be summarized as follows:

1. It depends upon the establishment and consideration of the value of a telephone company's investment in each locality. This would involve the making of many separate valuations, with all the attendant expense and litigation.

2. It would be difficult to allocate and segregate the proper proportion of the revenues and other funds of the company, its revenues, and expenses, to each local area, as well as to divide and segregate the physical property into toll and exchange property and toll and exchange use.

3. To attempt to fix rates on the theory that all exchanges should pay the same rate of return to the company would be to establish rates in some of the

[1] It has been adopted by the commissions in New York, New Jersey, Pennsylvania, Maryland, Georgia, Wisconsin, Colorado, West Virginia, Michigan, Oregon, North Dakota, and other states.

smaller exchanges which would exceed the value of the service. The rates for each class of service within an exchange must be fixed with due attention to the value of the service to the different classes, and the same principle applies to the fixing of rates for various exchanges. Moreover, telephone companies would not be permitted to earn a higher rate of return on exchanges in larger towns and cities than in smaller ones, and consequently no company could afford to develop unprofitable territory or extend service to smaller towns.

4. The value of the service for any particular community, any more than its cost cannot be determined scientifically, since a part of the value of the service in one community is due to the fact that it is connected with other communities. If, owing to high rates fixed on a cost basis, telephone service could not be furnished in certain communities located in the territory served by a state-wide utility, the service in the communities already served would be proportionately less valuable.

The commissions that favor the establishment of rates on a company-wide basis claim that under this theory the amount of revenue can be obtained through uniform rates for like circumstances and conditions, instead of through hundreds of separate rates and classifications for the same service, each of which might be a subject of dispute; that apportionment of costs between the toll and exchange services can be made more easily; and that the cost to the public of rate investigations is less. While at times, because of local conditions, some communities may provide more, some less, than their proper shares of the total revenue of the company, taking into consideration the quality of service received, these commissions hold that under the state-wide basis they are in a position to compel a state-wide telephone company to give the best obtainable service in any particular locality without an increase in rates in that community. During the time in which one community has a less efficient service than another in its class, it pays more than its just share; but for a time after the latest improvements are introduced, it pays less. Such conditions are continually recurring in the telephone industry where developments take place rapidly, and so long as commissions pay due attention to the quality of service furnished, such effects are transitory, although failure to detect and correct discrepancies is a fruitful source of discrimination between communities.

Consideration of rates on a state-wide basis does not imply that rates for the various exchanges need be the same. The prevailing practice is to group exchanges for rate-making purposes

and to apply different rates for different exchanges. Grouping generally is on the basis of the number of telephones served by the exchange, although many other factors, such as population, saturation, competition, and extent of territory served, together with the character of the service, whether magneto or common battery, manual or dial, are considered. Discrimination can be avoided only by the establishment of proper groupings. An example of grouping is the rate groups established by the New York Commission in May, 1930, for the various exchanges of the New York Telephone Company in New York State. They are as follows:[1]

Group I. Exchanges up to 700 stations.
Group II. Exchanges 700 to 2,000 stations.
Group III. Exchanges 2,000 to 6,000 stations.
Group IV. Exchanges 6,000 to 10,000 stations.
Group V. Exchanges 10,000 to 20,000 stations.
Group VI. Exchanges 20,000 to 40,000 stations.
Group VII. Exchanges 40,000 to 100,000 stations.
Group VIII. Exchanges over 100,000 stations.
Group IX. New York City.

The application of the state-wide theory is not without its practical difficulties, however. It is hard for a commission to justify to the subscribers of an exchange admittedly earning a fair return according to any reasonable segregation an increase in rates on the grounds that the company as a whole is not earning a fair return upon its total property in the state. Conversely, the argument that the company is earning a fair return on the value of its property as a whole may be used to defeat increases in the rates of particular exchanges. Many commissions, including some that adhere to the state-wide theory generally, have held that where the earnings within the state as a whole are not excessive, and where the contribution of a given unit of a state-wide system seems to be out of line, the case may be disposed of on the basis of the rate of return on that particular unit without the necessity of going through a general valuation of the whole property. It is true, nevertheless, that a company having a state-wide business which is on a reasonable earning basis as a whole should not be permitted to select one "lean" section where

[1] *Re N. Y. Tel. Co.*, P.U.R. 1930C, 325, 372, 373.

its earnings seem to be subnormal and increase its rates in that section without decreasing its rates in "fat" areas. This rule has been called the "ceiling rule," and its purpose is to prevent unwarranted increases in earnings as a whole by adjusting the rates in lean territory.[1]

The problem of telephone-rate regulation, once reasonable classifications have been set up and reasonable differentials between the rates for different classes of service have been established, becomes one of fixing a level of rates that is reasonable. Since the telephone service is furnished under monopoly conditions, there are no competitive rates to serve as a guide, and some other yardstick of reasonableness must be found. The fundamental principle which is basic to the American system of public utility rate control is that a public utility is entitled to charge rates that will yield a fair return upon a fair value of the property devoted to and used in the public service. The application of this rule involves two fundamental problems—the determination of fair value and that of fair return. These are two of the most controversial matters in the entire field of public utility regulation. However, the issues have been so often and so fully presented before courts and commissions and have been discussed so voluminously by many others that no purpose would be served here in dealing with these controversial matters in detail.

The controversy over the determination of the fair value of public utility properties arises from the fact that "value" as a rate base is not synonymous with "market value" and cannot be arrived at in the same manner. In general, the market value of property is related to its present and prospective net earnings which are determined largely by competitive conditions. Public utilities operate mostly under monopoly conditions, and the reasonableness of the rates themselves, which are the principal factors in the production of net earnings, is the matter at issue. To take market value based upon earnings as the rate base, therefore, is to accept as a measure of reasonableness a standard which is determined largely by the use of the very rates into whose reasonableness inquiry is being made. To avoid the absurdity of such procedure, courts and commissions have sought to determine value as a rate base by the consideration of elements other

[1] *Telephony*, vol. 97, p. 13, 1929.

than sales value or earning power, and it is here that the controversies have arisen.

The courts have defined value for rate-making purposes as the value of all properties used and useful in the public service as of the time at which the rates are at issue and have set up a variety of factors which must be considered in arriving at such value. Chief among these enumerated factors are the actual original cost of the physical property and the cost of reproduction of the property at present prices. The original cost is often hard to determine because of the incompleteness and the inaccuracy of records, while reproduction cost represents a hypothetical estimate of the cost of reproducing substantially the same plant under the original conditions but at present prices. Added to the difficulty of determining hypothetical reproduction cost is the fact that it has been complicated by the introduction of such intangible items as good will, franchise value, going value, and many others. Furthermore, cost of reproduction at present prices changes with changing price levels. But the chief difficulty is due to the fact that the various elements are irreconcilable, since they invariably produce different amounts. Yet the courts have held that they are not exclusive and that all relevant factors must be considered and given such weight as is just and right in each case. The courts, however, have never indicated what weight must be attached to any element of value in arriving at a single-sum value and have never enunciated a formula for the determination of such value; in fact, they have held that valuation cannot be made a matter of formula but must be subject to the use of judgment and discretion. As a consequence, the regulatory commissions have been left in the dark as to definite guiding principles by which judgment must be exercised with respect either to any of these elements of value or to all of them together; and in any given case, a commission must bring together the various elements into a final single-sum value, which in case of appeal is later subject to the judgment of the courts.

That the expense, delay, and confusion occasioned by such procedure have been unwarranted and that rate control based upon a fair return upon fair value determined in this fashion is utterly ineffective have been demonstrated in every rate case involving the property of a large utility. No matter what the expense and delay, values determined are usable only at the

time when they are derived. They are never up to date, and the entire process of valuation must be gone through by the commissions every time that rates are at issue. Furthermore, if the values derived are not satisfactory to the utilities, they may be appealed to the courts, and the courts must go through much the same procedure. Because of the recognized difficulties in determining the cost of reproduction of public utility properties, especially where price levels change, and because of the ineffectiveness of rate regulation with a fluctuating rate base, it has been suggested that for value as the rate base there be used the amount of capital invested according to sound and honest judgment and that a fair return be allowed on this amount. This is commonly known as the prudent investment theory of valuation.

The principal arguments in favor of the use of the prudent investment as the rate base are that it provides the financial stability which is one of the chief purposes of regulation, that it is fair to investors in that they receive a fair return upon the money actually and prudently invested in the business, and that it is easy to administer, since valuation can always be kept up to date through accounting control. Against the argument that changing price levels are bound to introduce elements of instability, it is opposed that such fluctuations may be offset by adjustments in the rate of return. In favor of this theory also may be cited the authority of experience, as in public utility regulation in Massachusetts; the authority of legislative enactment, as in the Federal Water Power Act; and the authority of judicial dissents, as in certain dissenting opinions in valuation cases by Justices Brandeis and Holmes.[1] Opposition to the adoption of the prudent investment theory comes from those who are directly interested in valuations higher than would be derived through its application; from those who believe that the owners of public utility property, as the owners of other property, are entitled to a hypothetical fair value whatever the cost of the property; and from those who believe that the adoption of any such scheme of determining value would be unconstitutional.

While the present authors are hesitant to take dogmatic viewpoints regarding so controversial a matter as valuation, they feel that the crisis in regulation has been brought about

[1] MOSHER, and CRAWFORD, "Public Utility Regulation," Chap. XV, Harper & Brothers, New York, 1933.

in no small measure by the ineffectiveness of rate control under the present value doctrine and that regulation cannot be made effective without some drastic change in procedure. The prudent investment theory offers the fairest and most easily administered alternative to the valuation procedure that has prevailed, and its adoption could hardly do otherwise than remove many of the elements of controversy which so far have tended to render rate control ineffective. Many plans have been suggested by which the prudent investment theory might be put into practice, ranging from voluntary cooperation between the regulatory bodies and the utilities to mandatory legislation; and while the obstacles would be many, they do not seem to be insuperable. As to constitutionality, it is hard to believe that the Supreme Court would undo sincere and determined state or Federal efforts to resolve the valuation muddle.

In the regulation of public utility rates, from the standpoint both of the determination of fair value and of fair return, commissions must take cognizance of depreciation, including obsolescence as well as wear and tear. Annual charges for depreciation must necessarily be deducted from gross revenues before the determination of net return, since just treatment of the utilities demands, and the courts have required, that they be permitted to earn, in addition to those necessary to cover other essential costs, amounts sufficient to provide for the necessary replacement of assets as they wear out or become obsolete or inadequate. The courts have held also that the rate base represents the depreciated value, not the cost new, of the assets.

With respect to the annual provision for depreciation in operating expenses and to the deduction of accrued depreciation in the determination of the rate base, opinions among commissions, courts, and experts differ widely. Many methods are employed, and each has its own supporters. We are not concerned here with the proper method of providing for depreciation. We wish merely to call attention to a principle that seems to be reasonable and fair but has aroused much controversy—that the amounts that a company is permitted to charge to the annual operating expenses for depreciation and credit to depreciation reserve should be the amounts deducted from the undepreciated value of the property in determining the rate base.

The Bell telephone companies over a long period have computed depreciation on the straight-line basis. This method involves an annual charge to operating costs for depreciation based upon the estimated service life of all depreciable property. The amounts charged currently for depreciation are credited to the account for depreciation reserve; and when property is retired, its cost less salvage is taken out of the depreciation reserve. The depreciation reserve thus represents, at any given time, the proceeds of telephone rates which have been set aside for the ostensible purpose of replacing the capital consumed. Having made charges currently for depreciation on this basis, the Bell companies claim, however, that the accrued depreciation which is to be deducted in determining the depreciated rate base is not measured by the reserve for accrued depreciation but by the "actual," or "observed," depreciation. The amounts charged to depreciation reserve are not held as a separate fund but are invested in plant and equipment; consequently, in so far as accrued depreciation as represented by the reserve exceeds the observed depreciation deducted in ascertaining the depreciated rate base, it represents capital contributed by telephone subscribers upon which stockholders may legally demand a return. That there may be substantial differences between actual depreciation as estimated and the depreciation reserve was shown in a recent case in which the rates in the Chicago area of the Illinois Bell Telephone Company were at issue. For the years 1923 to 1931, inclusive, the amounts credited to the depreciation reserve were two to three times the amounts of "existing" depreciation as estimated by the company.[1]

In this case, according to the statement of the Supreme Court, the company claimed that the depreciation reserve in a given year

> . . . does not purport to measure the actual depreciation at that time; that it does not proceed in accordance with any fixed rule; that as to a very large part of the property there is no way of predicting the extent to which there will be impairment in a particular year. Many different causes operating differently at different times with respect to different sorts of property produce the ultimate loss against which protection is sought. As the accruals to the depreciation reserve are the result of calculations which are designed evenly to distribute the loss over estimated service life, the accounting reserve will ordinarily be in excess of

[1] *Lindheimer et al. v. Ill. Bell Tel. Co.*, 292 U. S. 151.

the actual depreciation. Further, there are the special conditions of a growing plant—"there are new plant groups in operation on which depreciation is accruing but which are not yet represented, or are but slightly represented, in the retirement losses." Where, as in this instance, there has been a rapid growth, retirements at one point of time will relate for the most part to the smaller preceding plant, while the depreciation reserve account is currently building up to meet the "increased eventual retirement liability" of the enlarged plant.[1]

The public service commissions of various states have not approved this practice of the Bell telephone companies and have undertaken to meet the issue in various ways. In some cases, they have attempted to require that the telephone company use the excess in the reserve over estimated depreciation as a basis for the reduction of rates for the future; and in others, they have insisted that the amount of the depreciation reserve be deducted as accrued depreciation in determining the rate base. In its most recent pronouncement on this matter, in the Illinois Bell case, the Supreme Court agreed with the company's counsel that "the reserve balance and the actual depreciation at any time can be compared only after examining the property to ascertain its condition"; but it held that the annual allowances for depreciation were excessive and refused to include the excess among the calculations of operating expenses. In view of the disparity between the claimed actual depreciation and the amount in the depreciation reserve, the Court held:

> It cannot be said that the company has established that the reserve merely represents the consumption of capital in the service rendered. Rather it appears that the depreciation reserve to a large extent represents provision for capital additions, over and above the amount required to cover capital consumption. This excess in the balance of the reserve account has been built up by excessive annual allowances for depreciation charged to operating expense.[2]

The problem of determining what constitutes fair return, while it has not been the subject of so much controversy as that of determining what constitutes fair value, includes many controversial elements. Besides establishing a fair percentage figure, which the courts have held must be the same as that

[1] *Ibid.*, p. 171.
[2] *Ibid.*, p. 174.

considered reasonable for other properties operated under similar conditions of risk, and which has uniformly been construed to lie somewhere between 6 and 8 per cent, commissions must consider the reasonableness of the deductions made from gross revenue. These deductions include operating expenses, depreciation, and taxes. Annual charges for depreciation have already been discussed, and only a brief statement need be made regarding taxes. The latter represent expenses of the utilities that are beyond their control or that of the regulatory bodies and must of necessity be met from earnings. Universally, they have been held to be proper deductions before fair return. Charges to operating expense include certain items that recently have come to be matters of controversy between the commissions and the utilities, notably the payments made by subsidiary operating companies to holding companies for goods and services. The most controverted of these items in the communications field are the license contracts between the American Telephone and Telegraph Company and its subsidiaries and the contracts between these subsidiaries and the Western Electric Company.

The present license contracts between the American Telephone and Telegraph Company and its subsidiaries are based upon original contracts issued by the predecessors of the American Company during the life of the basic Bell patents. The policy early adopted for the development of the telephone service was to encourage the establishment of local companies in various cities and to bind them by contracts which licensed them to use Bell patented equipment. Each license covered a specified territory, and the contracts, which in the beginning were for terms of 5 years but were later made permanent, granted rights under all patents then in existence and all relating to the telephone art which might thereafter be issued or acquired by the parent organization. At first, a rental was charged based upon the number of instruments used; but in 1902, by agreement between the parent company and its subsidiaries, the method of payment was changed from a rental per instrument to a charge of 4½ per cent of the total gross earnings.

From the beginning, the license charge has covered services other than merely the rental, maintenance, and repair of instruments. The early licensees had no considerable technical

knowledge, and of necessity they called upon the parent organization for technical advice. Repeated requests led to arrangements whereby the licensors, who were putting forth great effort in the perfection and improvement of the telephone, furnished advice and assistance to the licensees. Out of this situation grew the general staff of the American Company. Requests for information and advice were not confined solely to technical engineering problems. They soon had to do with legal matters, accounting practices, rates, classification of service, financial matters, and many other matters. Gradually, there was set up at the headquarters of the parent company an organization capable of giving detailed information and specific advice to the operating companies in every section of the United States.

The equipment and services furnished under the license contract came to include the following:[1]

1. Telephone instruments, that is, the receiver, transmitter, and induction coil, and, with the instruments, for no additional charge, the use of repeaters.
2. The use of all patents owned or controlled by the American Telephone and Telegraph Company and the benefit of the research and development work carried on by the American Telephone and Telegraph Company.
3. Financial assistance.
4. Accounting, legal, traffic, commercial, engineering, and operating advice and assistance; publicity and executive assistance.
5. The right to use all methods, systems, apparatus, and instruments covered by the patents owned or controlled by the American Telephone and Telegraph Company, free of any royalty, with insurance against infringement suits and a claim to indemnity in case of adverse claims under patents.
6. Advice and assistance in administering employees' benefit and accident funds.
7. Universal connection with all other telephones in the Bell System.

Payments under the license contract, which had been 4½ per cent of gross earnings, were reduced, effective Jan. 1, 1926, to 4 per cent. At the end of 1927, the conditions of these contracts were again changed providing for the sale of telephone instruments (receivers, transmitters, and induction coils) by the American Company to its subsidiaries, and that company was relieved of its obligations with regard to their replacement and repair. It is said that the price was about the current price less

[1] *Re N. Y. Tel. Co.*, P.U.R. 1923 B, 545, 558.

20 per cent.[1] At the same time, payments under the license contract were reduced from 4 to 2 per cent of gross earnings; and on Jan. 1, 1929, to 1½ per cent.

Various state commissions have held that in order to determine the reasonableness of the license charge made by the American Company, it is necessary to investigate fully the relationship of that company to its subsidiaries and to inquire into the costs of furnishing the services under the license contracts. They have held that the American Company does not deal "at arm's length" with a subsidiary and that the two corporations do not stand on equal footing. Because of its control, the terms of the contracts are dictated by the American Company to a subservient board of directors. Frequently, such commissions have refused to allow the full amount of the license fee as a deduction from gross revenues in the determination of fair return, but the Federal courts until recently have held that such a payment in the absence of proof of fraud or bad faith must be allowed.[2]

Regarding the ownership of the controlling stock of its subsidiaries by the American Company, the Supreme Court has held that the matter is unimportant except to invite "close scrutiny" of their intercorporate relations. However, many state commissions contend that it is this intercorporate relationship that makes the task of determining a reasonable license charge a difficult if not impossible one. They have repeatedly attacked also the method by which the license charged is assessed and have held that the cost to the operating companies of services furnished under the license contracts should be related to the costs incurred by the parent company in supplying such services.

That the license charge should not be based upon gross revenues, a very superficial inquiry will show, for only by a stretch of the imagination is it possible to conceive of any

[1] In the case of the Pacific Telephone and Telegraph Co., the instruments were sold at a price approximately 20 per cent below the then going price new and approximately 18 per cent below the average investment of the American Co. in the instruments. (*Re Pacific Telep. & Teleg. Co.*, P.U.R. 1930 C, 481, 503.) In this case, the California Commission held that the price was too high.

[2] *State ex. rel. S.W.B. Tel. Co. v. Missouri Pub. Serv. Comm.*, 262 U. S. 276.

economic relationship between the gross revenues of the operating company and the cost of furnishing, or the value of, the contract services. On the other hand, it is readily apparent that under such a method of charging, the operating subsidiaries and their subscribers may become the victims of unfair charges. In a time of rising prices, when telephone companies have to pay higher wages and higher prices for materials, rates must be increased to cover expenses. Increased rates mean increased gross revenues and automatically increased payments under the license contracts. Thus, the American Company profits through increases in the operating expenses of the subsidiaries, whether or not there has been a change either in the cost or in the value of the services performed under the license contracts. To contend that things are evened up in a time of falling prices is to assume that rates are reduced in the same proportion as they are raised, an assumption not necessarily true. At best, it is unscientific. Furthermore, to attempt to justify such a practice on the ground that license charges should be uniform for all companies is to overlook the fact that in this way the effects may be utterly lacking in uniformity, since the expenses and the gross revenues of the operating companies may be influenced materially by local conditions.

In *Smith v. Ill. Bell Tel. Co.*, 282 U. S. 133, decided in 1930, the Supreme Court reversed its position with regard to the license payments. In this case, Chief Justice Hughes, writing the decision for the Court, said that while there was no reason to doubt that valuable services were rendered by the American Company to its subsidiaries, there should be "specific findings" with regard to "the cost of such services to the American Company and the reasonable amount which should be allocated in this respect to the operating expenses of the intrastate business" of the Illinois Bell Telephone Company, the rates of which were at issue. The case was remanded to the District Court for the Northern District of Illinois for further findings.

The District Court in making its findings as to the cost to the American Company of services rendered by it to the Illinois Company held that the former was entitled to compensation sufficient to cover the following costs:[1]

[1] *Ill. Bell Tel. Co. v. Gilbert*, P.U.R. 1933 E. 301.

1. A reasonable proportion of the total costs to the American Company of the work of its 12 departments,[1] each of which furnished license contract services to the licensee companies.

2. Reasonable amounts to cover the costs of maintaining the receivers, transmitters, and induction coils, to cover depreciation and obsolescence of and to yield a fair return upon the reasonable value of such equipment, for the years preceding the date at which these apparatus were sold to the Illinois Company.

3. A reasonable proportion of the total cost to the American Company of maintaining a contingent reserve to protect its licensees against loss or damage from suits or judgments for infringements of any patents, where such infringement should result from the use of any apparatus recommended to such licensees by the American Company.

4. A reasonable proportion of the costs to the American Company of supplying office space and office furniture to its 12 departments.

The Company claimed, in addition to these, the right to compensation for two other items which the court held should not be allowed under operating expenses. The first of these concerned a fund maintained by the American Company, varying from $60,000,000 to $93,000,000 during different years, in the form of cash or short-term, nonfluctuating, low-yield securities, for the purpose of meeting any reasonable demands of the licensee companies (excluding the long lines) for funds, the amounts received as interest not being sufficient to cover the costs of maintaining such funds. The second item involved taxes paid each year by the American Company. These, the Court held, were not covered by the license contracts.

In its findings as to the cost to the American Company of the services furnished under the license contracts, and the reasonable amount that should be allocated in this respect to the operating expenses of the intrastate business of the Illinois Company, the Court found that for the years 1923 to 1928, inclusive, the costs to the American Company were less than the amounts found to be charged on the books of the company but that for the years 1929 to 1931, inclusive, the amounts charged on the books of the company were less than the amounts found to be the cost to the American Company. The Court held that the amounts to be allowed should be the amounts found to be the

[1] These departments are (1) operation and engineering, (2) development and research, (3) information, (4) personnel, (5) public relations, (6) treasurer, (7) controller, (8) secretary, (9) administration (including sundry items), (10) general service bureau, (11) operation (general), and (12) legal.

costs to the American Company, unless such amount for a given year were larger than the amount charged on the books of the company, in which case the smaller amount charged on the books of the company would be allowed as operating expense. A comparison of these amounts is shown in the following table:

Year	Amounts of total cost to A. T. & T. found to be properly allocable to the Illinois Bell	Amounts charged on the books of the Illinois Bell
1923	$1,088,195	$1,662,014
1924	1,156,046	1,787,095
1925	1,369,836	1,901,069
1926	1,412,867	1,845,571
1927	1,422,869	1,980,880
1928	1,005,063	1,036,616
1929	1,040,529	834,276
1930	1,191,882	864,131
1931	1,068,303	834,199

Under the contracts between the Western Electric Company and the operating companies of the Bell System, the latter companies employ the former to manufacture or to procure for them practically all the articles that they may require for their own use, the contracts providing, however, that the operating companies shall not be required to purchase or use any article, or articles, manufactured or sold by the Western Electric Company unless they desire to do so. The Western Electric Company agrees to procure by manufacture, purchase, or otherwise such articles in such quantities as needed and to establish convenient storerooms. The charges made by the Western Electric for telephonic appliances must be uniform to all licensees; for furnishing cable, the cost of manufacture plus an amount varying with points of shipment; for furnishing other manufactures of the Western Electric, prices as low as the Electric Company's prices to its most favored customers in the United States; and for furnishing articles not manufactured by the Electric Company, the cost to the Electric Company plus an amount varying with points of shipment.

In addition, the Western Electric Company agrees, at the option of the telephone company, and at prices to be arrived at by mutual agreement, to furnish the following special services:

1. Receiving, storing, and reissuing or disposing of any used apparatus, supplies, and material returned by the telephone company.
2. Carrying any special stock of any articles which the telephone company may prescribe from time to time.
3. Receiving, storing, and reissuing or disposing of furniture, fixtures, tools, and construction outfits.
4. Operating a local repair and emergency shop.
5. Receiving, storing, and delivering telephones and transmitters.
6. Mounting telephones and transmitters.
7. Inspection of articles not made by the Electric Company.
8. Cartage, except to the Electric Company's storerooms.
9. Prepayment of transportation charges on shipments to the telephone company and taking up and adjusting claims with carriers.
10. Any special accounting or clerical work not ordinarily required of a purchasing agent.
11. Any other services not hereinbefore in the contract described.

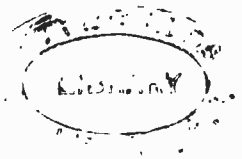
The payments under the Western Electric contracts have universally been allowed by state commissions, although some doubt has been expressed as to their ability, without a thorough investigation of the affairs of the company, to determine whether or not the charges are just. The problems encountered in the regulation of such matters and the issues involved have been well stated by the Wisconsin Commission, as follows:[1]

First, are the valuable researches and activities of the general staff of the American Company on behalf of the associated companies actually reflecting savings in dollars and cents to the associated companies? . . .

Second, assuming that the activities of the American Company under the license contract do produce economies as to all the kinds of service rendered, are these *economies passed on* to the subscriber for telephone service in Madison and other Wisconsin cities in the Bell System? If the benefits of large scale operation and centralized management of the American Company are not shared with the users of telephone service then the great superstructure which has been built up can hardly receive the approval of a body charged with the duty of protecting the public's interests. . . .

Third, it is a matter of common knowledge, confirmed by trade journals and the annual reports to stockholders, that the American Telephone and Telegraph Company and the Western Electric Company

[1] *Re Wis. Tel. Co.*, P.U.R. 1931 E. 101, 115, 116.



are not engaged merely in the telephone business or in license contract and holding company operations in connection with telephone business. For example, the American Company has assisted in the development of movietone, submarine cable, and of the developments which have come out of Electric Laboratories. These companies develop and/or furnish teletype-telegraph service, telephoto service, and radio broadcasting service and facilities. . . . To a considerable extent it may be said that these extra-telephone services and equipment are essentially *by-products of the telephone business.* The present record lends color to the conclusion that the entire charge of the development of the investigations by the American Company *prior to the time when these by-products became practical for manufacture and sale* has been charged to Bell System subsidiaries, the Wisconsin Company among them, and hence to Wisconsin telephone users. If this is true (and the facts in this regard should be submitted), the question arises: How should the profits made by the American Company and the Western Electric Company by reason of the development of these by-products be considered, if at all, in determining the reasonableness of the arrangements existing between the American Company and the Wisconsin Telephone Company? Should effect be given to such profits in the American Company's capacity as proprietor-investor, through rate of return; should they be given effect in determining the credit against the license payment to cover the cost of the development of these extra-telephone inventions, or in some other tangible, concrete way? That such an issue exists seems clear.

In *Smith v. Ill. Bell Tel. Co., supra.*, the Supreme Court was aware of the existence of these problems; and in remanding the case to the District Court, it required specific findings as to the propriety of the amounts paid by the Illinois Bell Company to the Western Electric Company. The Court held that while the average profit on the total business of the Western Electric Company had evidentiary value, this did not go far enough, because that company manufactured and sold many articles other than apparatus for the licensees of the Bell System. Nor was a comparison of the prices charged Bell licensees with those charged by other manufacturers of similar materials sufficient to establish their reasonableness, because the Western Electric Company, through the organization and control of the American Telephone and Telegraph Company,

> . . . occupied a special position with particular advantages in relation to the manufacture and sale of equipment to the licensees of the Bell

System, that is, that it was virtually the manufacturing department for that system, and the question is as to the net earnings of the Western Electric Company realized in that department and the extent to which, if at all, such profit figures in the estimates upon which the charge of confiscation is predicated.[1]

In making specific findings regarding the charges made by Western Electric Company to the Illinois Bell Telephone Company in this case, the District Court found that during the period from 1916 to 1932, the business of the Western Electric Company with its Bell customers amounted to more than 90 per cent of its sales of its own manufactures; and its business with Bell customers, if supplies are included, amounted to 82 per cent of its total sales. Western Electric's sales of its manufactured articles constituted approximately 70 per cent of its total sales to its Bell customers. As to the significance of the intercorporate relationships, the Court pointed out that the Western Electric Company has no sales expense and no credit risk involved in its Bell business. "By receiving advance estimates from the Bell associated companies of their requirements," the Court said, "it is able to plan its manufacturing work more efficiently and economically."[2] The Court found that the Western Electric's rate of earnings on its investment in its Bell business and on its investment, less the amount of its depreciation reserve account, had been substantially one-third lower than those of other large manufacturing companies whose risks and hazards made them fairly comparable; and that its rate of profit from sales on its Bell business, as distinguished from earnings on investment, had been less than one-half of the rate of profit made on sales by other large, comparable manufacturing industries.

In view of these findings, the Court held that reductions in cost due to the intercorporate relationship were passed on by the Western Electric in the prices charged to its Bell customers. It found the prices charged the Illinois Bell Company to be reasonable, except for an increase, effective Nov. 1, 1930, of 10.2 per cent, an advance not allowed in calculations of operating expenses upon which the charge of confiscation was determined. However, in view of price reductions prior to November, 1930,

[1] 282 U. S. 133, 152, 153.

[2] *Ill. Bell Tel. Co. v. Gilbert, supra*, p. 312.

the price level of products sold to Bell companies in 1929 being 58.3 per cent of that of Dec. 31, 1920, the Court held that the Western Electric was entitled to maintenance of the 1930 price level during the years 1931 and 1932. The District Court, despite the deductions that it made from the amounts charged the Illinois Bell Company on account of the license contract and the contract with the Western Electric Company, held that the rates fixed by the Illinois Commission still were confiscatory, but the Supreme Court reversed the decision.

In this recent decision, the Supreme Court exhibited a commendable desire to consider realities rather than hypothetical estimates in determining whether the rates charged by a public utility were actually confiscatory, an attitude assumed too infrequently by the Court in the many public utility rate cases that have come before it. The Court pointed out that in view of the actual experience of the Illinois Bell Company, the claim that it had been operating under confiscatory rates could hardly be substantiated, yet such a conclusion would follow inevitably if the findings of the District Court were to be accepted. It pointed out that during the period under consideration (1923 to 1931), the capital stock of the company had increased from $70,000,000 to $150,000,000 and that 8 per cent dividends had been paid during the entire period, in addition to interest on some $50,000,000 of funded debt. Reserves for depreciation and for the amortization of intangible capital increased from $37,575,-004 in 1923 to $69,242,667 in 1931; surplus and undivided profits, from $5,600,326 in 1923 to $23,767,381 in 1931; book cost of plant and equipment in the Chicago area, from $95,582,266 in 1923 to $177,384,652 in 1931; and the number of telephones in Chicago, from 690,000 in 1923 to 987,000 in 1929, the peak year, with 940,000 in 1931. After reviewing these evidences of successful operation, the Court said:

> This actual experience of the company is more convincing than tabulations of estimates. In the face of that experience, we are unable to conclude that the company has been operating under confiscatory intrastate rates. Yet, as we have said, the conclusion that the existing rates have been confiscatory—and grossly confiscatory—would be inescapable if the findings below were accepted. In that event, the company would not only be entitled to resist reduction through the rates in suit but to demand, as a constitutional right, a large increase

over the rates that have enabled it to operate with outstanding success. Elaborate calculations which are at war with realities are of no avail. The glaring incongruity between the effect of the findings below as to the amounts of return that must be available in order to avoid confiscation and the actual results of the company's business makes it impossible to accept those findings as a basis of decision.[1]

While this decision cuts through many hypothetical claims similar to those too often made by public utility companies in rate cases, it leaves certain issues undecided. The Court did not pass on the controversial items in operating expenses, which have been discussed above, in view of "the determinative nature, for the present purpose," of the charges for depreciation made by the Illinois Bell Company. Full and complete investigation of the intercompany payments made between the members of the Bell System is necessary to determine what the equities are, from the standpoint both of the companies and of the consumers. In making such an investigation, the Federal Communications Commission should be of great assistance to the state commissions.

State Regulation of Telephone Service.—As has been said, the second test of the satisfactoriness of telephone service is its availability, quality, and dependability. A majority of the state commissions have jurisdiction over the service of telephone utilities, and their powers extend to such general matters as the establishment of adequate and efficient service and abandonment as well as the more specific matters involved in the maintenance of certain standards of service. Provisions in the laws governing the establishment of service generally require that a certificate of public convenience and necessity must be obtained from the public service commission before a new company may engage in furnishing telephone service or an established company may extend its lines into new territory. Extensions generally exempted from the above requirement include those within a city or county in which the company has already been given service, those into contiguous territory, and those necessary in the ordinary conduct of business. The purposes underlying the requirement of certificates for the establishment of service are (1) to establish with reasonable certainty that there is a public need for the service or that public convenience will be served;

[1] *Lindheimer et al. v. Ill. Bell Tel. Co.*, *supra*, pp. 163–164.

(2) to make certain that none but responsible parties will be permitted to undertake the furnishing of service; and (3) to prevent wasteful and uneconomic duplication of facilities. Nowhere is there an attempt to define the term "public convenience and necessity," and it would be impossible to do so in language that would be specific and yet sufficiently broad to include the immense variety of conditions under which public utility companies do, or might, operate. The determination as to whether or not public convenience and necessity would be served in a given case is an administrative matter which must be decided by a competent body of men in the light of all the relevant facts.

Extension of service to all applicants within the network of the established lines of a telephone company is a requirement inherent in the very nature of its public service obligation, although the extent of this obligation has not always been clearly recognizable. In a recent case, "Wired Music," a New York company, organized for the purpose of transmitting music over leased wires to hotels, restaurants, and private residences, having been refused facilities by the New York Telephone Company, appealed to the New York Public Service Commission to require the telephone company to furnish such facilities. The telephone company contended that its leased-wire facilities were part of its spare facilities, not within its public profession or undertaking and therefore not within the jurisdiction of the Commission. It argued, further, that the demands of the music concern might reach beyond its spare facilities and entail the construction of additional plant and line equipment which, should the music company fail, would be rendered worthless. The Commission found, however, that the service applied for was not unlike that furnished broadcasting stations for the transmission of speech and music from the points of pickup to the transmitters and was similar to services supplied to burglar alarm companies, stock exchange ticker, and news subscribers. It ordered the telephone company to furnish the facilities requested.[1]

Extensions into newly developed or sparsely settled territory and the length of an extension that a telephone company may reasonably be required to make at its own expense raise problems which require individual treatment. Commissions generally

[1] *Re N. Y. Tel. Co.* (N. Y.), P.U.R., 1932 A, 262.

have construed their powers to be limited to the requirement of reasonable extensions within the territory served by the telephone company and not to include authority to require extensions into territory to the service of which it has not dedicated any part of its property; and the courts have held similarly. Determination as to the reasonableness of a particular extension must involve a consideration of the following factors: the length of the extension and how the construction cost is to be met, the company's financial condition, the duplication of telephone facilities, the present and prospective profitableness of the particular extension, and the rights of existing subscribers. In general, commissions have held that while a given extension need not show an immediate profit, and extensions need not be uniformly profitable, telephone companies are under no obligation to extend their facilities and supply service at published rates without some regard to the cost of the extension or the sufficiency of the return to be expected. Where the extension is a long one, or where the possibility of obtaining additional subscribers is uncertain, the usual procedure is for the company and the subscriber to share the construction, and sometimes the maintenance, costs, often with the additional provision that the company will return to the subscriber the amount that he spends upon construction if the line becomes profitable within a reasonable period of time. These matters are covered by the rules and regulations under which a telephone company agrees to furnish service, and which must be approved by the commission having jurisdiction.

The powers of state commissions usually include also the authority to permit, or refuse to permit, telephone companies to abandon service. Cases involving the total abandonment of property by a telephone company are relatively rare, the issue usually being the abandonment of an exchange or of a particular line. It is well-recognized as a part of the public service obligation of those who supply utility services that, although no authority exists that may compel one to engage in such a business enterprise, once having done so he grants the public an interest in its use, and he may not abandon such service without considering the public interest. As a general rule, it might be said that an unprofitable exchange or line may not be abandoned, if there is public need for it and if the telephone property as a whole is earning a fair return. However, where the system is not being

operated profitably, and where it can be clearly shown that deficits are due to the operation of unprofitable exchanges or lines, partial abandonment may be permitted. The reasons for the unprofitableness of an exchange have a material bearing on the disposition of the case. If a telephone company, in the opinion of the commission, has not done all that it could to increase revenues by securing new and additional patronage, if realizable economies have not been effected, or if no attempts have been made to introduce remunerative rates, the right to abandon a given exchange may be denied.

The powers of most state commissions over the service of public utility companies include those to prescribe reasonable rules concerning the quality of service to be supplied, but few commissions have prescribed standards for telephone service. There are several reasons for this: In the first place, standards for telephone service are difficult to formulate, owing to the fact that the type of service that might be considered satisfactory in a small community might be wholly unsatisfactory in a larger one. In the second place, inventions that have changed radically the character of telephone service have followed one another rapidly in the telephone service, and there is a feeling that the prescription of minimum standards is likely to make them maximum standards and thus to discourage technical improvement. Finally, the ideas of subscribers as to what is or is not satisfactory telephone service change with times and conditions, being affected materially by relative wealth and prosperity. Arguments against the prescribing of standards for telephone service by a public service commission have been stated by one telephone official as follows:

> (1) There is no simple test for telephone service; (2) the establishment of rigid standards in telephone regulation inevitably involves a confusion between standards of results and the methods or appliances used for obtaining results; (3) too many definite standards of accomplishment are burdensome, and excessive cost is incurred in management, not only on account of the numerous reports and analyses that are required or encouraged but also on account of the expense that is automatically engendered by the attempt to secure, in advance, a uniform attainment of the standard; and (4) the adoption of standards necessarily requires a close acceptance of the standards as a governing policy for the general management, this leading to the acceptance of the

standard performance as "good service" and tending to discourage those who are willing and capable of doing better work.[1]

In spite of well-taken arguments against the prescribing of standards for telephone service by regulatory bodies, many feel that the determination of reasonable, uniform minimum standards is possible and that the requirement that telephone companies furnish service that would comply with such standards would aid in the betterment of service. This was recommended by the Bureau of Standards as long ago as 1921,[2] after a careful study of the problem, and at least two state commissions—Wisconsin and Illinois—have at one time or another set up minimum standards for telephone companies under their jurisdiction. Effective regulation of standards necessarily implies full cooperation between the commissions and the management both in the determination of proper standards and in their application.

The rules of the Illinois Commission are indicative of the standards that may be set up for telephone companies. This Commission laid down the following general principles as guides:

1. To furnish adequate and satisfactory service, it is necessary for the utility to furnish the necessary plant and equipment and so operate and maintain the same that any subscriber's station may be connected with any other subscriber's station with the least possible delay and that the subscribers may carry on a conversation in a satisfactory manner.
2. In general, the grade of telephone service required by a community varies with the telephone development of the area. In particular localities, special needs have to be considered in the determination of the grade of service to be rendered. In all cases, however, the general satisfaction of the majority of the users is the most important criterion of good service.[3]

Specific rules deal with the elimination of cross talk, noise, and other disturbances which are detrimental to transmission; the number of subscribers to be connected on local exchange lines and rural lines; the maintenance of lines for through traffic; the proper maintenance of equipment; provision for adequate reserve equipment; the employment of sufficient operating force;

[1] KINNARD, L. H., in M. L. Cooke, "Public Utility Regulation," Ronald Press Company, New York, pp. 133–136, 1924.

[2] Standards for Telephone Service, Bureau of Standards, *Circ.* 112, 1921.

[3] Illinois Commerce Commission, Gen. Order 107.

provisions for emergencies; the proper handling of calls; the preparation of directories; and the elimination of interruptions and irregularities in the service. No specific rules were prescribed with regard to the toll service, although general provisions were laid down for testing toll circuits, reporting trouble on circuits, timing toll messages, avoiding unnecessary delay in the handling of such toll messages, and recording the condition of toll lines entering each exchange.

State Regulation of Telegraph Communication.—State commission regulation of telegraph communication has been concerned with problems similar to those faced in the regulation of telephone communication. The same general principles apply with respect to discrimination and the reasonableness of rates in general. Proper segregation of intrastate and interstate operations is as difficult here as elsewhere and is further complicated by the fact that two major companies operate in all the states. Not only is it necessary, therefore, to make proper divisions between the cost of furnishing interstate and intrastate telegraph service in a particular state, but the general overhead expenses, such as supervision expenses of commercial and traffic departments and home and general office expenses, must be allocated to the traffic carried in the various states. The use by different commissions of different methods of allocating such expenses, especially if they arrive at different results, would entail much confusion were it not for the fact that relatively few complaints concerning intrastate telegraph rates come before the state commissions, an effect due at least in part to the competition between the telegraph companies. Some 40 state public service commissions have jurisdiction over intrastate telegraph rates.

While many state laws empower the public service commission to regulate certain aspects of telegraph service, such powers necessarily cannot be so broad as those with respect to telephone service. The right to establish telegraph service, to build new lines, and to operate them is a Federal, not a state, right. It has been held that the effect of the enactment of the Post Roads Act and of the privileges granted thereunder is that a telegraph company that accepts its terms and conditions may construct and operate its lines over these roads, and the state can have no authority to say that it shall not be done and cannot, by any specific statute, prevent the company from placing its lines

along the post roads or stop the use of them after they are so placed.[1] Thus, it was held that a state might not exclude a telegraph company, having accepted the terms of the Post Roads Act, from the use of such roads even though they were wholly within the state. An act of the state of Florida conferred upon a single corporation, the Pensacola Telegraph Company, the exclusive right of transmitting intelligence by telegraph over a certain portion of its territory; and the Pensacola corporation under that law appealed to the courts to prevent the Western Union Telegraph Company from constructing and using a line in its exclusive territory. The matter was taken to the Supreme Court of the United States eventually, and this Court held that the Post Roads Act declares, in the interest of Commerce and the convenient transmission of intelligence from place to place by the government of the United States and its citizens, that the erection of telegraph lines shall, so far as state interference is concerned, be free to all who submit to its conditions. The Florida statute, it held, would exclude all telegraphic correspondence between citizens of other states and those residing in the territory in question, except by the lines of the corporation given exclusive rights in that territory, and thus would constitute unconstitutional regulation of interstate commerce.[2]

It has been held also that a telegraph company, having accepted the terms of the Post Roads Act, need not obtain a certificate of public convenience and necessity from a state commission before constructing and operating telegraph lines on the post roads, even though the purpose of denying such a certificate might be to avoid wasteful and uneconomic duplication of facilities. A state may not require a certificate as a prerequisite to the construction or operation of a telegraph line within the state for the doing of interstate business or as a prerequisite to the construction of a line physically connected to an interstate line, even though potentially usable for intrastate purposes. It has been held, further, that a state may not require a certificate of public convenience and necessity as a prerequisite to the conduct of intrastate telegraph business.[3]

[1] *Western Union Tel. Co. v. Attorney General of Mass.*, 125 U. S. 530.

[2] *Pensacola Tel. Co. v. Western Union Tel. Co.*, 96 U. S. 1,10,11. (1877).

[3] *Re Postal Tel. Cable Co.* (Calif. Comm.), P.U.R. 1925 C, 398; and *Postal Tel. Cable Co. v. R.R. Comm.*, P.U.R. 1927 B, 474 (Calif. Sup. Ct.).

But the effect of the "Federal franchise" of a telegraph company is not to give it an absolute right to carry on its intrastate telegraph business to the complete exclusion of the police power of the state. Under the legitimate exercise of its police powers, a state may tax the property of a telegraph company located within its borders;[1] and although a city may not arbitrarily exclude the wires and poles of a telegraph company from its streets, it may impose reasonable restrictions and regulations upon the use of its streets.[2] Such powers are, however, regulatory and not prohibitory. Where a city has laid down specific regulations concerning the use of its streets, which a telegraph company has followed in constructing and using its lines, such lines are protected by the Post Roads Act against exclusion or other arbitrary action of the city. Furthermore, where no specific regulations have been enacted, but the city authorities with full knowledge of all circumstances have acquiesced in their construction, maintenance, and operation, the city may, under exceptional circumstances, be held to have waived its rights or to have estopped itself, and such lines also are protected by the Post Roads Act.[3]

When an intrastate telegraph service is once established, its continuance becomes a matter of public interest, and usually the service may not be abandoned without the consent of the state regulatory body.[4] The duty of the commission is primarily to protect the public interest, and consumers may not be deprived of telegraph service upon which they have come to depend merely because a particular service is unprofitable. However, abandonment of unprofitable offices has been permitted by state commissions where it has been shown that continued operation would entail serious loss, especially where alternative methods of sending messages have been available. No commission has ever prescribed standards for telegraph service.

More than once, the question has been raised as to the authority of a state commission to compel a railroad carrier subject to its jurisdiction, which had granted a telegraph company the exclusive right to install telegraph offices in its stations, to grant equal

[1] *Western Union Tel. Co. v. Mass.*, 125 U. S. 530.
[2] *Western Union Tel. Co. v. Richmond*, 224 U. S. 160.
[3] *Essex v. New England Tel. Co.*, 239 U. S. 313.
[4] *Western Union Tel. Co. v. Carter*, P.U.R. 1924 B, 269 (Okla. Sup. Ct.).

privileges to its competitor. Such an issue was raised before the Florida Commission, and the Florida Supreme Court held that it was beyond the Commission's jurisdiction. The Court said that for purposes of public regulation there is a fundamental distinction between the acts of a common carrier in the performance of its duties as such and those done in the exercise of its purely private right to manage and control its own property in matters not embraced within its public duties. The right of a railroad to contract with a telegraph company in such matters is part of its private right, and it is under no compulsion by law, as a part of its duties as a common carrier, to grant another telegraph company like facilities for a like purpose. There is no public duty upon a common carrier, the Court said, so to use its property that others who have no business with it as a carrier may make profit for themselves.[1] This is an important decision in view of the effect of such contracts upon competition in the telegraph industry. The Federal Communications Commission is required to investigate these contracts and to recommend Federal legislation to control them if deemed desirable or necessary.

State and Municipal Regulation of Radio Communication.—The Courts have held that all radio communications, even though they may be intended only for intrastate transmission, are interstate commerce. Therefore, since the Federal Government has assumed the regulation of radio communication as a nation-wide problem, state or local regulation in so far as it encroaches upon the sphere of Federal regulation constitutes unconstitutional regulation of interstate commerce. Nevertheless, a surprisingly large amount of radio legislation is to be found among the laws of the various states and among the ordinances of cities, towns, and villages. Most of this legislation has to do with radio broadcasting and is aimed to eliminate electrical interference with radio reception, to prevent the operation of a loud-speaker in such manner as to constitute a nuisance, and to provide against the construction and use of apparatus dangerous to life and property. Other laws have attempted to limit the power output of stations, to restrict hours of operation, and to determine the location of transmitters. In addition, attempts have been made to levy local licenses or privilege taxes upon radio

[1] *State ex. rel. Postal Tel. Cable Co. v. Wells*, P.U.R. 1929 B, 373.

stations. Some of the regulations lie clearly within the police powers of the states; but in the case of many others, the conflict between state and Federal regulation is obvious, and, where such conflict arises, Federal jurisdiction is supreme.

An excellent analysis of state and local regulatory measures, made some time ago by Segal and Spearman of the Legal Division of the Federal Radio Commission, classified them as follows:

I. Laws providing direct local control of radio transmission or apparatus, such as those:
   A. Prescribing local licenses or privilege taxes.
   B. Limiting the operation of reception apparatus.
   C. Restricting the hours of transmission.
   D. Dealing with the location of transmission equipment:
      1. To prevent the type of interference known as "blanketing" (laws limiting the power output of transmitters).
      2. To make zoning laws applicable to radio towers and buildings.
   E. Extending the state's control over public utilities to radio transmission.
   F. Concerning themselves with the subject matter of radio transmission.
II. Antinuisance laws.
   A. For the control of locally originating electrical interference with radio reception.
   B. For the control of loud-speaker operation.
III. Laws dealing with apparatus construction.
   A. As to towers, poles, guy wires, antennas, etc.
   B. As to wiring (fire hazards).[1]

Although this classification was made several years ago, and although many ordinances contain several of its features, it embraces fully the various types of regulatory measures that have been adopted by states and municipalities. In the absence of final pronouncements by the Supreme Court of the United States, and with only a few decisions by other courts concerning these measures, the boundary line between Federal and state jurisdiction cannot be drawn with certainty. While commercial radiotelegraph communication is a public utility service, such communication is wholly interstate commerce and not subject to state regulation. Radio broadcasting, in many respects, is not a public utility; hence laws designed to extend the state's control over public utilities to radio communication are invalid.

[1] SEGAL and SPEARMAN, "State and Municipal Regulation of Radio Communication," Government Printing Office, pp. 2–3, 1929.

Specific measures which from the standpoint of policy are unnecessary, or are clearly invalid, include those prescribing local licenses or privilege taxes, those restricting the hours of transmission, and those dealing with the location of transmission equipment to avoid interference. Measures that are clearly within the police powers of the state are those which control loud-speaker operation, zoning laws applicable to radio towers and buildings, and those dealing with apparatus construction designed to protect life and property. On the border line of necessity or validity are those designed to control locally originating electrical interference with radio reception from electric power-transmission circuits; from certain industrial uses of electricity, such as precipitator devices to control smoke and noxious fumes, arc welders, portable drills, motors and generators, bell ringers, thermostats, and starting contacts; and from electrical appliances used in the household, store, and office. Many of these are unnecessary, since power companies are interested in leaks from the point of view of preventing losses to themselves; and ordinances requiring such companies, and street-car companies, as well as those using industrial electrical appliances, to go to prohibitive expense to avoid interference with radio reception would probably be invalid and in many cases contrary to public policy. Similar principles apply in the case of interference from electrical appliances used in the household, store, or office, although individual offenders need not be protected who knowingly and persistently operate interference-producing devices of wide effect where corrective devices may be economically installed. Laws dealing with the subject matter of radio broadcasting, so far as they deal with defamatory matter, seem to be valid, although others requiring stations located within a state to do certain broadcasting for the state or its police department are of questionable validity. An interesting issue has been raised recently by the attempt of certain states to forbid the equipment of automobiles with radio receiving sets on the ground that the operation of such sets interferes with careful driving.

The question of the relative spheres of state and Federal jurisdiction over communications, to which reference has already been made, has been an important one in connection with radio broadcasting; but the drift is in the direction of the concentration

of all control, except for the regulation of certain nuisances or defamatory utterances, in the hands of the Federal regulatory body. However, the Communications Act of 1934, like the Radio Act of 1927 which preceded it, deals only with the regulation of broadcast transmission, not reception. Consequently, regulation of radio reception in the public interest, so far as it is necessary and desirable, must be undertaken by the states and municipalities.

In summary, it might be said that regulation of telephone communication in most states is as detailed and comprehensive in scope as the regulation of other public utility services. Similar problems are encountered also, especially in the determination of reasonable rates which is the crux of the regulatory problem. Telephone regulation has been largely state regulation and is likely to remain so because of the preponderance of intrastate operations, the field of Federal regulation being confined chiefly to the interstate toll service, although cooperation between Federal and state commissions can make state regulation of the intrastate service more effective through proper segregation of intrastate and interstate toll and exchange property, revenues, and expenses. Also, Federal investigation of matters that are common to several state commissions, including the contract payments between the subsidiaries and the parent company of the Bell System and between these subsidiaries and the Western Electric Company, should aid in arriving at reasonable determinations of many controversial issues. Almost as many state commissions have jurisdiction over telegraph communication as of telephone communication, but the scope is not so broad, and the problems have been fewer and less complex. So long as competition remains the controlling policy in the telegraph industry, both state and Federal authorities will have the task of seeing to it that such competition is free and unrestrained, that unfair methods of competition are abolished, and that the effects of competition are not destructive. As regards radio communication, the sphere of state regulation is closely circumscribed, owing to the fact that radio communications are all interstate, state regulation being confined largely to the exercise of police powers with respect to certain aspects of radio broadcasting.

CHAPTER XIII

THE INTERNATIONAL REGULATION OF TELECOMMUNICATION SERVICES

Because of its very nature, telecommunication regulation requires not only the establishment of certain national policies and rules applicable to all telecommunication services but also the laying down, by international agreement, of broad, fundamental policies which are basic to the framework of national regulation.

As early as 1875, this was recognized by the nations of the world; and an International Conference in Saint Petersburg, Russia, drafted and adopted the world's first telegraph convention which was to remain in effect for more than 50 years and became known as the Saint Petersburg Telegraph Convention, 1875.

When radio apparatus was first installed on shipboard, it became apparent that unless an international agreement were negotiated under the terms of which all ship stations would be required to intercommunicate with one another, especially in cases of distress, a situation would soon grow up involving the use of many types of equipment, most of them communicating only with vessels of the same company equipped with similar apparatus and either refusing to communicate or not capable of communicating with vessels carrying different equipment. Such a condition would not promote safety of life at sea and would be a tremendous handicap to the orderly growth of the new art.

Accordingly, in 1903, on the invitation of the German Government, a preliminary wireless conference was held in Berlin; and in 1906, the larger nations of the world, including the United States, met again in Berlin and adopted the first wireless telegraph convention known as the Berlin Wireless Telegraph Convention, 1906.

Six years later, this was revised at the London Conference of 1912; and the London Wireless Telegraph Convention, 1912, was adopted. This was supplanted 15 years later by the International Radiotelegraph Convention of Washington, 1927.

In the meantime, although the original Telegraph Convention of Saint Petersburg remained in effect, various conferences of an administrative nature were held to revise the working regulations which supplemented that convention. These conferences were held in Paris in 1890, in London in 1903, in Lisbon in 1908, in Paris in 1925, and in Brussels in 1928.

The International Telegraph Conference of Paris, 1925, called for the purpose of revising the telegraph regulations annexed to the Saint Petersburg Telegraph Convention; and the International Radio Conference of Washington, 1927, adopted resolutions recommending the amalgamation of the International Telegraph Convention and the International Radio Convention. It was decided among the nations signatory to these two conventions that the next telegraph and radio conferences should be held simultaneously at the same place with a view to a possible fusion of the two conventions. The Spanish Government invited both conferences to meet at Madrid in September, 1932; and in 1930, the International Bureau of the Telegraph Union circulated a draft of a combined radio and telegraph convention which was suggested for use as a basis for the submission of proposals by the various governments. This draft was taken as a basis for proposals and at the Madrid Conference was considered by a Joint Convention Committee of both conferences, which recommended the adoption of a single convention to be known as the "Telecommunication Convention." This convention contains statements of general principle, most of them applicable alike to radio, telegraphy, and telephony. The statement of general principles in the convention is supplemented by details incorporated in separate sets of regulations dealing with radio, telegraphy, and telephony. For the most part, the convention articles relate to all three services.

The International Telecommunication Convention of Madrid. For many months prior to the Madrid Conference, open meetings were held under the auspices of the Department of State and the Federal Radio Commission to consider what changes should be made in the Washington Radiotelegraph Convention and General Regulations Annexed thereto, in order to improve them and to keep abreast with the current developments in the radio art. At these meetings, which were attended by representatives of the various government departments interested in radio and

representatives of commercial communication companies, proposals were drawn up in behalf of the United States Government and submitted to the foreign nations for their consideration. After these proposals had been published, together with those of other nations, they were reconsidered, and the proposals of the other nations of the world were studied.

The convention itself for the most part established broad general principles covering all phases of the communication field. From the point of view of the American delegation, it was important to avoid specific commitments concerning telephony and telegraphy, which while easy to apply in nations that operate their own telephone and telegraph services might be too much involved in operation and management questions for the United States, where the greater part of the communication business is handled by private companies. On account of this basic difference between communications in the United States and in foreign countries, the United States has never been a party to the Saint Petersburg Telegraph Convention of 1875 nor to the various sets of telegraph regulations that have supplemented this convention.

Consequently, the Madrid Telecommunication Convention for the most part deals with the more general aspects of communication, and the principles that constitute the framework of the Convention are amplified in separate sets of regulations dealing with radio, telegraphy, and telephony. Because of the special interference characteristics of radio, however, a special chapter containing certain articles relating only to radio was made a part of the convention itself at the insistence of a number of nations, including the United States.

The term "telecommunication" was adopted by the conference to include all the services covered by the convention and regulations.

The International Telecommunication Union, replacing the old International Telegraph Union, is created in the first article of the new Convention. The union covers radio, telegraphy, and telephony in its unification of these services under a joint secretariat at Bern.

The next article sets forth the regulations annexed to the convention and is in accord with the precedent established by the International Radiotelegraph Conference of Washington. The

radio regulations are divided into two parts: the General Radio Regulations, covering international rules and regulations applicable to all nations in common; and the Additional Radio Regulations, which deal with more detailed questions of management and charges and are applicable more specifically to nations in which the communication services are operated by the government.

In addition to the two sets of radio regulations, the convention is supplemented by the Telegraph Regulations and the Telephone Regulations. Under the terms of the convention, a government that accepts the convention itself must agree to be bound by the provisions of at least one set of regulations, with the further proviso that the Additional Radio Regulations may be accepted only in conjunction with the General Radio Regulations.

Since the American delegation signed only the International Telecommunication Convention and the General Radio Regulations, the government of the United States has obligations only with respect to radio and is not bound by provisions dealing with telegraphy and telephony. It may thus be seen that while the essential advantages of unification have been gained, it was possible in working out this change to take into account the special conditions obtaining in countries that do not operate their own communication services, without fundamental changes in the position of the United States which, with respect to the telegraph and telephone services, has not been changed by the adoption of the Madrid Convention.

The convention itself is divided into five chapters. Chapter I, Organization and Functioning of the Union, contains the first 17 articles. For the most part, the material in these articles corresponds to provisions in the International Radiotelegraph Convention of 1927, with the exception that provisions for adherence to and denunciation of the Convention and Regulations Annexed thereto are given in greater detail. The first seven articles cover Constitution of the Union; Regulations; Adherence of Governments to the Convention; Adherence of Governments to the Regulations; Adherence to the Convention and to the Regulations by Colonies, Protectorates, Overseas Territories, or Territories under Sovereignty, Authority, or

Mandate of the Contracting Governments; Ratification of the Convention; Approval of the Regulations.

Article 8 provides for the abrogation among the contracting governments of conventions and of regulations prior to the present convention.

Articles 9, 10, 11, 12, and 13 cover Execution of the Convention and of the Regulations; Denunciation of the Convention by the Governments; Denunciation of the Regulations by the Governments; Denunciation of the Convention and of the Regulations by Colonies, Protectorates, Overseas Territories, or Territories under Sovereignty, Authority, or Mandate of the Contracting Governments; and Special Arrangements. Article 14 covers relations between the contracting governments and noncontracting governments.

Article 15 on arbitration follows the precedent established in the corresponding article of the Washington Convention but gives more complete directions for the setting up of an arbitration court in case a dispute between governments cannot be settled through diplomatic channels.

Article 16 on international consulting committees continues the authority for the International Consulting Committee on Radio and also provides the basis for similar committees to deal with questions of telegraphy and telephony.

Article 17, Bureau of the Union, is a long one setting forth in detail the work and scope of the Bureau of the Union.

Chapter II, headed Conferences, contains Arts. 18, 19, 20, and 21 and covers Conferences of Plenipotentiaries and Administrative Conferences, Change of Date of a Conference, Internal Regulations of the Conferences, and Language. A significant change is made in Art. 18, providing for the participation in an advisory capacity of private operating agencies. This will permit the participation of American operating companies in international telegraph and telephone conferences which adopt regulations of a management and operational character. At the time of the adoption of the Madrid Convention, the American Government was not in a position to take an active part in the adoption of such operating rules because it did not sign and does not accept the telegraph and telephone regulations. Since the passage of the Communications Act of 1934, this government now possesses

the necessary control over telegraph and telephone communication to enable it to become signatory to the telegraph and telephone regulations at the next world conference, with adequate protection to American interests.

Article 21 represents a notable step forward in the history of communication conferences for English-speaking delegations. Although it provides for the continuance of French as the language for the documents of the union, it places English and French on an equal basis for all discussions and debates of the conferences, with official interpreters furnished by the Bureau of the Union for immediate translations from French to English and vice versa.

Chapter III, entitled General Provisions, includes Arts. 22 to 33, inclusive. These cover Telecommunication as a Public Service; Responsibility; Secrecy of Telecommunications; Constitution, Operation, and Protection of the Telecommunication Installations and Channels; Stoppage of Telecommunications; Suspension of Service; Investigation of Violations; Charges and Franking Privileges; Priority of Transmission for Government Telegrams and Radiotelegrams; Secret Language; Monetary Unit, and Rendering of Accounts. In this chapter, Art. 25, requiring facilities for a rapid and uninterrupted exchange of international communications, represents a new principle in so far as the United States is concerned. Article 26 involves the question of censorship in that it provides for the stoppage or interruption of any private telegram, radiotelegram, or telephone conversation by one of the high contracting governments should such a telecommunication appear dangerous to the safety of the state or contrary to the laws of the country, to public order, or to decency. This article is considerably more liberal than the corresponding article of the old telegraph convention, and it will help American newspaper correspondents and other users of telegraph facilities in foreign countries in the handling of their messages. Whereas formerly a government that stopped a message was not required to advise the office of origin of this action, now, under the terms of the new article, the office of origin must immediately be notified of the stoppage of the said communication or any part thereof, except where it might appear dangerous to the safety of the state to issue such notice.

Article 30 gives priority to the transmission of government telegrams and radiotelegrams, unless the sender renounces this right of priority. Although this is not included in the Washington Convention and General Regulations, it is nevertheless in accord with present practice.

Chapter IV is headed Special Provisions for Radio. This chapter contains Arts. 34 to 39, inclusive, and deals with Intercommunication, Interference, and Distress Calls and Messages, False or Deceptive Signals—Irregular Use of Call Signals, Limited Service, and Installations of National Defense Services. The general matters covered by this chapter correspond very closely to similar articles in the International Radiotelegraph Convention of 1927. The wording of Art. 35, which covers Interference was changed to some extent to provide greater protection to existing services from interference. Chapter V, headed Final Provisions, closes the Convention with Art. 40, stating that the convention becomes effective on Jan. 1, 1934.

General Radio Regulations.—An inspection of the General Radio Regulations of Madrid and a comparison of these regulations with the General Regulations Annexed to the Washington Radiotelegraph Convention will show that the General Radio Regulations of Madrid follow the Regulations of Washington along basic lines and that it is only in matters of detail here and there, where an improvement in the existing regulations could be made, that changes were found necessary. With very few exceptions, the table of allocation of frequencies, which is the heart of the regulations, follows closely the pattern of the Washington General Regulations.

The American Delegation at Madrid made every endeavor to continue with as few changes as possible the allocation of frequencies made by the Washington Regulations. A very large number of stations have become established throughout the world on the basis of this allocation, and the desire was generally expressed at Madrid to make no arbitrary changes in the existing allocation or changes that did not appear absolutely necessary. The final allocation table as agreed upon at Madrid is shown in Fig. 5. Although this allocation table is no longer merely a guide but is to be followed by all nations in their assignment of frequencies to stations capable of causing international interference, the right of a nation to use any frequency upon the sole condition

ALLOCATION OF FREQUENCY BANDS BETWEEN 10 AND 60,000 KC. (30,000 AND 5 M.)

Frequencies, kc.	Wave lengths, m.	Services		
		General allocation	Regional agreements	
			European region*	Other regions
10–100	30,000–3,000	Fixed		
100–110	3,000–2,727	(*a*) Fixed (*b*) Mobile		
110–125	2,727–2,400	Mobile		
125–150 [1]	2,400–2,000	Maritime mobile (open to public correspondence exclusively)		
150–160	2,000–1,875	Mobile		
160–285 [4]	1,875–1,053		160–240 (1,875–1,250) Broadcasting[3] 240–255 (1,250–1,176) (*a*) Services not open to public correspondence (*b*) Broadcasting[2,3] 255–265 (1,176–1,132) (*a*) Aeronautical (*b*) Broadcasting[2,3] 265–285 (1,132–1,053) Aeronautical	160–194 (1,875–1,546) (*a*) Fixed (*b*) Mobile 194–285 (1,546–1,053) (*a*) Aeronautical (*b*) Fixed not open to public correspondence (*c*) Mobile except commercial ship stations

* *Definition of the European region:* The European region is limited on the north and west by the natural boundaries of Europe, on the east by the meridian 40° East of Greenwich and on the south by the parallel 30° North, so as to include the western part of the U.S.S.R. and the territories bordering on the Mediterranean, except the parts of Arabia and Hejaz which are included in this sector.

[1] The wave of 143 kc. (2,100 m.) is the calling-wave of mobile stations using continuous long waves.

[2] The European administrations shall arrange among themselves for placing in the band 240 to 265 kc. (1,250 to 1,132 m.) broadcasting stations which, by reason of their geographical position, will not interfere with services not open to public correspondence or with aeronautical services. Furthermore, these services shall be organized in such a way as not to interfere with the reception of the broadcasting stations thus chosen, within the limits of the national territories of these stations.

[3] Services open to public correspondence shall not be admitted in the bands allocated to broadcasting, between 160 and 265 kc. (1,875 and 1,132 m.), even under the terms of Art. 7, Sec. 1.

[4] The frequency band 160 to 265 kc. (1,875 to 1,132 m.) shall also be assigned to Australia and New Zealand for broadcasting, as a regional allocation. The administrations of these two countries agree to place stations transmitting in this band, in such a way as to avoid interfering with other services in other regions.

FIG. 5.

ALLOCATION OF FREQUENCY BANDS BETWEEN 10 AND 60,000 KC. (30,000 AND 5 M.).—(*Continued*)

Frequencies, kc.	Wave lengths, m.	Services		
		General allocation	Regional agreements	
			European region	Other regions
285–290 [5]	1,053–1,034		Aeronautical	Radiobeacon
290–315 [5]	1,034–952	Radio-beacon	Maritime radiobeacon	
315–320 [5]	952–938		Maritime radiobeacon	Aeronautical
320–325	938–923		Aeronautical	(*a*) Aeronautical (*b*) Mobile not open to public correspondence
325–345 [6]	923–870	Aeronautical		
345–365	870–822		Aeronautical	(*a*) Aeronautical (*b*) Mobile not open to public correspondence
365–385	822–779	(*a*) Radio direction finding. (*b*) Mobile, providing it does not interfere with radio direction finding. Coast stations using B waves excluded.		
385–400	779–750		Services not open to public correspondence	Mobile
400–460	750–652	Mobile		

[5] A band 30 kc. wide, included within the limits of 285 to 320 kc. (1,053 to 938 m.) shall be allocated in each region to radiobeacon services. In the European region, this band shall be reserved solely for maritime radiobeacons.

[6] The wave of 333 kc. (900 m.) is an international calling-wave for the aeronautical services.

FIG. 5.—(*Continued.*)

ALLOCATION OF FREQUENCY BANDS BETWEEN 10 AND 60,000 KC. (30,000 AND 5 M.).—(*Continued*)

Frequencies, kc.	Wave lengths, m.	Services		
		General allocation	Regional agreements	
			European region	Other regions
460–485	652–619	Mobile A1 and A2 only		
485–515 (7)	619–583	Mobile (distress, calling, etc.)		
515–550 (8)	583–545	Services not open to public correspondence, A1 and A2 only		
550–1,500 (9)	545–200	(*a*) Broadcasting (*b*) Wave of 1,364 kc. (220 m.) A1, A2, and B for mobile services exclusively (10)		

[7] The wave of 500 kc. (600 m.) is the international calling and distress wave. The use of this wave is defined in Arts. 19, 22, and 30.

[8] The European administrations shall arrange among themselves to place in the band 540 to 550 kc. (556 to 545 m.) broadcasting stations which, by reason of their geographical position, will interfere neither with mobile services in the band 485 to 515 kc. (691 to 583 m.), nor with services not open to public correspondence in the band 515 to 550 kc. (583 to 545 m.).

Furthermore, services not open to public correspondence shall organize in such a way as not to interfere with the reception of broadcasting stations thus chosen within the limits of the national territories of these stations.

[9] Mobile services may use the band 550 to 1,300 kc. (545 to 230.8 m.) on condition that they do not interfere with the services of a country which uses this same band exclusively for broadcasting.

[10] On the frequency of 1,364 kc. (220 m.), type B waves shall be forbidden between 18:00 and 23:00 o'clock, local time, in all the regions where their use might interfere with broadcasting. However, in the region of North America, type-A1 waves only shall be authorized during these hours.

FIG. 5.—(*Continued.*)

ALLOCATION OF FREQUENCY BANDS BETWEEN 10 AND 60,000 KC. (30,000 AND 5 M.).—(*Continued*)

Frequencies, kc.	Wave lengths, m.	Services		
		General allocation	Regional agreements	
			European region	Other regions
1,500–1,715 [11] [14]	200–174.9		1,500–1,530 (200–196.1) (*a*) Fixed (*b*) Mobile, A1 and A2 only 1,530–1,630 (196.1–184) Mobile A1, A2, A3 [12] 1,630–1,670 (184–179.6) Maritime mobile calling-wave (A3 only) [13] 1,670–1,715 (179.6–174.9) Maritime mobile (A3 only)	(*a*) Fixed (*b*) Mobile
1,715–2,000	174.9–150		1,715–1,925 (174.9–155.8) (*a*) Amateur (*b*) Fixed (*c*) Mobile 1,925–2,000 (155.8–150) (*a*) Amateur (*b*) Maritime mobile (A3 only)	(*a*) Amateur (*b*) Fixed (*c*) Mobile

[11] The frequency 1,650 kc. (182 m.) is a calling-wave for the mobile radiotelephone service with low-power ship stations. This calling-wave shall not be obligatory and the date on which it shall become obligatory for each country shall be determined by internal regulation.

[12] In principle, this frequency band shall be reserved for telephone service with low-power ship stations. The countries of Europe whose ships do not use this type of communication shall avoid, so far as possible, the use of telegraphy in this band in regions near those where this telephone service is carried on.

[13] No traffic may be carried on in the band 1,630 to 1,670 kc. (184 to 179.6 m.).

Calling on the wave of 1,650 kc. (182 m.) shall not be obligatory; each country shall determine, by internal regulation, when it shall become effective.

[14] Within Europe, the frequency bands 1,530 to 1,630 kc. and 1,670 to 1,715 kc. (196.1 to 184 m. and 179.6 to 174.9 m.) may be used by short-distance fixed services, provided they do not interfere with mobile services.

NOTE.—A European conference, which is to take place before the present Regulations go into effect, may, as an exception, decide on annexing to its protocol some of the derogations which it may decide to make *in the regional bands* and which it may deem necessary to show therein. Such derogations will be in addition to those which are already provided for in the above table.

FIG. 5.—(*Continued.*)

ALLOCATION OF FREQUENCY BANDS BETWEEN 10 AND 60,000 KC. (30,000 AND 5 M.).—(*Continued*)

Frequencies, kc.	Wavelengths, m.	Services
		General allocation
2,000–3,500	150–85.71	(*a*) Fixed (*b*) Mobile
3,500–4,000	85.71–75	(*a*) Amateur (*b*) Fixed (*c*) Mobile
4,000–5,500	75–54.55	(*a*) Fixed (*b*) Mobile
5,500–5,700	54.55–52.63	Mobile
5,700–6,000	52.63–50	Fixed
6,000–6,150	50–48.78	Broadcasting
6,150–6,675	48.78–44.94	Mobile
6,675–7,000	44.94–42.86	Fixed
7,000–7,300	42.86–41.10	Amateur
7,300–8,200	41.10–36.59	Fixed
8,200–8,550	36.59–35.09	Mobile
8,550–8,900	35.09–33.71	(*a*) Fixed (*b*) Mobile
8,900–9,500	33.71–31.58	Fixed
9,500–9,600	31.58–31.25	Broadcasting
9,600–11,000	31.25–27.27	Fixed
11,000–11,400	27.27–26.32	Mobile
11,400–11,700	26.32–25.64	Fixed
11,700–11,900	25.64–25.21	Broadcasting
11,900–12,300	25.21–24.39	Fixed
12,300–12,825	24.39–23.39	Mobile

FIG. 5.—(*Continued.*)

ALLOCATION OF FREQUENCY BANDS BETWEEN 10 AND 60,000 KC. (30,000 AND 5 M.).—(*Continued*)

Frequencies kc.	Wavelengths m.	Services
		General allocation
12,825–13,350	23.39–22.47	(*a*) Fixed (*b*) Mobile
13,350–14,000	22.47–21.43	Fixed
14,000–14,400	21.43–20.83	Amateur
14,400–15,100	20.83–19.87	Fixed
15,100–15,350	19.87–19.54	Broadcasting
15,350–16,400	19.54–18.29	Fixed
16,400–17,100	18.29–17.54	Mobile
17,100–17,750	17.54–16.90	(*a*) Fixed (*b*) Mobile
17,750–17,800	16.90–16.85	Broadcasting
17,800–21,450	16.85–13.99	Fixed
21,450–21,550	13.99–13.92	Broadcasting
21,550–22,300	13.92–13.45	Mobile
22,300–24,600	13.45–12.20	(*a*) Fixed (*b*) Mobile
24,600–25,600	12.20–11.72	Mobile
25,600–26,600	11.72–11.28	Broadcasting
26,600–28,000	11.28–10.71	Fixed
28,000–30,000	10.71–10.00	(*a*) Amateur (*b*) Experimental
30,000–56,000	10.00–5.357	Not reserved
56,000–60,000	5.357–5	(*a*) Amateur (*b*) Experimental

FIG. 5.—(*Continued.*)

that no interference to the service of other nations would result was recognized.

The principle of regional agreements based upon arrangements between nations or groups of nations that will not cause interference to other countries was more definitely established. Any assignments to stations that depart from the allocation table contained in Art. 7 must be notified to other nations and must be made in such a way as not to cause interference to the services to which the frequencies are assigned by the allocation table. All governments will thus have an opportunity for protest and adjustments when necessary.

The greatest amount of controversy at the conference was caused by the desire of the European nations to make more frequencies available for broadcasting. Although the discussions on this question lasted almost for the duration of the conference, no satisfactory agreement was reached, and a decision was made to postpone the reallocation of European broadcasting stations to another conference at Lucerne, where an attempt was made to solve these problems for the European region.

As a result of considerable study since the Washington Radio Conference, it was felt desirable to include in the new regulations certain engineering principles which could be used as a guide by the nations of the world. In accordance with this principle, a table of frequency tolerances and a table of frequency band widths occupied by emissions were included in the General Radio Regulations.

The General Radio Regulations also provided for the establishment of a frequency list of world radio stations arranged by frequencies. This list has grown to be the most important international list of radio stations, and provision is made in the new regulations for the form in which the information is to be published, together with the form for the seven other lists[1] published by the Bureau of the International Telecommunication Union.

[1] These lists, together with their supplements, may be obtained from the Bureau of the International Telecommunication Union, Bern, Switzerland, at the following prices in Swiss gold francs, postpaid:

1. List of Frequencies and Supplements—26 francs.
2. List of Coast Stations and Ship Stations—3.70 francs.
3. List of Aircraft and Aeronautical Stations—2.50 francs.
4. List of Broadcasting Stations—4.00 francs.
5. List of Stations Performing Special Services—5.00 francs.

The Telecommunication Convention and General Radio Regulations Annexed thereto were the only agreements signed by the United States at the Madrid Conference, with the exception of the Final Protocol, which was merely a declaration on the part of some governments at the time of signing the Convention and General Radio Regulations.

International Consulting Committees.—In addition to the administrative conferences just described, a number of technical conferences are held from time to time, called for the purpose of keeping abreast with technical progress in the three principal branches of telecommunication, *i.e.*, radio, telegraphy, and telephony. Authority for these conferences is given in Art. 16 of the International Telecommunication Convention, and detailed instructions are given in the three sets of regulations for radio, telegraphy, and telephony annexed to the Telecommunication Convention. During the past, the United States has not participated actively in the International Consulting Committee on Telegraphy (C.C.I.T.) or the International Consulting Committee on Telephony (C.C.I.F.) but has taken a very active part in the three meetings of the International Consulting Committee on Radio (C.C.I.R.) held at The Hague in 1929, Copenhagen in 1931, and Lisbon in 1934.

The C.C.I. Radio differs from the other two committees in that its meetings are, in principle, held only every 5 years, whereas the other two committees meet every 2 years. The findings of these international committees are codified into what are known as "opinions," which, while not legally binding on the participating governments, nevertheless have the force of recommendations which gradually find their way into the national legislation and regulations of the principal nations. An example of such an opinion which had a very important effect in the world allocation of frequencies was Opinion 18 issued by the first C.C.I.R. at The Hague, recommending the world allocation of frequencies above 6000 kc. on a 0.1 per cent frequency separation, with the additional recommendation that such specific allocations be integral multiples of 5 kc. The effect of this in the United States was practically to double the number of

6. List of Call Letters of Fixed, Land and Mobile Stations and Supplements—9.30 francs.

7. List of Fixed Stations and Supplements—7.70 francs.

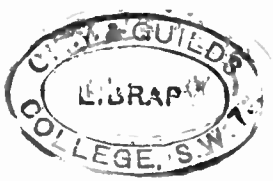
channels available for assignment. It led to a general reallocation of the so-called short waves in January, 1931.

Other technical recommendations of the C.C.I.R. have resulted in the requirement for broadcasting stations to maintain a 50-cycle tolerance, the adoption of a general tolerance table for all classes of services, and an improvement in operating conditions in the shared bands occupied by fixed and mobile services. Many of these recommendations after a trial period found their way into the General Radio Regulations Annexed to the International Telecommunication Convention of Madrid, 1932, and thereby became mandatory for the contracting nations.

Other International Agreements.—The Madrid Convention, in Art. 13, also recognizes the right of the nations to enter into regional agreements for matters affecting certain regions only, and in accordance with this principle such a regional conference was held for the European nations at Lucerne, in the spring of 1933, resulting in the adoption of a European Broadcasting Convention. A similar regional conference was held among the nations of North and Central America at Mexico City during the summer of 1933, and at that conference certain technical recommendations to form a basis for the orderly allocation of broadcast frequencies, and communication frequencies having a regional character, were adopted. This agreement, which has not been published previously, may be found in Appendix B.

In summary, it is well to remember that the Telecommunication Convention of Madrid, 1932, will probably continue unchanged for a good many years. In fact, at the Madrid Conference, the hope was expressed that the Convention itself would remain in effect as long a period of time as did the Saint Petersburgh Telegraph Convention of 1875—more than 50 years. The three separate sets of regulations will, of course, require amendment and modification from time to time at the periodic administrative conferences which, in principle, are to take place every five years. In view of the new government control over all communication services acquired through the Communications Act of 1934, the possibility of American adherence to the telephone and telegraph regulations at the Cairo Conference will be studied very carefully, inasmuch as, under the new Act, full control over rates and allied questions is vested in the new Commission. The question of regional agreement has been

worked out with respect to frequencies used for communication purposes, but the broadcast situation is still fraught with many possibilities of serious trouble, owing to the increasing interference between broadcasting stations on this continent. A great need exists for the negotiation and ratification of a satisfactory agreement in this field which will afford some measure of stability to the broadcasting industry.



CHAPTER XIV

THE COMMUNICATIONS ACT OF 1934

The Communications Act of 1934 provides a comprehensive scheme for the regulation of telecommunications under six titles. Title I covers general provisions, such as the purposes of the Act, its application, certain definitions, and provisions relating to the Commission on Communications which it creates; Title II contains provisions applicable to all common carriers subject to the Act and certain special provisions relating to telephone companies; Title III includes special provisions relating to radio; Title IV, procedural and administrative provisions; Title V, penal provisions and provisions relating to forfeitures; and Title VI, a number of miscellaneous provisions, including the transfer to the Commission of duties, powers, and functions under existing law; repeals and amendments and the effect of transfers, repeals, and amendments; provisions relating to the unauthorized publication of communications; emergency powers of the President; the effective date of the Act; and a separability clause. Since the procedural and administrative provisions and those relating to penalties and forfeitures, while vitally important to just and efficient administration of the Act, are principally of legal and not of general interest, our discussion of the Act will be confined chiefly to its other provisions.

TITLE I. GENERAL PROVISIONS

1. Purpose and Application of the Act.—The purpose of the Act is stated in Sec. 1, as follows:

> 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, 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," which shall be constituted as hereinafter provided, and which shall execute and enforce the provisions of this Act.

The provisions of the Act are made applicable to all interstate and foreign communication by wire and radio and to all interstate and foreign transmission of energy by radio, which originates and/or is received within the United States, to all persons engaged in such communication or transmission of energy and to the licensing and regulating of all radio stations, except that it does not apply to persons engaged in wire or radio communication or transmission in the Philippine Islands or the Canal Zone, or to wire or radio communication or transmission wholly within the foregoing territories. The provisions of the Act do not apply, or give the Commission jurisdiction with respect, to (1) charges, classifications, practices, services, facilities, or regulations for or in connection with intrastate communication service of any carrier, with the exception of radio communication within any state where the effects extend to, or interference is caused beyond, the borders of said state, or (2) any "connecting carrier" engaged in interstate or foreign communication solely through physical connection with the facilities of another carrier not directly or indirectly controlling or controlled by, or under direct or indirect common control with, such carrier, except that such carriers are subject to the provisions of the Act with regard to service and charges. The latter clause, together with Sec. 201, which provides, in part, that nothing in the Act shall be construed to prevent a common carrier subject to the Act from entering into or operating under a contract for the exchange of services with any common carrier not subject to the Act if the Commission is of the opinion that such contract is not contrary to the public interest, excludes from the jurisdiction of the Commission common carriers that engage in communications only as an adjunct of their other operations, except to the extent of the establishment of through routes and joint rates with common carriers subject to the Act, and uncontrolled connecting companies

2. Definitions.—Section 3 contains a number of definitions. "Wire communication" is defined as "the transmission of writing, signs, signals, pictures, and sounds of all kinds by aid of

wire, cable, or other like connection between the points of origin and reception of such transmission, including all instrumentalities, facilities, apparatus, and services (among other things, the receipt, forwarding, and delivery of communications) incidental to such transmission"; and "radio communication," as such transmission by radio including the receipt, forwarding, and delivery of communications incidental to transmission. "Interstate communication" or "interstate transmission" means communication (1) from any state, territory, or possession of the United States (other than the Philippine Islands and the Canal Zone) or the District of Columbia to any other such political subdivision; (2) from or to the United States to or from the Philippine Islands or the Canal Zone, in so far as such communication takes place within the United States; or (3) between points within the United States but through a foreign country; but it does not include wire communication between points within the same state, territory, or possession of the United States or the District of Columbia, through any place outside thereof, if such communication is regulated by a state commission. The latter clause eliminates conflicts of jurisdiction where wire communication between points in the same state for a part of the distance passes outside the boundaries of the state and provides for the regulation of certain communications which otherwise would not be subject to state or Federal regulation, since a transmission between two points in the same state which passes through a foreign country is not intrastate commerce.[1]

"Foreign communication," or "foreign transmission," means communication from or to any place in the United States to or from a foreign country or between a station in the United States and a mobile station located outside the United States. "Common carrier" means any person engaged as a common carrier for hire in interstate or foreign communication or transmission of energy, except a person engaged in radio broadcasting in so far as such person is so engaged. This definition does not include any person if not a common carrier in the ordinary sense of the term and therefore does not include press associations or other organizations engaged in the business of collecting

[1] Letter from Frank McManamy, chairman of the Legislative Committee of the Interstate Commerce Commission, to Hon. C. C. Dill, Hearings on S. 2910, 73d Cong., 2d Sess., p. 201.

and distributing news services which may refuse to furnish any person service that they are capable of furnishing and may furnish service under varying arrangements, establishing the service to be rendered, the terms under which rendered, and the charges therefor. "Person" includes an individual, partnership, association, joint-stock company, trust, or corporation. "Telephone exchange service" and "telephone toll service" are defined, the former to mean "service within a telephone exchange, or within a connected system of telephone exchanges within the same exchange area operated to furnish to subscribers intercommunicating service of the character ordinarily furnished by a single exchange, and which is covered by the exchange service charge"; and the latter to mean "telephone service between stations in different exchange areas for which there is made a separate charge not included in contracts with subscribers for exchange service."

Other definitions cover many radio terms formerly defined only in the regulations of the Federal Radio Commission. A "radio station" means a station equipped to engage in radio communication or radio transmission of energy; a "mobile station," "a radio-communication station capable of being moved and which ordinarily does move"; a "land station," a station, other than a mobile station, used for radio communication with mobile stations; and an "amateur station," a radio station operated by a duly authorized person interested in radio technique solely with a personal aim and without pecuniary interest. "Mobile service" means the radio-communication service carried on between mobile stations and land stations and by mobile stations communicating among themselves; "broadcasting" means the dissemination of radio communications intended to be received by the public, directly or by the intermediary of relay stations; and "chain broadcasting" is defined as simultaneous broadcasting of an identical program by two or more connected stations. These definitions are, of course, binding upon the Commission, but in practice many of them will require specific interpretation.

3. Organization of the Commission.—The provisions relating to the Commission, contained in Sec. 4, have been adopted mostly from various sections of the Interstate Commerce Act. They relate to the organization and functions of the Commission

and include such matters as the qualifications of commissioners, the terms of office, salaries of commissioners and personnel, the principal office of the commission, expenditures, quorum, powers to make necessary rules and regulations, conduct of proceedings, annual reports and reports of investigations, and the publication of reports and decisions. Each member of the Commission must be a citizen of the United States. No member or person in the employ of the Commission

> . . . shall be financially interested in the manufacture or sale of radio apparatus or of apparatus for wire or radio communication; in communication by wire or radio or in radio transmission of energy; in any company furnishing services or such apparatus to any company engaged in communication by wire or radio or to any company manufacturing or selling apparatus used for communication by wire or radio; or in any company owning stocks, bonds, or other securities of any such company; nor be in the employ of or hold any official relation to any person subject to any of the provisions of this Act; nor own stocks, bonds, or other securities of any corporation subject to any of the provisions of this Act.

Nor shall the commissioners engage in any other business, vocation, or employment. Not more than four commissioners shall be members of the same political party. The first commissioners are appointed for terms of 1, 2, 3, 4, 5, 6, and 7 years, respectively, but thereafter for terms of 7 years. The Commission is empowered to perform any and all acts, to make such rules and regulations, and to issue such orders as may be necessary in the execution of its functions. It must make and publish reports but is authorized to withhold publication of records or proceedings containing secret information affecting the national defense.

The Commission, by Sec. 5, is authorized to divide its members into not more than three divisions, each to consist of not less than three members; to direct that any of its work, business, or functions be assigned or referred to any of such divisions; and at any time to amend, modify, supplement, or rescind any such direction. This provision follows closely the provisions of Sec. 17 of the Interstate Commerce Act. It enables the Commission to fix its own divisions and assign work to them as occasion requires. Judging by the experience of the Interstate

Commerce Commission, which since 1917 has functioned under a similar provision, it should make for efficient administration. Division among the commissioners and the staff of the immense amount of important and detailed work which such a commission faces is necessary, but legislative specification of divisions and of the work that may be assigned them might well impose upon the Commission as a whole an irksome, detailed burden of numerous minor duties with respect to subjects that could better be handled by a division and might give to the divisions, instead of to the Commission, the important task of formulating policies and determining the construction of the law in respect of major subjects. It is best that such matters be left to the Commission's determination in the light of experience. Any division is authorized to hear and determine, order, certify, report, or otherwise act in respect of any work assigned it and has all the jurisdiction and powers concerning such work as are conferred by the law upon the Commission. Any order, decision, or report made by any division shall have the same force and effect as if made by the Commission, subject to rehearing by the Commission. The Commission also is authorized to assign or refer any portion of its work, business, or functions to an individual commissioner or to a board composed of an employee or employees of the Commission, except investigations instituted on the Commission's own motion or, without the consent of the parties thereto, contested proceedings involving the taking of testimony at public hearings or investigations specifically required by the Act.

TITLE II. COMMON CARRIERS

1. Service and Charges.—Title II contains provisions applicable to all common carriers subject to the Act. Most of these provisions have been taken bodily or with slight modification from the Interstate Commerce Act, although certain wholly new provisions have been added, and many of the provisions transferred have been made applicable for the first time to communications. The requirement that every common carrier engaged in interstate or foreign communication shall furnish such service upon reasonable request therefor expresses an obligation inherent in the nature of public utility service which is commonly recognized. The duty impressed upon carriers

by the provisions of Sec. 201, "in accordance with the orders of the Commission, in cases where the Commission, after opportunity for hearing, finds such action necessary or desirable in the public interest, to establish physical connections with other carriers, to establish through routes and charges applicable thereto and the divisions of such charges, and to establish and provide facilities and regulations for operating such through routes," is one impressed by the Interstate Commerce Act only upon transportation companies and is now made applicable to communication companies. A similar provision in the original Senate bill (S. 2910) was critized in a report upon that bill made by the Interstate Commerce Commission, on the ground that it imposed no duty upon the carriers to establish through routes prior to determination and order by the Commission and that the carrier's duty should be separate from the Commission's power to require observance of the duty or to prescribe the governing rule when the carrier fails to perform its duty.[1] Whether or not the powers of the Communications Commission over these matters are ample, experience alone will tell. If found to be inadequate, they should be made sufficiently broad, for such powers are necessary to assure to the public the most efficient and most universal communications service and to see to it that justice is done as among the companies themselves and between them and the public.

Section 201, Par. *b*, permits just and reasonable classifications of service and provides further that "nothing in this Act or in any other provision of law shall be construed to prevent a common carrier subject to this Act from entering into or operating under any contract with any common carrier not subject to this Act, for the exchange of their services, if the Commission is of the opinion that such contract is not contrary to the public interest." The most common contracts affected by this proviso are those by which the telegraph companies furnish message service to railroads in return for transportation of men and materials and perhaps right of ways. Representatives of the Western Union Telegraph Company, in the hearings on the Senate bill, objected to giving the Commission power to disapprove such contracts on the ground that a competitor might use this clause in filing objections to an exclusive contract that

[1] Hearings on S. 2910, 73d Cong., 2d Sess., p. 203.

a telegraph company has with a railroad company, urging that the terms were contrary to the public interest.[1] This provision was favored, and naturally, by representatives of the International Telephone and Telegraph Company because the Postal Telegraph system is excluded from many of the principal railroad stations of the country owing to exclusive contracts between the Western Union and the railroad companies.[2] Commission control over such matters is essential to constructive regulation in the interest of fair competition.

The requirements, in Sec. 201 and 202, that all charges, practices, classifications, and regulations shall be just and reasonable, although the services may be classified and different charges made for different classes of service, and that there shall be no unjust or unreasonable discriminations are common ones. However, the specific provisions are much abbreviated as compared with those in the Interstate Commerce Act. Identical provisions in the original Senate bill were criticized on the ground that the decisions of the Supreme Court are filled with statements that abolition of discrimination, whatever its form, was the heart of the original act to regulate interstate commerce and that uncertainty would have been avoided by the use of the specific, well-tried provisions of the Interstate Commerce Act.[3] Section 202*b* causes the terms "charges and services," wherever referred to in the Act, to include also the "charges for, or services in connection with, the use of wires in chain broadcasting or incidental to radio communication of any kind."

Sections 203, 204, and 205 contain provisions adapted from the Interstate Commerce Act concerning the filing of schedules of charges, the supervision of new charges, and the prescribing of just and reasonable charges. Every common carrier subject to the Act, except the "connecting carriers" to which reference has previously been made, must file with the Commission and print and keep open for public inspection schedules showing all charges for itself and its connecting carriers for interstate and foreign wire and radio communication between the different

[1] Statement of R. B. White, Hearings on S. 2910, 73d Cong., 2d Sess., p. 104.

[2] Statement of Sosthenes Behn, Hearings on S. 2910, 73d Cong., 2d Sess., p. 120.

[3] Report of the I.C.C., Hearings on S. 2910, 73d Cong., 2d Sess., p. 204.

points on its own system and between points on its own system and points on the systems of connecting carriers where through routes have been established, whether such charges are joint or separate, and showing the classifications, practices, and regulations affecting such charges. No change shall be made in such charges, classifications, regulations, or practices except after 30 days' notice to the Commission, although the Commission may modify this requirement for good cause. No charges except those lawfully filed shall be made, and no refunds or rebates or special privileges or facilities may be granted other than those specified in the schedules filed. Whenever a new charge, classification, regulation, or practice is filed with the Commission, it may upon complaint, or upon its own initiative without complaint, hold a hearing and, pending such hearing and the decision thereon, may suspend the operation of such new charge, classification, regulation, or practice for a period not to exceed 3 months. If the proceeding has not been concluded and an order made within the period of suspension, the proposed change shall go into effect at the end thereof; but in case of a proposed increased charge, the Commission may require the interested carrier or carriers to keep accurate account of all amounts received by reason of such increase and, if the increase is later found to be not justified, to require that such amounts be refunded to the proper parties. The burden of proof that a proposed increased charge would be just and reasonable is placed upon the carrier. The Commission, upon complaint or on its own motion, after full opportunity for hearing, is authorized and empowered to determine and prescribe just and reasonable charges, or maximum or minimum, or maximum and minimum charges to be observed and just, fair, and reasonable classifications, regulations, or practices. Sections 206, 207, 208, 209, and 210 deal with the liability of carriers for damages, the recovery of damages, complaints to the Commission, orders for the payment of money, and franks and passes, respectively.

Section 211 requires every carrier to file with the Commission copies of all contracts, agreements, or arrangements with other carriers or with common carriers not subject to the Act, in relation to any traffic affected by the Act to which it is a party. Paragraph *b* of this section provides also that the Commission shall have authority to require the filing of any other contracts

of any carrier, as well as the authority to exempt a carrier from submitting copies of minor contracts. The reason for adding Par. *b* is clear. Many contracts are and may be made by the carriers subject to the Act with persons other than carriers in relation to matters which may, and should, be investigated by the Commission. No question should arise as to the Commission's authority to compel the filing of such contracts.

2. Interlocking Directorates; Competition and Consolidation. Section 212, dealing with interlocking directorates; Sec. 213, dealing with the consolidation of telephone companies; Sec. 313, dealing with the application of the antitrust laws to radio communication; and Sec. 314, dealing with the preservation of competition in commerce between wire and radio constitute the policy of the Act with respect to competition and monopoly in communication. In general, as has been pointed out, this policy is aimed at preserving competition between the communication companies, except that consolidations or acquisitions of control in the telephone industry are made subject to approval of the Communications Commission, and when so approved the antitrust laws do not apply. The antitrust laws are made specifically applicable "to the manufacture and sale of and to trade in radio apparatus and devices entering into or affecting interstate or foreign commerce and to interstate or foreign radio communications"; and consolidation of wire and radio companies, where the effect is, or might be, substantially to lessen competition between them is specifically prohibited. The Act makes it unlawful, after 60 days from the date of its enactment, for any person to hold the position of officer or director of more than one carrier subject to the Act unless such holding shall have been approved by the Communications Commission.

3. Valuation.—The valuation provisions of the Act, contained in Sec. 213, add little to the clarification of the valuation muddle. They are adapted from Sec. 19*a* of the Interstate Commerce Act; and while many unessential details are omitted, and certain procedures are changed, in general the same procedure and the same principles control. The Communications Commission is not required to make a valuation of the properties of the communications as of any particular time but from time to time as may be necessary for the proper administration of the Act. It is not required to make an inventory of carrier property but

may at any time require any carrier subject to the Act to file with it an inventory of all or any part of its property owned or used, showing the units of such property, classified in such detail and in such manner as the Commission shall direct; the estimated cost of reproduction new of such units; and their reproduction cost new less depreciation, as of such date as the Commission may direct. In addition, the Commission may at any time require a carrier to file with it a statement showing the original cost at the time of dedication to the public use of all or any part of the property owned or used by the carrier. For such showing, the property shall be classified, and the original cost defined, in such manner as the Commission may prescribe; and if any part of such cost cannot be determined, the portion of the property for which original cost cannot be determined shall be reported separately, and the original cost estimated, if the Commission shall so direct, in such manner as it may prescribe. Other facts upon which the Commission may require a report with regard to original cost are the amounts by which the cost to the carrier owning the property at the time when the report is required exceed or are less than the original cost of the same and the sources from which the original cost report was obtained. A provision that eliminates several controversial points with respect to original cost is that which requires that nothing shall be included in the report of original cost or in any valuation of the property of a carrier made by the Commission on account of any easement, license, or franchise granted by the United States or by any state or political subdivision thereof beyond the reasonable necessary expense lawfully incurred in obtaining the same, an expense that shall be reported separately as the Commission may require.

Two helpful clauses with regard to the valuation of telephone properties are found in Par. *c* and *d* of Sec. 221. These provide that "the Commission may classify the property of any such carrier used for wire telephone communication, and determine what property of said carrier shall be considered as used in interstate or foreign telephone toll service"; and after such classification in making a valuation of the property of any wire telephone carrier "may in its discretion value only that part of the property of such carrier determined to be used in interstate or foreign telephone toll service." The segregation of

interstate and intrastate property has always been a troublesome matter in telephone-rate cases, and one that the state commissions have not been well-equipped to handle. That specific findings are necessary has been recognized both by the Commissions and by the courts, including the Supreme Court of the United States.[1] The lack of a uniform and authoritative segregation of the interstate toll properties of the Bell System, not to mention those of other telephone companies, has been responsible for much controversy before the state commissions and the courts. An early determination by the Federal Communications Commission would do much to eliminate such controversies, as well as to assist in determining just and reasonable toll rates. The provision that the Communications Commission need evaluate only the toll property is important to the state commissions, since their hands will not be tied in the matter of making valuations of exchange property.

On the whole, valuation under the Communications Act will not differ in any essential detail from that under the Interstate Commerce Act. The Commission is not required immediately to begin making valuations for the communication companies, as was the Interstate Commerce Commission for all carriers subject to the Interstate Commerce Act; and in Par. *g* of Sec. 213, it is provided that, if requested to do so by the Communications Commission, the Interstate Commerce Commission shall complete such valuations of the properties of communication companies as are now in progress and shall transfer to the Communications Commission the records relating thereto. The Communications Commission, as we have seen, has relieved the Interstate Commerce Commission of further duties under this section. But only a few minor changes have been made in procedure; and in rate cases, the Communications Commission, in spite of the provision in Sec. 213*f*, that the Commission in making a valuation "shall be free to adopt any method of valuation which shall be lawful," will face the old irreconcilables "original cost" and "cost of reproduction."

4. Extension of Lines.—Section 214 provides that

> . . . no carrier shall undertake the construction of a new line or of an extension of any line, or shall acquire or operate any line, or extension thereof, or shall engage in transmission over or by means of such addi-

[1] *Smith v. Ill. Bell Tel. Co., supra.*

tional or extended line, unless and until there shall first have been obtained from the Commission a certificate that the present or future public convenience and necessity require or will require the construction, or operation, or construction and operation, of such additional or extended line.

This section adapts the provisions of Par. 18 to 22 of Sec. 1 of the Interstate Commerce Act as to certificates for rail construction to the construction of communication lines, and the purposes to be accomplished are similar to those generally underlying the requirement of such certificates. Realizing, however, that a blanket requirement would entail much needless delay and expense, especially by the telephone companies, and would conflict unnecessarily with state regulation, Congress exempted from the requirements of this section the construction, acquisition, operation, or extension of (1) a line within a single state unless said line constitutes part of an interstate line; (2) local, branch, or terminal lines not exceeding 10 miles in length; and (3) any lines acquired under the provisions of the Act relating to the consolidation of telephone companies. The section provides also that the Commission may, upon appropriate request being made, authorize temporary or emergency service or the supplementing of existing facilities, without regard to the other requirements of the section. The Commission may issue such certificate for a portion or portions of the line or extension prayed for or for the partial exercise only of the right or privilege requested and may attach to the issuance of the certificate such terms and conditions as in its judgment the public convenience and necessity may require. The Commission may also, upon complaint or its own initiative, authorize or require any carrier "to provide itself with adequate facilities for performing its service as a common carrier and to extend its line," if reasonably required in the public interest or if the expense involved therein "will not impair the ability of the carrier to perform its duty to the public."

While the provisions of this section are designed to apply to the regulation of communications principles generally recognized as necessary to prevent the construction of unneeded public utility facilities, especially by irresponsible parties, and to prevent wasteful and uneconomic duplication, it should be pointed out that the administration of these provisions in the

case of the telegraph companies will raise problems different from those in the case of the telephone companies. Because of the nature of the telephone service, monopoly and the division of territory are tolerated, if not specifically favored. Each telephone company operates in a given territory and can readily be protected from the competition of others. But the policy of the Communications Act compels competition among telegraph companies, and such competition of necessity implies duplication. Competing telegraph companies must be permitted to extend their lines and facilities almost without hindrance. Rigid adherence to the principles underlying the granting of certificates would tend to check such competition and to maintain the existing disparities between the major telegraph systems.

5. Inquiries Concerning Transactions Relating to Services and Equipment.—Section 215 requires the Commission to investigate three important aspects of the activities of communication companies and to report its findings to Congress, together with its recommendations as to whether or not additional legislation on these subjects is desirable. In the first of these, the Commission is required to examine into "transactions entered into by any common carrier which relate to the furnishing of equipment, supplies, research, services, finances, credit, or personnel to such carrier and/or which may affect the charges made or to be made and/or the services rendered or to be rendered by such carrier, in wire or radio communication subject to this Act." The Commission is required to report specifically whether in its opinion legislation should be enacted

> . . . (1) authorizing the Commission to declare any such transactions void or to permit such transactions to be carried out subject to such modification of their terms and conditions as the Commission shall deem desirable in the public interest; and/or (2) subjecting such transactions to the approval of the Commission where the person furnishing or seeking to furnish the equipment, supplies, research, services, finances, credit, or personnel is a person directly or indirectly controlling or controlled by, or under direct or indirect common control with, such carrier; and/or (3) authorizing the Commission to require that all or any transactions of carriers involving the furnishing of equipment, supplies, research, services, finances, credit, or personnel to such carrier be upon competitive bids on such terms and conditions and subject to such regulations as it shall prescribe as necessary in the public interest.

The Interstate Commerce Act has no provisions similar to those stated above, but it does not deal with a wholly new aspect of regulation. The public utility laws of several states in recent years have been amended not alone to require the public service commissions to investigate transactions between the subsidiaries of holding companies subject to their jurisdiction and such holding companies but to grant them varying degrees of jurisdiction over such transactions, including contracts for the furnishing of supplies and services. The object it seeks to accomplish is a laudable one. Too frequently has the public interest suffered because of exorbitant payments for services and supplies exacted from operating companies by the holding companies that controlled them or for construction and maintenance work done by affiliated companies. What the situation is with regard to transactions between the communication companies subject to the Act and companies from which they receive supplies and services has not been fully disclosed, but there are enough facts on record to warrant a full investigation and the enactment of additional legislation to remove abuses where they are found to occur. Important transactions which are subject to investigation under this clause are the license contracts between the American Telephone and Telegraph Company and its subsidiaries and the contracts between those subsidiaries and the Western Electric Company.

The second investigation required under this section concerns "the methods by which and the extent to which wire telephone companies are furnishing wire telegraph service and wire telegraph companies are furnishing wire telephone service." Complaints have been made frequently that the American Telephone and Telegraph Company, by means of leasing circuits as a by-product of its main business, has forced the telegraph companies to furnish competitive services below cost. It also has been charged that competition in the leased-wire service has led to much abuse in the form of the use of such wires by parties other than the lessees. These matters should be thoroughly investigated, and additional powers given the Communications Commission if deemed necessary.

The third investigation required by Sec. 215 involves "all contracts of common carriers subject to this Act which prevent the other party thereto from dealing with another common

carrier subject to this Act." The principal complaint which gave rise to the requirement of this particular investigation is that of the Postal Telegraph system, which holds that the exclusive privileges which the Western Union enjoys by contract in a large number of railroad stations and hotels handicap the former in competition with the latter company.

6. Inquiries into Management.—By Sec. 218, the Commission is empowered to inquire into the management of all carriers subject to the Act and is required to keep itself informed as to the manner and method by which the same is conducted and as to technical developments and improvements in wire and radio communication or 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." This clause is similar to one found in Sec. 12(1) of the Interstate Commerce Act, but it broadens the provision there found by including the duty of the Commission to keep informed as to technical developments and improvements in the communication art. It represents a forward-looking policy in that it directs attention to the quality and improvement of the service, which, as has been shown, is an important aspect of regulation. The clause seems to be concerned only with completed developments and improvements and new inventions and does not seem to authorize the Commission to invade the privacy of the inventor's laboratory. As such, it is scarcely open to sound objection.

7. Annual and Other Reports.—The Commission is authorized, in Sec. 219, to require annual reports under oath from all carriers subject to the act and "from persons directly or indirectly controlling or controlled by, or under direct or indirect common control with, any such carrier, to prescribe the manner in which such reports shall be made, and to require from such persons specific answers to all questions upon which the Commission may need information." Such annual reports must show in detail

> . . . the amount of capital stock issued, the amount and privileges of each class of stock, the amounts paid therefor, and the manner of payment for the same; the dividends paid and the surplus fund, if any; the number of stockholders (and the names of the 30 largest holders of each class of stock and the amount held by each); the funded and floating debts and the interest paid thereon; the cost and value of the carrier's property, franchises, and equipments; the number of employees

and the salaries paid each class; the names of all officers and directors, and the amount of salary, bonus, and all other compensation paid to each; the amounts expended for improvements each year, how expended, and the character of such improvements; the earnings and receipts from each branch of business and from all sources; the operating and other expenses; the balances of profit and loss; and a complete exhibit of the financial operations of the carrier each year, including an annual balance sheet.

They shall contain also such information as the Commission may require concerning charges or regulations, agreements, arrangements, or contracts affecting charges. The Commission may also require any such carriers to file monthly reports of earnings and expenses and to file periodical and/or special reports concerning any matters with respect to which the Commissions may, or must, act.

These provisions, which follow closely those in Par. 1 and 2 of Sec. 20 of the Interstate Commerce Act, are comprehensive and detailed. Based upon accounts controlled by the Commission, annual and other periodical and special reports should provide the information necessary for the routine administration of the Act and should keep the Commission informed with respect to many aspects of the management of the companies. There is a widespread belief among students of these problems that with strict accounting control supplemented by detailed and meaningful reports, many of the problems of regulation can be reduced to matters of routine procedure. An important provision, in view of the ramifications of holding-company control, is that which enables the Commission to require reports from persons directly or indirectly controlling or controlled by the carriers subject to the Act. It will serve, at least in part, to disclose the true nature of the relationships between the carriers and the companies with which they are affiliated, as well as facts necessary to determine the reasonableness of intercompany payments and financial transactions. Interesting new facts to be reported by the carriers are the names of the 30 largest holders of each class of stock with the amount held by each and the names of all officers and directors with the amount of salary, bonus, and all other compensation paid to each.

8. Accounts, Records, and Memoranda; Depreciation Charges. By Sec. 220, the Commission is authorized to prescribe the form

of any and all accounts, records, and memoranda to be kept by the carriers with respect to the movement of traffic as well as of receipts and expenditures. This section provides also that the Commission shall, as soon as practicable, prescribe for such carriers the classes of property for which depreciation charges may properly be included under operating expenses and the percentages of depreciation that shall be charged with respect to each of such classes of property, classifying the carriers as it may deem proper for this purpose. The prescribing of uniform accounts, and especially depreciation charges, for the telephone companies by a Federal Commission has long been a matter of controversy. As far back as 1923, the National Association of Railroad and Utilities Commissioners, a body composed of representatives of the state public service commissions, adopted resolutions asking Congress to remove from the Interstate Commerce Act a similar provision requiring the Interstate Commerce Commission to prescribe depreciation accounts and charges for telephone companies. Similar resolutions have been adopted by that body from time to time, and representatives of the Association objected to the inclusion of such a requirement in the Communications Act of 1934.

The state commissioners believe that uniform depreciation rates for all telephone properties which will be fair both to the companies and to the consuming public cannot be established, because the service lives of the same kind of property vary widely with the conditions that surround the use of property in individual cases and that proper rates in individual cases can best be determined by the state bodies. In so far as this is done by a Federal body, they say, it must necessarily be upon the basis of guesswork; but if done, the findings will be binding upon the state commissions, and their powers will be limited in determinations in respect of annual charges for depreciation and the depreciated rate base. The Interstate Commerce Commission after many years of study also came to the conclusion that the fixing of depreciation rates for telephone companies should be left to the state commissions. Following out the mandate of the Interstate Commerce Act, however, it laid down a body of principles and rules governing the determination of such charges and ordered the telephone companies to file depreciation rates and supporting data with the state commissions by Aug. 1, 1934,

requesting these commissions to make their recommendations, after a consideration of which it would prescribe rates. According to Par. *b* and *c* of Sec. 604, this proceeding may be completed, and the determinations of depreciation charges by the Interstate Commerce Commission for communication companies, as well as all orders with respect thereto, shall have the same force and effect as though made by the Communications Commission under the Communications Act. Regarding uniform rates of depreciation for telephone properties, the Interstate Commerce Commission has said:

> All parties to this proceeding concede that uniform rates of depreciation cannot be established for all telephone companies. There is entire agreement that rates of depreciation for the same classes of property differ materially, dependent upon the conditions under which the particular company operates, and that if we are to prescribe rates of depreciation, as the statute contemplates, a careful study must be made of the situation of each individual company. Nor, so far as we are aware, has any exception been taken to the assertion of the committee representing the National Association of Railway and Utilities Commissioners that the great bulk of telephone business consists of intrastate local community service; that the interstate service is largely toll service; and that it constitutes an insignificant fraction of the total business. These being the facts, and disregarding for the moment the proper interpretation of the law we are called upon to administer, it is obvious that the determination of rates of depreciation for the various classes of telephone property is a task which could more appropriately, conveniently, and economically be carried on by the state commissions than by us.[1]

Similarly, arguments have been presented against prescribing uniformity in other accounts on the ground that requirements that are necessary and proper for large telephone companies are unduly burdensome upon small ones. Uniformity is most beneficial for the companies that operate in more than one state, especially certain members of the Bell System, which operate in several states. For example, the Southern Bell Telephone Company operates in nine states, in each of which is a commission usually having broad powers with respect to accounts and depreciation. Much confusion and unnecessary expense would be occasioned if different commissions were to require the same

[1] Telephone and Railroad Depreciation Charges, 118 I.C.C. 295, 332.

company to establish different accounting charges based upon fundamentally different theories. Solution of these problems lies in the recognition of the appropriate spheres of Federal and state jurisdiction and in cooperation between the Federal and state commissions. The Communications Act, in Par. *h* and *i* of Sec. 220, wisely grants the Communications Commission broad authority to cooperate fully with the state commissions. It provides that

> . . . the Commission may classify carriers subject to this Act and prescribe different requirements under this section for different classes of carriers, and may, if it deems such action consistent with the public interest, except the carriers of any particular class or classes in any state from any of the requirements under this section in cases where such carriers are subject to state commission regulation with respect to matters to which this section relates; [and that the Commission] before prescribing any requirements as to accounts, records, or memoranda shall notify each state commission having jurisdiction with respect to any carrier involved, and shall give reasonable opportunity to each such commission to present its views, and shall receive and consider such views and recommendations.

Paragraph *j* of Sec. 220 requires the Commission to investigate and report to Congress as to the need for legislation to define further or harmonize the powers of the Communications Commission and the state commissions with respect to these matters.

That the regulation of the accounts of telephone companies will call for effective cooperation between the Communications Commission and the state commissions there is little doubt. The New York Commission, in prescribing recently a new system of accounts for telephone companies subject to its jurisdiction to be effective Jan. 1, 1936, held that the accounting system of the Interstate Commerce Commission had not produced uniformity and that it applied to less than a score of companies in New York State, more than 200 companies not coming under its provisions. In addition, the Commission said, a different system of accounts was necessary to facilitate its work by furnishing information to be used in fixing rates, authorizing securities, and passing upon transfers of property from one company to another and in connection with other regulatory matters, some of which were not subject to the jurisdiction of the Interstate Commerce Commission or to the jurisdiction of the newly

created Communications Commission. The New York Commission prescribed no uniform system of accounts for the American Telephone and Telegraph Company, foregoing any attempt to exercise its legal authority to do so, in view of the fact that a very small portion of the company's business is intrastate; and it felt that the Federal commission should not attempt to prescribe accounts for telephone companies the bulk of whose operations are intrastate merely because they do a small amount of interstate business. While it recognized that a telephone company should not be required to keep two systems of accounts and that a certain amount of uniformity was essential, the New York Commission said that the Federal Commission should not undertake to oust the states from all control over accounts until the "utter impossibility of coordinated state action has been demonstrated."[1] Recent activities of the Federal and state commissions, fortified by court decisions, seem to indicate that the necessary cooperation will be effected.

TITLE III. SPECIAL PROVISIONS RELATING TO RADIO

Title III contains special provisions relating to radio. Its provisions are taken mostly from the Radio Act of 1927, as amended, although certain matter no longer effective has been deleted, and new sections have been added. The original Senate bill contained several new provisions dealing with controversial matters, but most of the changes from existing law were omitted in the Communications Act, except those taken from H.R. 7716, a bill to amend the Radio Act of 1927, which passed both Houses of the Seventy-second Congress but was pocket vetoed by President Hoover. The purpose of the Act with respect to radio is

> . . . to maintain the control of the United States over all the channels of interstate and foreign radio transmission; and to provide for the use of such channels, but not the ownership thereof, by persons for limited periods of time, under licenses granted by Federal authority, and no such license shall be construed to create any right beyond the terms, conditions, and periods of the license.

A license is required, except in the case of government-owned stations, for the operation of any apparatus for the transmission

[1] *Re Uniform System of Accounts for Telephone Corp. (N. Y.)*, 5 P.U.R. (N. S.) 402, 408.

of energy or communications or signals by radio in interstate or foreign commerce; and no license shall be granted until the applicant therefor "shall have signed a waiver of any claim to the use of any particular frequency or of the ether as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise."

The terms of licenses are limited to periods of 3 years for broadcasting stations and 5 in the case of stations of all other classes, although they may be revoked at any time for cause. At the expiration of any license, it may be renewed from time to time, except that no renewal shall be granted more than 30 days prior to the expiration of the license. By the provisions of Sec. 310*a*, station licenses may not be granted to or held by:

1. Any alien or the representative of any alien.
2. Any foreign government or representative thereof.
3. Any corporation organized under the laws of any foreign government.
4. Any corporation of which any officer or director is an alien or of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof, or by any corporation organized under the laws of a foreign country.
5. Any corporation directly or indirectly controlled by any other corporation of which any officer or more than one-fourth of the directors are aliens, or of which more than one-fourth of the capital stock is owned of record or voted, after June 1, 1935, by aliens, their representatives, or by a foreign government or representative thereof, or by any corporation organized under the laws of a foreign country, if the Commission finds that the public interest will be served by the refusal or the revocation of such license.

The first four of the above paragraphs are taken, with slight modification, from Sec. 12 of the Radio Act; but Par. 5 is new and applies rules with respect to alien ownership and control to holding companies, except that the Commission may exercise its discretion in refusing to grant or in revoking a license to such parties under such conditions. They were placed in the Act chiefly in the interest of national defense, as the result of a pretty strong demand, especially on the part of navy and army officials, that there be no foreign ownership of American communication companies subversive to the national interest. Recently, in view of the vital importance of the communication systems of the United States to the national defense, an Army and Navy Joint Board made a study of the subject and recommended the adoption of a policy designed to keep American communication

systems, especially radio systems, absolutely free of foreign control and influence. The reasons for the nationalistic attitude of the military departments of the Federal government have been stated as follows:

> Considering from a strictly national defense point of view the question of international ownership or dominance of radio companies, a few of the more salient objections should be emphasized. In the event of war between other nations, nationally owned companies would be expected to scrupulously guard against committing an unneutral act, whereas an international company would not only lack the same incentive but might even find it advantageous to perform unneutral service. Such stations might easily be employed in espionage work and in the dissemination of subversive propaganda.
>
> It is not sufficient that the military forces have authority to assume control of radio stations in war. A certain amount of liaison between radio company executives and department officials responsible for government communications is required in peace time. Familiarity on the part of commercial executives of American radio companies with communication operating methods, plans, and developments of the military departments of the government is certainly to the best interests of the nation. Some of these matters are of a very secret nature. For the Navy Department to initiate and carry out this important contact with commercial companies, the divulging of confidential plans to directors is necessary. This is obviously impossible with even one foreigner on the board.
>
> International companies must have agreements between their subsidiaries and the parent companies for a free exchange of information. Foreign personnel are transferred from one subsidiary to another so as to obtain intimate knowledge of the methods and equipment employed by other branches. It is impossible for a military service to work in close cooperation with or disclose its new developments to an organization which has foreign affiliations of this nature and employs foreign personnel.[1]

The Commission may grant licenses, renewals of licenses, and modifications of licenses only upon written application therefor. This was the practice of the Federal Radio Commission. It may issue temporary licenses, for periods not to exceed 3 months, for stations on vessels or aircraft in cases of emergency. In

[1] Extract from a letter from the Secretary of the Navy to the chairman of the Senate Interstate Commerce Committee, dated Mar. 22, 1932, Hearings on S. 2910, 73d Cong., 2d Sess., p. 169.

granting licenses for a radio station intended or used for commercial foreign communication, the Commission may impose any terms, conditions, or restrictions authorized to be imposed with respect to submarine-cable licenses by Sec. 2 of the Submarine Cable Act, approved May 24, 1921. Each license shall contain the conditions that it does not vest in the licensee any right to operate the station or any right in the use of the frequencies designated in the license beyond the term thereof or in any other manner than authorized therein. The station license, the frequencies authorized to be used, and the rights therein granted shall not be transferred, assigned, or in any manner either voluntarily or involuntarily disposed of or indirectly by transfer of control of any corporation holding such license, except by consent of the Commission in writing. The powers and duties of the Communications Commission concerning radio communication are, in general, the same as those formerly possessed by the Federal Radio Commission.

Section 313 transfers the provisions of Sec. 15 of the Radio Act that where a licensee has been found guilty of violation of the laws of the United States relating to unlawful restraints of trade and monopolies, the Court, in addition to the penalties imposed by said laws, may adjudge, order, and/or decree that the license of such licensee shall be revoked. A new clause, Sec. 311, provides that the Commission may use its discretion in refusing a license where the applicant has been adjudged by a court to be guilty of a violation of the antitrust laws but where the judgment has not extended to the revocation of an existing license. This provision should remove doubts as to the Commission's authority and duty if it should face a situation similar to that faced by the Federal Radio Commission when the Radio Corporation of America was adjudged guilty of violation of the antitrust laws, but the Court did not order its radio licenses revoked. Only after much discussion, and a divided opinion, did the Federal Radio Commission, in the preceding case, decide that the law did not require the revocation of the licenses of the Radio Corporation.

Special Provisions Relating to Broadcasting.—The United States, for the purposes of Title III, is divided into five zones, the boundaries of which are identical with those prescribed in the Radio Act of 1927, except that the Virgin Islands, Puerto Rico,

Alaska, Guam, American Samoa, and the territory of Hawaii are expressly excluded from the zones. Section 307 also retains the requirements of the Davis Amendment to the Radio Act of 1927 that the Commission shall so allocate broadcasting facilities as to establish equality of broadcasting service, both of transmission and of reception, as between the different zones. This is one provision that might well have been omitted in transferring and rewriting the provisions of the Radio Act. At the time when the Davis Amendment was enacted, there was an inequitable distribution of broadcasting facilities as between the different sections of the United States, but it was a mistake to require that they be equalized as between the zones created by the Radio Act. These zones were established originally to provide for regional representation upon the Federal Radio Commission; they were approximately equal in population but vastly different in area. Because of the disparity in the areas of the various zones, equalization has resulted in ample facilities in the populous zones of small area and a lack of facilities in the larger, but less populous, zones. In the fifth zone, for instance, which embraces practically 49 per cent of the area of the United States, many additional local stations could have been licensed which even a liberal interpretation of the Davis Amendment would have prohibited. Paragraph *b* of Sec. 307 meets this specific problem by providing that

> . . . the Commission may also grant applications for additional licenses for stations not exceeding 100 watts of power if the Commission finds that such stations will serve the public convenience, interest, or necessity and that their operation will not interfere with the fair and efficient radio service of stations licensed under the provisions [of Sec. 307].

The foregoing provision makes the equalization requirement inapplicable for local stations, but it is retained for stations of greater power, a policy that is inconsistent to say the least. No sueful purpose is served by retaining the zones set up by the Radio Act or by requiring the equalization of broadcasting facilities as between such zones. Regional representation on the Communications Commission is not required, and zones that are not in accord with natural laws and engineering principles present a stumbling block to the carrying out of the very purpose for which the Davis Amendment was enacted, the equalization

of broadcasting service as between the different sections of the United States. The Federal Radio Commission, in the hearings on the Senate bill, specifically recommended the elimination of the requirements of the Davis Amendment and the restoration of the requirement of the first paragraph of the original Sec. 9 of the Radio Act that the Commission shall make such a distribution of licenses, frequencies, hours of operation, and power among the several states and communities as to provide an equitable distribution of radio service to each of the same.[1] This body felt that in such an important administrative matter, the hands of the Communications Commission should not be tied.

Paragraph *c* of Sec. 307 requires the Commission to study the proposal "that Congress by statute allocate fixed percentages of radio broadcasting facilities to particular types or kinds of nonprofit radio programs or to persons identified with particular types or kinds of nonprofit activities" and to report to Congress, not later than Feb. 1, 1935, its recommendations, together with the reasons for the same. This provision grew out of the agitation that has been carried on for years by certain educational, religious, philanthropic, and labor groups, the complaint being that the interests of such groups and the public at large in the allocation of broadcasting facilities have been sacrificed to those of the commercial broadcasters. This is a highly controversial matter. The question is not as to the merits of such groups as applicants for facilities but as to the effect upon broadcasting as a whole if the policy of legislative allotment of facilities were to be adopted. Facilities thus set aside by Congress would be available for the groups designated regardless of the worth or the general interest of the programs broadcast. Furthermore, if one such group were granted facilities, others could with equal right demand equal facilities. The result would be the allocation of a large part of the limited number of facilities available to the various special groups of which the population is composed and a greater tendency toward broadcasting programs of interest to particular groups, rather than to the public at large.

Section 315 adopts the provisions of Sec. 18 of the Radio Act that if any licensee shall permit any legally qualified candidate

[1] Statement of E. O. Sykes, Hearings on S. 2910, 73d Cong., 2d Sess., p. 39. By Act of Congress, June 5, 1936, the Davis Amendment was repealed.

for public office to use a broadcasting station, he shall afford equal opportunities to all other such candidates for that office in the use of such station, except that no obligation is placed upon any licensee to allow the use of its station by such candidate. The redrafted Senate bill (S. 3285) contained a provision which also would have placed licensees of broadcasting stations under similar obligations with respect to persons speaking in support of candidates for public office or on public questions to be voted upon at an election. It declared, further, that it should be considered in the public interest for a licensee, so far as possible, to permit equal opportunity for the presentation of both sides of public questions, that the rates charged for such use should not exceed the rates for commercial use, and that there should be no discrimination between persons using the station for such purposes. These provisions of the Senate bill, however, were eliminated in conference.

Section 315 provides also that the licensee shall have no power of censorship over the material broadcast under the provisions of the section. This provision, which was also in the Radio Act, has been objected to by the broadcasters in the light of a decision by the Nebraska Supreme Court,[1] which held the licensee of a broadcasting station, as well as the political speaker, liable for defamatory utterance, even though it was shown that the broadcaster had no advance knowledge of what was to be said and that the announcer paid no attention to the words uttered. This Court held that the prohibition concerning censorship in Sec. 18 of the Radio Act merely prevented the licensee from censoring the words as to their political and partisan trend but did not give the licensee any privilege to join and assist in the publication of a libel or grant any immunity from the consequences of such action. In view of the fact that speeches by candidates for public office frequently contain matter that, if untrue, may be actionable defamation, since only by such utterances may misdeeds of officeholders and candidates be exposed, the effect of this decision, unless the Supreme Court holds to the contrary, will be far-reaching. To protect themselves, the broadcasters will have to demand the right to see in advance and to bar speeches containing libelous or slanderous matter, or they will be forced to refuse the use of their facilities by candidates for public office.

[1] *Sorenson v. Wood and KFAB Broadcasting Co.*, 243 N. W. 82.

Such an alternative the broadcasters should not be required to face. The law, or the construction placed upon it by the Nebraska Supreme Court, must be changed in order to protect the broadcasters and to safeguard broadcasting as an open forum for the discussion of political questions. The broadcasters cannot be expected to grant facilities to persons over whose utterances they have no control but for which they must assume liability.

The matter of censorship over broadcast programs as a whole has aroused much controversy. The Radio Act contained provisions forbidding the utterance of any obscene, indecent, or profane language by means of radio communication, denying the Commission the power of censorship over radio communication and forbidding it by regulations or conditions promulgated or fixed to interfere with the right of free speech by means of radio communication. These are retained in the Communications Act, and to them is added a new provision, Sec. 316, which reads, in part, as follows:

> No person shall broadcast by means of any radio station for which a license is required by any law of the United States, and no person operating any such station shall knowingly permit the broadcasting of, any advertisement of or information concerning any lottery, gift enterprise, or similar scheme, offering prizes dependent in whole or in part upon lot or chance, or any list of the prizes drawn or awarded by means of any such lottery, gift enterprise, or scheme, whether said list contains any part or all of such prizes.

Section 316 thus enacts into law a provision that has been incorporated in numerous bills previously introduced into Congress but that failed of passage. It aims to impose upon broadcasting stations the same restrictions with respect to lottery advertisements as apply to newspapers and other printed matter, and its purpose in this respect is laudable. It also should eliminate objectionable gift enterprises and so-called "contests," which appear in so many programs where success is dependent largely upon lottery or chance and very little upon the knowledge, ingenuity, or perseverance of the contestants. However, in so far as it suggests the further extension of legislative censorship of broadcast programs, it is to be viewed with suspicion.

Paragraph *b* of Sec. 325 adds a new provision designed to correct an existing evil. For years, it has been the practice of certain

persons, having been refused facilities in the United States or deprived of those that they formerly possessed because the programs that they broadcast were not considered to be in the public interest, to set up high-power stations in Mexico, where regulation has been lax, and to broadcast programs designed to interest listeners within the United States. Because of insufficient local talent, however, the programs have been furnished largely from American studios connected to the transmitting stations by wire or by other means. These persons have been able completely to circumvent the law and regulation of the United States merely by establishing a transmitting station in a foreign country, while programs have originated in and have been destined to listeners within the United States. To eliminate this abuse, the Federal Radio Commission suggested, and Congress incorporated into the Communications Act, the following clause:

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

TITLES IV AND V. PROCEDURAL AND ADMINISTRATIVE PROVISIONS; PENAL PROVISIONS AND FORFEITURES

Section 401 grants the district courts of the United States jurisdiction to enforce the provisions of the Act and the orders of the Communications Commission. The provisions of the Expediting Act, approved Feb. 11, 1903, as amended, which relates to any suit in equity wherein the United States is complainant and of Sec. 238(1) of the Judicial code, as amended, which provide for three-judge courts, expedition, and direct appeal to the Supreme Court in proceedings to enforce and set aside the Commission's orders, are made applicable to any suit in equity under Title II of the Act. By Sec. 402, the provisions of the Act of Oct. 22, 1913 (38 Stat. 219), the District Court Jurisdiction Act, relating to the enforcing or setting aside of the

orders of the Interstate Commerce Commission, are made applicable to suits to enforce, enjoin, set aside, annul, or suspend any order of the Communications Commission, except orders granting or refusing an application for a construction permit for a radio station or for a radio license. Appeals from decisions of the Commission in the last named cases may be taken to the Court of Appeals of the District of Columbia by an applicant whose application has been refused or by any other person aggrieved or whose interests are adversely affected by any decision of the Commission granting or refusing any such application. The review by the Court of Appeals is limited to questions of law; and the findings of fact by the Commission, if supported by substantial evidence, are conclusive unless it clearly appears that such findings are arbitrary or capricious. The Court's judgment shall be final, subject, however, to review by the Supreme Court of the United States on appeal by the appellant, by the Commission, or by any other interested party intervening in the appeal. The procedure for appeals in radio cases follows the provisions of the amended Sec. 16 of the Radio Act of 1927.

Section 403 provides for inquiry by the Commission on its own motion into any matter or thing concerning which complaint may be made under the Act or concerning which any question may arise under the provisions of the Act or relating to the enforcement of any of the provisions of the Act; and Sec. 404 requires reports of investigations made by the Commission. Sec. 405 provides for rehearing before the Commission after a decision, order, or requirement has been made by the Commission; Sec. 406 extends the jurisdiction of the district courts to mandamus proceedings to compel a carrier subject to the Act to furnish facilities; Sec. 407 concerns petitions for the enforcement of orders requiring carriers to make payments of money; and Sec. 408 establishes the periods within which all orders of the Commission, except those for the payment of money, shall become effective.

Section 409 includes general provisions relating to proceedings before the Commission, witnesses, and depositions. Any member or examiner of the Commission, or the director of any division when duly designated by the Commission, may hold hearings, etc., except that in the administration of Title III an examiner

may not be authorized to exercise such powers with respect to a matter involving (1) a change of policy by the Commission, (2) the revocation of a station license, (3) new devices or developments in radio, or (4) a new kind of use of frequencies. In all cases heard by an examiner, the Commission shall hear oral arguments on request of either party.

Section 410 contains a new provision relating to the use of joint boards for cooperation between the Communications Commission and the state commissions. Paragraph *a* reads as follows:

> The Commission may refer any matter arising in the administration of this Act to a joint board to be composed of a member, or of an equal number of members, as determined by the Commission, from each of the States in which the wire or radio communication affected by or involved in the proceeding takes place or is proposed, and any such board shall be vested with the same powers and be subject to the same duties and liabilities as in the case of a member of the Commission when designated by the Commission to hold a hearing as hereinbefore authorized. The action of a joint board shall have such force and effect and its proceedings shall be conducted in such manner as the Commission shall by regulations prescribe. The joint-board member or members for each state shall be nominated by the State commission of the state or by the Governor if there is no State commission, and appointed by the Federal Communications Commission. The Commission shall have discretion to reject any nominee. . . .

This section prescribes by law machinery for the cooperation between the Communications Commission and state commissions which experience with railroad regulation has shown to be necessary. There is no provision in the Interstate Commerce Act conferring upon joint boards powers to act upon matters under the Interstate Commerce Act. Paragraph *b* of Sec. 410 also provides that the Communications Commission may confer with any state commission having regulatory jurisdiction with respect to carriers regarding the relationship between rate structures, accounts, charges, practices, classifications, and regulations of carriers subject to the jurisdiction of such state commission and of the Communications Commission and may hold joint hearings. The latter provision is similar to that in Sec. 13(3) of the Interstate Commerce Act, except that it omits the requirement of notice by the Commission to the states in investigations

in which charges or regulations subject to state jurisdiction are brought in issue. The Communications Act omits the important provision contained in Par. 4 of Sec. 13, empowering the Interstate Commerce Commission to remove unjust discrimination against interstate commerce caused by intrastate charges or regulations. Cooperation between the Federal and state commissions, as has been pointed out, is as essential to the effective regulation of communications as of transportation because of the dual nature of our government. The Communications Act not only recognizes this fact but attempts to provide means by which such cooperation may be made effective. It should serve to reassure the state commissions who have protested ceaselessly the increasing concentration of the regulation of the railroads in the hands of the Federal body and have opposed the creation of a Federal Communications Commission on the score that a similar tendency would manifest itself in the regulation of telephone communication.

Section 411 contains provisions relating to the joinder of parties; Sec. 412, provisions relating to the filing of tariffs, contracts, agreements, and arrangements between common carriers, statistics, tables, and figures contained in the reports of carriers and others made to the Commission, the keeping of them as public records in the custody of the secretary of the Commission, and their use in judicial proceedings; Sec. 413, provisions requiring the designation by every carrier of an agent in the District of Columbia upon whom all notices and process and all orders, decisions, and requirements of the Commission may be served; Sec. 414, a provision that nothing in the Act shall in any way abridge or alter the remedies then existing at common law or statute, the provisions of the Act being in addition to such remedies; Sec. 415, provisions relating to limitations as to actions at law; and Sec. 416, provisions relating to the orders of the Commission. Title V, Sec. 501 to 505, inclusive, contains provisions relating to penalties and forfeitures.

TITLE VI. MISCELLANEOUS PROVISIONS

1. Transfer of Powers and Duties.—Title VI contains miscellaneous provisions, embracing for the most part necessary provisions regarding the transfer of powers and duties, records and property and repeals and amendments of existing laws.

Section 601*a* transfers to the Communications Commission all duties, powers, and functions of the Interstate Commerce Commission under Act of Aug. 7, 1888 (25 Stat. 382), relating to operation of telegraph lines by railroad and telegraph companies granted government aid in the construction of their lines; and Par. *b* of the same section imposes upon the Communications Commission all duties, powers, and functions of the Postmaster General with respect to telegraph companies and telegraph lines under any existing provision of law.

2. Repeals and Amendments.—By Sec. 602, the Radio Act of 1927, as amended, and the provisions of the Interstate Commerce Act, as amended, in so far as they relate to communication by wire or wireless or to telegraph, telephone, or cable companies operating by wire or wireless, except provisions permitting contracts between communication companies and other common carriers for the exchange of services, and permitting the exchange of franks between communication and transportation companies, are repealed. The last sentence of Sec. 2 of the Submarine Cable Act, approved May 27, 1921, is amended to read as follows: "Nothing herein contained shall be construed to limit the power and jurisdiction of the Federal Communications Commission with respect to the transmission of messages." The first paragraph of Sec. 11 of the Clayton Antitrust Act, approved Oct. 15, 1914, is amended to read as follows:

> Sec. 11. That authority to enforce compliance with Sec. 2, 3, 7, and 8 of this Act by the persons respectively subject thereto is hereby vested: In the Interstate Commerce Commission where applicable to common carriers subject to the Interstate Commerce Act, as amended; in the Federal Communications Commission where applicable to common carriers engaged in wire or radio communication or radio transmission of energy; in the Federal Reserve Board where applicable to banks, banking associations, and trust companies; and in the Federal Trade Commission where applicable to all other character of commerce. . . .

3. Transfer of Employees, Records, Property; Effect of Transfers, Repeals, and Amendments.—Section 603 provides for the transfer of all officers and employees of the Federal Radio Commission (except the members thereof, whose offices are abolished) whose services in the judgment of the Commission are necessary to its efficient operation; all records and property

under the jurisdiction of the Federal Radio Commission; and all records under the jurisdiction of the Interstate Commerce Commission and of the Postmaster General relating to the duties, powers, and functions imposed upon and vested in the Communications Commission by the Communications Act. Section 604 provides that all orders, determinations, rules, regulations, permits, contracts, licenses, and privileges relating to communications which have been issued, made, or granted under the jurisdiction of the Interstate Commerce Commission, the Federal Radio Commission, or the Postmaster General, in effect at the time this section takes effect, shall continue in effect until modified, terminated, superseded, or repealed by the Communications Commission or by operation of law. Any proceedings, hearing, or investigation begun or pending before those commissions or the Postmaster General at the time of the organization of the Communications Commission shall be continued as originally begun if it involves (1) the administration of duties, powers, and functions transferred to the Commission by this Act; or (2) the exercise of jurisdiction similar to that granted the Communications Commission by this Act. All records transferred shall be available for use of the Communications Commission to the same extent as if such records were originally records of the Commission. All final valuations and determinations of depreciation charges by the Interstate Commerce Commission with respect to common carriers engaged in radio or wire communication and all orders of the Interstate Commerce Commission with respect to such valuations and determinations shall have the same force and effect as though made by the Commission under this Act. The provisions of the Communications Act do not affect suits undertaken prior to the date of the organization of the Commission.

4. War Emergency; Powers of the President.—Section 606 authorizes the President during the continuance of a war in which the United States is engaged, if he finds it necessary for the national defense and security, to direct that communications essential to the national defense and security shall have preference or priority with any carrier subject to the Act. Any carrier complying with such order is thereby exempt from any and all other provisions in the existing law regarding preference or priority. During such war, it is declared unlawful to obstruct

or retard communication, and the President is authorized to employ the armed forces of the United States to prevent any such obstruction or retardation of communication. Paragraph *c* provides that upon proclamation by the President that there exists war or a threat of war or a state of public peril or disaster or other national emergency, or in order to preserve the neutrality of the United States, the President may suspend or amend, for such time as he may see fit, the rules and regulations applicable to any or all stations within the jurisdiction of the United States as prescribed by the Commission and may close any station for radio communication and have its apparatus and equipment removed or authorize its use or control by any department of the Government. The Senate bill contained a provision authorizing the President in time of war or public peril to take over wire and radio offices and stations, but the provision concerning wire communications was eliminated. In all cases, just compensation shall be paid to the owners. These provisions, adopted from Sec. 6 and 7 of the Radio Act, grant necessary emergency powers and are self-explanatory.

CHAPTER XV

COMMUNICATIONS AND NATIONAL POLICY

An act of Congress of the importance of the Communications Act of 1934, to be properly understood and evaluated, must be viewed from the standpoint of the conditions responsible for its enactment and the purposes that it is designed to achieve. Telecommunications have come to be an essential arm of commerce, a service upon which the public generally is dependent, and an indispensable aspect of the national defense. It cannot be a matter of public indifference, therefore, whether the communication services of the United States are adequate and efficient or whether the rates charged are reasonable. The early chapters of this volume present a picture of technical development and of adaptation of the services to varying communication needs that is truly remarkable, but it has been shown also that certain practices of the communication companies have not been, and are not now, in the public interest. In the case of the communication services, as of other public utility services, the need for regulation by governmental authority to prevent unjust discrimination, unfair methods of competition, and the charging of exorbitant rates has long been appreciated. As early as 1910, the Federal government gave the Interstate Commerce Commission a measure of control over the rates and practices of communication companies engaged in interstate commerce, and most of the states have extended the jurisdiction of their public service commissions to include intrastate communications.

The need for regulation of the communication companies is more generally felt at the present time than at any other period in their history, and the demand is for more detailed, more comprehensive, more effective regulation. It seems to be an inevitable tendency in a regulatory system that regulation to be effective must become more and more intrusive. This tendency has clearly been manifest in the history of public utility regulation generally, and it may be perceived in the very determined attitude of the Federal government to revamp its

regulatory machinery with regard to communications. Prior to 1934, there had been a general feeling, well-marked in the years immediately preceding, that while state regulation of communications had been as broad in scope and as effective as the regulation of other public services, Federal regulation of telegraph and telephone communications had been superficial and dilatory. The principal reasons given for this condition were the division of authority over communications between several Federal agencies, the lack of adequate regulatory powers, and the preoccupation of the Interstate Commerce Commission, into whose hands the bulk of authority had been placed, with other duties, to the practical exclusion of communication problems. Also, it had come to be recognized more and more widely with increasingly rapid technical developments that the problems of interstate and foreign communication are in many respects similar whether the agency be telephone, telegraph, cable, or radio; that a communication service is often a coordinated one involving the employment of more than one of these agencies; and that intelligent regulation of one agency implies a thorough knowledge of other agencies and the relations that exist between them, whether competitive or coordinative. Out of the perception of these facts grew the demand for a Federal communications commission which would devote its entire time to communications and to which all Federal authority over communications would be delegated.

The situation before the passage of the Communications Act of 1934 was briefly this: The Interstate Commerce Commission had jurisdiction over the rates and practices of wire and wireless companies engaged in interstate or foreign communication. It had heard and acted upon all complaints filed with it, but few complaints had been so filed. The executive branch of the Federal government had jurisdiction over the granting of licenses for the landing of cables on the shores of the United States and the right to reserve for, and to assign to, strictly governmental agencies bands of radio frequencies and particular frequencies. The Federal Radio Commission had authority to license and to regulate the operation, but not the rates and charges, of radiocommunication companies engaged in interstate and foreign communication. No Federal agency existed to deal with communication problems as such.

The suggestion had frequently been made in Congress that these functions should be brought together under a single head, and an attempt to accomplish this was made in the Seventy-first Congress, in the form of a bill to create a commission on communications introduced by Senator Couzens in the spring of 1929.[1] Hearings on this bill continued for about 9 months, during which time, in addition to considering a vast amount of documentary evidence, the Senate Interstate Commerce Committee heard 55 witnesses, the printed record of the hearings totaling 2,392 pages. After the close of the hearings, the bill was redrafted and reintroduced, but nothing came of it. Shortly after President Roosevelt took office, he directed the Secretary of Commerce to organize an Interdepartmental Committee to make a study of the entire communication situation and to make recommendations concerning new legislation. This committee was faced with three alternative policies which it might recommend: (1) a continuation of the system of regulation substantially as it then existed; (2) government ownership and operation of the communication services; and (3) substantial revision of the existing system of regulation. The committee waived aside the first alternative as inadequate to meet the situation and expressed itself in favor of the continuance, at least for the present, of private ownership and operation, believing that the disadvantages of government ownership and operation outweighed the advantages. The committee summarized these advantages and disadvantages as follows:

Advantages of government ownership and operation:

1. Lower tolls due to (*a*) the elimination of the present communication-company profits and excessive overhead costs; (*b*) the elimination of large "accounting" costs through the use of the postage stamp in prepaying telegrams; and (*c*) the saving on interest charges upon borrowed funds.
2. Better service by the consolidation of the telegraph and telephone, both the wire and the radio services.
3. The prevention of discriminatory services.
4. The prevention of speculative management.
5. The extension of service to localities not now served.
6. The ability to present a united front to foreign systems.

Disadvantages of government ownership and operation:

1. The danger of political domination and interference.
2. Government red tape.

[1] S. 6, 71st Cong., 1st Sess.

3. The charge that the government does not conduct its business economically.

4. The conjecture that government ownership would discourage initiative, technical research, and advancement.

5. The belief that the communication service under government ownership in foreign countries is inferior to ours under private ownership.

6. The belief that the people do not want government ownership.[1]

The Interdepartmental Committee recommended substantial changes in the existing system of regulation, among them the establishment of a single commission to regulate all communications under Federal control. It was believed that vigorous regulation of communications by a single body exclusively devoted to that duty would accomplish the following results:

1. The reduction of rates by regulating profits and overhead expenses and intercompany charges.

2. The prevention of unjust discrimination.

3. The control of exclusive contracts which are made by communication companies with hotels, railroads, and foreign countries.

4. The regulation of annual depreciation charges.

5. The prevention of speculative management.

6. The prevention of the "watering" of stocks.

7. The extension of service in localities and homes not now served.[2]

President Roosevelt transmitted the report of the Interdepartmental Committee to the appropriate committees of Congress and in a special message to Congress, Feb. 26, 1934, announced a broad policy which he believed should be adopted "for the sake of clarity and effectiveness" in the relationship of the Federal government to the public utilities. This relationship, he said, "should be divided into three fields—transportation, power, and communications." The President pointed out that whereas the problems of transportation were vested in the Interstate Commerce Commission; and those of power, its development, transmission, and distribution, in the Federal Power Commission, there existed no single governmental agency charged with broad authority in the field of communications. He recommended that Congress create immediately a new agency, to be known as the Federal Communications Commission, to which should be transferred the powers and functions

[1] Study of communications by an interdepartmental committee, 73d Cong., 2d Sess., Senate Committee Print, pp. 5, 6.

[2] *Ibid.*, p. 9.

relating to communications then possessed by the Interstate Commerce Commission. He did not recommend, however, that the powers be broadened or extended at that time, except that the new commission should be given, in addition to the powers transferred to it from other agencies, "full power to investigate and study the business of existing companies and make recommendations to the Congress for additional legislation at the next session."[1] It was clearly in the mind of the President that facts had not been disclosed previously upon which to base specific measures concerning controversial matters.

The Communications Act exhibits no desire on the part of Congress to launch out upon uncharted seas of regulation, although the regulatory powers which are transferred to the new Commission in some respects are amplified considerably. Thus, certain powers that the Interstate Commerce Commission possessed only with respect to transportation are adapted and made applicable for the first time to communications. Among these, it may be recalled, are the powers of the Commission to require the furnishing of service and the establishment of through routes and to fix reasonable through and joint rates and the divisions thereof; to require reasonable classifications, regulations, practices, etc.; to issue or deny certificates of public convenience and necessity for the construction or extension of lines; to require the filing and observance of schedules of charges; and to investigate and suspend proposed changes in charges. In general, the effect of these provisions is to give to the Communications Commission as broad powers with respect to the rates and service of communication companies as the Interstate Commerce Commission possesses over the rates and service of railroad companies. In some respects, the jurisdiction of the Communications Commission over communications is broader than that of the Interstate Commerce Commission over transportation, since the jurisdiction of the former extends to all telecommunications subject to Federal regulation, whereas that of the latter is limited, or lacking altogether, with respect to carriers in interstate commerce other than the railroads and motor carriers.

Many of the controversial issues in the regulation of communications are left undecided in the Communications Act of 1934, and no new light is thrown upon other long-standing issues.

[1] *New York Times*, Feb. 27, 1934.

In the field of public utility regulation, generally the greatest single obstacle to effective rate regulation has been the fact that courts and commissions have never agreed as to the proper methods of determining the rate base, yet Congress in the Communications Act offers no solution to the valuation muddle, nor does it suggest any alternative method of determining reasonable rates. Perhaps this problem cannot be solved by legislation; but so long as reasonable rates are to be considered those that will yield a fair return upon a fair value of the property used or useful in the public service, rate regulation will be effective only to the extent that the valuation issues are adequately solved.

A second controversial matter which is not settled by the Communications Act is the regulation of the relationships between holding companies and operating companies and between operating companies and manufacturing companies. Contracts for goods or services between affiliated companies in the public utility field have been productive of much that is antagonistic to the public interest. The Commission is empowered to require reports from holding companies which may serve to disclose the nature of the relationships between them and the communication operating companies, but the extent of its control over such relationships is not clearly established. Rather, it is required to investigate all transactions entered into by common carriers subject to the Act which may affect the charges made and the services rendered, and to report to Congress whether or not such intercorporate relationships have affected adversely the charges and service of the operating companies, together with recommendations as to new legislation if deemed necessary. While cautious handling of this problem is essential to equitable treatment of the companies as well as the consumers, because there are distinct advantages in common control of communication operating units, it is a well-established fact that the powers of the state commissions have been inadequate to deal effectively with the abuses of holding company control, and there has long been the need for Federal regulation.

A third issue which must be faced, and concerning which a more uniform policy must be adopted, is that of the consolidation of communication companies. That certain of the communication companies are not satisfied with the present alignments is

shown by the frequency with which proposals involving new alignments are made. The Federal Communications Commission has investigated this matter and has recommended to Congress that a new section (Sec. 222) be added to the Communications Act of 1934, the effect of which would be to enable companies "solely or principally engaged in the transmission of written messages by means of telegraph land lines, cables, or radio" to consolidate their properties, in whole or in part, if the proposed consolidation were found by the Commission to be in the public interest. If this provision were enacted, as is now the case with respect to consolidations of telephone companies, any act or acts of Congress making the proposed transaction unlawful would not apply. Cognizant of the objections to the creation of monopolies without adequate protection of the public interest and believing that, while the standard of public interest, convenience, and necessity is adequate for discretionary powers, certain matters are so patently in the public interest that they should be dealt with directly in the law, the Commission has recommended that Congress insure their observance by requiring acceptance of them as a condition precedent to the Commission's consent to consolidation. These specific provisions are designed to assure that no consolidation would be permitted that would not inure to the benefit of the public, the employees of the telegraph companies, and the investors in telegraph securities.

With respect to rate regulation, the Commission recommended a provision requiring that as a condition to its consent to consolidation the company shall agree that no charges may be increased without prior consent of the Commission given in writing; and that

> . . . the consolidated company shall further agree that any attempted increase, without the prior consent of the Commission, in any charge for foreign transmission of messages beyond its level at the time of the Commission's consent to consolidation, shall of itself constitute sufficient ground for the revocation of or refusal to renew any or all radio station licenses for foreign communication issued to the company or any of its subsidiary or affiliated companies.

Such provisions are obviously not necessary with respect to domestic communication, since the Commission's rate powers are adequate without them. They are designed to forestall opposi-

tion to a consolidation of telegraph companies engaged in international communication, especially cable and radio, on the ground that the charges of such a company would not otherwise be completely under the control of the Communications Commission. The Commission believes that the elimination of wasteful and unnecessary duplication of facilities in the domestic telegraph service through consolidation should result in lower telegraph rates and that the consolidation of the international telegraph services should strengthen the position of American communication companies in bargaining with foreign monopolies. The preeminence of the United States in radio communication, the Commission believes, is endangered through the inequality that results when two or more American companies are competing with each other for business controlled by a single foreign company. As was pointed out in Chap. VIII, telegraph communication in most foreign countries is a monopoly under either government or private control, and competition between American companies tends to give the advantage to the foreign company without necessarily benefiting American ratepayers. The Commission believes that the benefits of consolidation can be realized and the public interest adequately protected by supplementing legislative grant of enabling powers with contractual obligations.

To anticipate the objection that a consolidated company would not develop and extend service to the degree that might be expected under competition, the Commission recommended that as a condition to the Commission's consent the company be required to agree

> . . . that (1) it will extend service to or improve the service at any place, and will open a cable or radio circuit to any place (on condition if the place be not under the jurisdiction of the United States that the consent of the appropriate authorities be obtained) which the Commission, after opportunity for hearing, shall find to be desirable in the public interest and shall require by order; and that (2) it will not abandon or diminish the service at any place or over any cable or radio circuit without the prior consent of the Commission given in writing.

The purpose of this recommendation is to add to the powers which the Commission already possesses with respect to service jurisdiction to compel extensions as well as to prevent abandon-

ments of service. Since the consolidated company would have to agree to this condition, the Commission could compel action in the public interest if the management should be reluctant to extend telegraph service to smaller communities. With respect to research and development, the Commission believes that the pooling of engineering and inventive skill in the service of the various telegraph companies, together with the pooling of the funds available for research, will result in improvement of the service; and that reluctance on the part of the management of the consolidated company to pursue improvements would be overcome by the competition of the telephone and the air mail, as well as by the powers of the Commission to license new radiotelegraph companies, to grant certificates for new telegraph lines and to require interconnection of lines.

Probably the most important recommendations made by the Commission are the provisions designed to protect the interests of labor, since it is well realized that important economies could be effected by a consolidated telegraph company through the elimination of duplicate personnel. The Commission recommended that the law provide specifically that

> . . . employees may be retired or dismissed as a direct or indirect result of the consolidation only upon the payment to them of retirement annuities or dismissal compensation based upon age, service and earnings, the amount and form of compensation to be determined by the Federal Communications Commission or such other administrative agency as may be designed by the President. . . . Where the employee would be eligible to retirement under the plan in effect in the company in whose employment he was at the time of the consolidation, the retirement annuity shall not be less than that to which he is entitled under the plan in effect at the time of his retirement or that to which he would have been entitled on the basis of his age, service and earnings under the plan in effect on Jan. 1, 1935, whichever is more favorable to the employee.

The Commission also recommended that provision be made for appeal to the regulatory body by any person dismissed after Jan. 1, 1935, who believes his dismissal was in anticipation of consolidation or who believes he is being dismissed or forced to retire or resign as a direct or indirect result of consolidation and that the regulatory body be given power to compel retention or reinstatement of such employee with payment for lost time

if it finds the complaint justified. The Commission recommended, further, that Congress provide that no employee shall be put in a worse position with respect to hourly wage or average monthly wage, on account of consolidation, than he was on Jan. 1, 1935, or when the consolidation is consented to by the Commission, whichever is better from the standpoint of the employee; that seniority of employees shall be merged in accordance with regulations to be prescribed by the regulatory authority; and that while the company shall have the right to transfer employees from one place to another and from one type of work to another, any employee shall have the right to appeal to the regulatory body, which shall have the power to veto any proposed transfer if it finds that undue hardship will be worked on the persons involved.

To protect the interests of investors in the securities of communication companies, the Commission recommended that the total capitalization "shall include nothing for property or equipment in excess of that reasonably necessary to carry on the domestic and foreign telegraph business of the country, with due allowance for the prospective future demand for telegraph service." This, the Commission believes, would protect the consumers from rates high enough to carry unnecessary duplicate plant and equipment, and the investors would be compensated through greater security of their investment in the used and useful plant.

An important recommendation from the standpoint of the national defense is that "not over one-fifth of the capital stock of the company may be owned of record, and none of the capital stock may be voted, by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country; nor may any officer or director of the company be an alien. The Commission believes that the national defense would be better served by a consolidated telegraph system than by competing companies. The plant could be kept in better condition to stand the strain of war traffic; a more adequate reservoir of skilled telegraph men would be provided, owing to improvement and stabilization of employment conditions in the industry; and the system could be taken over more quickly and effectively for government operation in war time. This recommendation, however, anticipates the

consolidation of radio with wire telegraphy and incorporates the recommendations of the Joint Board of the Army and Navy regarding ownership and control of American systems for international radiotelegraph communication. It has long been felt by the service departments that the national defense requires cooperation between the communication services of the army and the navy and those of the commercial companies and that this should include cooperation in research and development as well as in the development of an efficient communication system for war-time operation. Since this would involve the sharing of many laboratory secrets and details of organization, they believe that military secrets cannot with safety be divulged to boards of directors upon which aliens may sit. Similar restrictions with respect to the issuance of licenses for radio stations are found in Sec. 310*a* of the Communications Act, but the proposed recommendation regarding a consolidated telegraph company goes much farther in providing that none of the capital stock may be voted by aliens and that no alien may be an officer or director of the consolidated company.

These recommendations of the Commission will no doubt be given serious consideration by Congress. As was pointed out in Chap. VIII, there are differences of opinion as to the advisability of permitting further consolidation of companies engaged in telegraph communication, especially the consolidation of wire and radio companies, but the choice is between competition and regulated monopoly, and this choice must be made in the light of present conditions. There is no recommendation that consolidation be mandatory, merely that the companies be permitted to consolidate when and if it is to their interests to do so and in the public interest. The specific provisions which would have to be met as a condition to the Commission's approval of consolidation, in addition to the Commission's general powers, should be ample to protect the interests of the users of the service, labor, and the investors, if wisely administered. Especially important are those designed to protect the interests of labor, in view of aroused national consciousness regarding the need for economic security for the working classes. These provisions should present an effective barrier to consolidation for speculative purposes or consolidation not otherwise in the public interest. They go much farther than the provisions of public utility

statutes generally in the regulation of matters usually deemed to lie wholly within the province of management and for this reason might prove objectionable to the companies themselves. The interests of consumers, employees, and investors, as well as of the national defense, in the long run are bound up with the well-being of the companies that furnish the services. If the present competition among the telegraph companies, both wire and radio, is destructive, the companies and the Commission should be enabled to work out the appropriate remedy. No public purpose would be served by preventing by legislation consolidations that would enable the companies to thrive on a service better adapted to the needs and which for that reason would be in the public interest.

The Commission also recommended that a new section (Sec. 223) be added to the Communications Act to enable it to protect American interests in connection with the competition among American companies in international communication. This section would provide that

> No new wire or radio circuit intended for direct or indirect communication between the United States and any foreign country shall be opened or operated except after a finding by the Commission that American interests will be protected and served thereby; and all contracts, agreements or arrangements for or relating to the establishment or operation of such new circuits shall expressly provide that they are subject to the approval of the Commission. In determining whether or not any such proposed new circuit will protect and serve American interests, the Commission shall consider all facts and circumstances having to do with or leading up to the proposed establishment of the circuit including all acts done or promises made in such manner as to create a reasonable belief that they were performed or made with the intention or effect of influencing the establishment or operation of the circuits or any contract relating thereto, whether or not the persons performing such acts or making such promises are subject to this Act. There shall be a legal presumption that no new circuit will serve or protect American interests where the division of tolls or other compensation, terminal charges, out-payments, charges for equipment, payment of commissions, absorption of costs, solicitation of traffic, or any other matter which might influence the flow of traffic or communications is less favorable to American interests than in the case of any other circuit which is directly or indirectly handling traffic or communications which may be diverted to the new circuit.

The Commission shall have the right to suspend the opening of the circuit or the operation of any contract, agreement or arrangement for a reasonable time to permit it to make any necessary investigation in connection therewith. Should any cause or circumstance arising or first coming to the knowledge of the Commission subsequent to its approval of the opening or operation of such new circuit be brought to the attention of the Commission which would have led to the withholding of approval for the opening or operation of such new circuit had the Commission been in possession of such information at the time of the approval thereof, the Commission shall have authority to withdraw or suspend its approval of the operation of any circuit so approved and thereupon the operation of the circuit shall be discontinued. The Commission shall not approve the establishment, opening or operation of any circuit for foreign communication upon terms which are less favorable to American interests than the most favorable terms upon which the same communication service is being rendered by any American company, or if it shall appear that the conditions under which such communication service is to be rendered are less favorable than those of any expiring contract which has been in effect if the Commission has reason to believe that such contract was not renewed because of anticipation of a new contract on terms less favorable to American interests.

The purpose of this recommendation is to give the Commission control over a situation, to which reference has frequently been made, that threatens American control of international communications. If further consolidation be not permitted, or if it be delayed, contracts with foreign monopolies may be entered into which will be unfavorable to American companies, because of the competitive situation. The Commission has pointed out that some American communication companies are affiliated with manufacturing companies in the United States or abroad and with operating companies abroad and that it is at least theoretically possible for a contract made by a carrier subject to the Act to be fair on its face and yet have been induced by actions taken or terms made by American or foreign companies not subject to the Act which are detrimental to American interests. The need for Commission control over these matters, with jurisdiction to examine into all phases of these transactions, is obvious. Whether or not Congress enacts further legislation regarding consolidation of the telegraph services, it should grant the Commission jurisdiction over contracts which may seriously affect the future of American communications.

In addition to the specific recommendation that its control of contracts between American communication companies and foreign companies be made more adequate, the Commission has recommended that Congress declare illegal any exclusive contract whether in domestic or in foreign communication. The extent to which such contracts have been entered into and their effects upon competition were pointed out in Chap. VIII. The Commission's recommendation is as follows:

> It shall be unlawful for any common carrier to enter into or operate under any contract any provision of which purports to grant an exclusive right of occupancy or any other exclusive right as against any other American-owned and -controlled carrier engaged in interstate or foreign communication by wire or radio; and the Commission shall not find any contract, including contracts between common carriers subject to this Act and common carriers not subject to this Act for the exchange of their services, to be in the public interest when such contract contains any provision purporting to grant such exclusive rights as against any other American-owned and -controlled carrier.

The enactment of this provision would be advisable in the absence of new legislation regarding consolidation. If competition to any extent is to be retained in telegraph communication, it should not be restrained by contracts that exclude competing carriers from places to which the public has access and thus prevent that freedom of choice between competing services which is the essence of competition. Further, as the Commission points out, if such exclusive contracts are to be permitted, the carriers may claim a value for them in determinations of the rate base, and thus the public be required to pay for being excluded from the service of a competing carrier. While it is believed that many, if not all, of the exclusive contracts are illegal under present laws, Congress could remove all doubts in the matter by specifically declaring their invalidity.

One test of the efficacy of Federal regulation of communications will be the extent to which satisfactory cooperation between the Communications Commission and state agencies having jurisdiction over the charges and practices of communication companies can be achieved. As has appeared, the intrastate operations of communications companies are subject to the jurisdiction of state commissions. Delimitation of the appropri-

ate spheres of state and Federal regulation in such matters as accounting practices, valuation, depreciation, and many others affecting the charges and service of communication companies cannot be made precisely because of the intermingling of intrastate and interstate property and operations. The opposition expressed by state commissioners to the broadening of Federal powers over communications arose from a fear that the result would be a usurpation by the Federal Commission of many powers possessed by the state commissions. In the Communications Act, Congress made provision for cooperation between the Communications Commission and the state commissions; but as a practical matter, such cooperation will have to be worked out by the commissioners themselves. The problem is akin to that in the field of railroad regulation, and here fortunately a method of solving jurisdictional problems between the Interstate Commerce Commission and the state commissions was developed which the Communications Commission might follow in principle. This cooperation involves not only joint conferences on matters affecting both jurisdictions but joint preparation of final orders. Cooperation is the only avenue to effective regulation. Nothing but confusion, inadequate protection of the public interest, or the imposition of needless burdens upon the communication companies will follow if the Federal and the state commissions are at loggerheads.

In the field of radio-broadcasting regulation, several important controversial issues remain. Among these are how and to what extent broadcasting facilities should be made available for noncommercial, especially educational, broadcasting; limitations on the quantity and quality of advertising matter appearing in broadcast programs; and the censorship of programs. In some respects, these are related aspects of the same general problem—the advisability, and the appropriate degree, of public control of broadcast programs—but many subsidiary problems of material consequence are created.

On the whole, regulation of radio communication under the Radio Act of 1927 and amendments to the Act which grew out of experience and are incorporated in the Communications Act have provided a sound basis of radio law and administration. In the regulation of technical matters especially, the work of the Federal Radio Commission was intelligent and efficient.

No one who recalls the chaotic broadcasting situation which prevailed at the time when the Commission took office can fail to appreciate the significance of its work in reducing interference and in raising technical standards for transmitting apparatus and station operation. This work has merited, and received, general commendation. However, the Federal Radio Commission was criticized for favoring commercial more than noncommercial interests in the granting of broadcasting licenses and for its failure to adopt a more positive and coherent program for the protection and development of educational and cultural broadcasting.

Criticism of the Federal Radio Commission was chiefly that in this way there had been turned over to commercial exploitation channels that otherwise might be used for political leadership, popular education, and the control of public opinion for other than private ends. The critics pointed out that the private use of broadcasting channels is primarily to serve private ends, whereas the primary objective of radio broadcasting should be the social welfare of the nation. The achievement of such an objective, they said, should not be left to chance by-product production, incidental to the attainment of income for advertisers and broadcasters. Because of an alleged "sacrificing" of educational and other noncommercial broadcasting to commercial broadcasting, frequent appeals were made to Congress to set aside by law a fixed proportion of all broadcasting facilities for the use of nonprofit organizations interested in broadcasting programs of educational or cultural merit free of the advertising that accompanies commercial programs. In response to this sentiment, Congress enacted Sec. 307*c* of the Communications Act, which required the Communications Commission to investigate such a proposal and to report its recommendations to Congress.

The proposal to allocate by statute a fixed proportion of broadcasting facilities (facilities taken to mean frequencies, power, and time) to nonprofit organizations is open to several serious objections. In the first place, the amount of facilities is absolutely limited, and there is little basis for the hope that present facilities can be extended materially in the immediate future, whereas the number of nonprofit organizations which would be eligible to apply for and receive facilities under a

blanket provision is great. Testimony at the hearings held by the Broadcast Division of the Federal Communications Commission, in response to the mandate in Sec. 307c of the Act, showed that during the first half of 1934 commercial stations gave broadcasting time to more than 100 separate nonprofit organizations, each of which, whether educational, religious, charitable, agricultural, labor, political, or social service, and whether national or local in scope, would be entitled to apply for facilities. Thus, either Congress or the Commission would be compelled to pass judgment upon the relative importance of various types of nonprofit service, to decide the proportion of the facilities set aside which should go to the various groups and within each group the particular applicants that should be granted the facilities allocated to that group. The administrative problems that such a scheme would create would be difficult, if not impossible, of practical solution.

In the second place, statutory allocation of a fixed proportion of facilities to any particular group of interests is wrong in principle. It immediately singles out that group for special treatment, places undue emphasis upon its right to broadcast regardless of the interests of the listening public, and serves to protect it in the possession of facilities, thus creating a fixed, or "frozen," condition in broadcasting inimical to progressive development. Such a policy presupposes that programs serve the public interest merely because they emanate from stations owned and operated by nonprofit organizations, yet these organizations are notoriously lacking in financial resources to produce programs of high merit and wide appeal, even if it were not their admitted purpose to produce programs of interest chiefly to limited groups in the general population. While it is recognized that substantial minority groups are entitled to broadcasting service, it does not follow that they should receive service at the expense of larger groups in the population. To say that giving the public what it wants in broadcasting is to sacrifice the important and serious for the unimportant and frivolous is to raise the question as to what is important or serious and the further question as to whether the bulk of the facilities should be used to amuse the masses or to educate the classes.

Obviously, what is needed is an allocation of facilities, or a disposition of broadcast time, such that all parties will receive

their just shares of broadcasting service. Sound public policy requires that facilities first be granted to those able and willing to give a well-rounded service, which would include programs designed to appeal to minority groups as well as those of more general interest, so that the general public throughout the nation would be assured of at least one broadcast service of general appeal; after this, facilities should be allocated to those who would make the best use of them, in the light of the needs and desires of the listening public, whether they be commercial or nonprofit organizations. The position of relative unimportance of noncommercial stations at present is due only in part to the activities of the former Commission. Since 1927, many educational stations have voluntarily assigned or surrendered their licenses because of insufficient program or financial resources to continue operation. At best, and overlooking the fact that it would dogmatically declare the broadcasting of such organizations to be in the public interest, until noncommercial stations are adequately endowed it would constitute a wastage of broadcasting facilities for Congress to set aside any fixed proportion for their exclusive use.

At the hearings on this matter, few proposals were made that directly or by implication advocated legislative allocation of a fixed proportion of broadcasting facilities to nonprofit organizations. A proposal in the form of resolutions adopted by the American Federation of Labor, that 50 per cent of all broadcasting facilities be allocated to such organizations, by legislation if necessary, was withdrawn by William Green, president of the Federation, in view of the action of the Executive Council (the Executive Council is the governing body of the Federation between conventions) at a meeting following the adjournment of the convention of the Federation at which these resolutions were adopted.[1] Two associations interested in educational broadcasting—the National Educational Association and the National Committee on Education by Radio—introduced proposals that adequate facilities be made available for educational broadcasting but with no specific recommendations as to allocation by Congress or as to any definite percentage of facilities that should be made available. The proposal of the National

[1] Hearings before the Broadcast Division, Federal Communications Commission, pp. 13, 744–745, Sec. 307*c* of the Communications Act of 1934.

Educational Association, embodied in the form of a resolution adopted at the convention of that Association in 1931 and reaffirmed at succeeding conventions, stated that "legislation should be enacted which will safeguard for the uses of education a reasonable share of the radio broadcasting channels of the United States."[1] The National Committee on Education by Radio proposed that existing educational public welfare stations be protected in their present facilities and that provision be made for the improvement of the existing facilities of these stations and for the establishment of additional stations of like character, as need for such stations appears, "by allocating for noncommercial broadcasting a reasonable and adequate percentage of desirable channels and privileges." This Committee proposed also that in determining public interest, convenience, or necessity, "public welfare as a primary purpose of educational stations should be given due and favorable weight."[2] A few other proposals advocating allocation of facilities to nonprofit organizations were made but with no substantial backing.

The bulk of the testimony offered by those advocating changes from the present system of regulation advocated either that the Commission establish a system of priorities in the matter of allocation similar to that implied in the proposal to allocate separate facilities to nonprofit organizations by law or that it require, as a condition of public interest, convenience, or necessity, that every commercial station make available, free of charge and substantially free of all station control, a portion of its time for the use of nonprofit organizations, such action to be carried out by the Commission under its existing powers, which by many were believed to be adequate, or under powers made adequate, if necessary, by action of Congress.

In so far as such proposals advocate the establishment of fixed priorities by the Commission, whether by allocation of broadcasting facilities or by allocation of broadcast time by commercial stations, they are subject to objections and administrative difficulties similar to those that would attend legislative establishment of priorities. While we must regard sympathetically all sincere efforts to develop the educational possibilities of radio, we must also recognize the fact that those potentialities have not

[1] *Ibid.*, pp. 25–26.
[2] *Ibid.*, pp. 43–44.

been established with sufficient exactness to warrant the setting aside of a fixed proportion of facilities for educational stations. If the term education is used in a broad sense, many of the programs of commercial stations, sponsored as well as sustaining, may be considered educational. Because of the high cost of broadcasting meritorious programs and the unique system of support for broadcasting which has developed in the United States, the possibilities that lie in the development of radio under commercial sponsorship as well as by educational leadership must be fully explored.

The solution of this problem lies not in the allocation of more facilities to a group not able to use to the fullest those that they have had but in cooperation between the commercial broadcasters and the nonprofit organizations in the broadcasting of programs of educational and cultural merit. Such programs will need the financial support that, apart from government sponsorship, can be obtained only from commercial interests, and they require in their preparation and presentation the abilities of men trained in educational and cultural pursuits. That such cooperation is possible is well-known to those familiar with the activities of the National Advisory Council on Education by Radio and many similar activities. It is indicated also by the extent to which commercial broadcasters have made their facilities available to nonprofit organizations. The study made by the Federal Radio Commission some years ago[1] and testimony at the recent hearing of the Communications Commission both indicated that the commercial broadcasters have made available for noncommercial broadcasting a large amount of time, nearly all free of charge, and have offered facilities in excess of those that nonprofit organizations have requested or were prepared to use. For example, during the first half of 1934, 275 commercial stations actually broadcast in cooperation with, or in behalf of, nonprofit organizations 77,542 hr., or 11.3 per cent of their total operating time, of which 14,873 were evening hours, representing 8 per cent of the total evening time of these stations. Add to these the programs of a similar nature broadcast by these stations but not in cooperation with, or in behalf of, nonprofit organizations, and there were broadcast programs of an educational or informative nature occupying 114,159 hr., or 16.7 per cent of the total operat-

[1] Commercial Radio Advertising, *Sen. Doc.* 137, 72d Cong., 1st Sess.

ing time of these stations. Of these, 24,582 were evening hours, representing 13.3 per cent of the total evening time. In general, the proportion of time used for such broadcasts was materially greater on the larger stations and the networks than on the smaller stations.[1] Well-established also was the fact that the commercial stations gave much cooperation in the preparation and presentation of such programs and, except for editorial selection, exercised no censorship of their content.[2]

However, that such cooperation has not been all that could be desired is evidenced by the amount of criticism of the attitude of certain broadcasters on the score that the hours offered educational or other nonprofit organizations have not been the best hours for their purposes and that they have been subject to change when opportunity arose to sell the time formerly given. Real cooperation between commercial broadcasters and nonprofit organizations will require more than lip service. On the part of the broadcasters, it will mean the grant of good hours, and guaranteed hours, even at the sacrifice of some revenue; and on the part of the nonprofit organizations, the development of programs capable of achieving the purposes sought. The function of regulation should be to encourage more effective cooperation. This, however, requires no additional legislation or further broadening of the Commission's powers. The phrase public interest, convenience, or necessity is broad enough to embrace activities of the Commission designed to eliminate abuses as well as to foster broadcasting development. Too often, the functions of regulatory commissions have been considered by them to be mostly of a corrective nature, and regulation has suffered accordingly. It is to be hoped that steps will be taken to stimulate the development of educational and cultural broadcasting so as to avoid further legislative interference in matters that are essentially administrative.

One situation complained of by publicly and institutionally owned stations is that which forces them to spend large sums of money in defending their facilities against commercial applicants. Realizing the justice of this complaint, the Commission has recommended that Congress make provision for informal, preliminary hearings on applications that appear from examina-

[1] Hearings before the Broadcast Division, F.C.C., *op. cit.*, pp. 676–678.

[2] *Ibid.*, pp. 539, 750, 12288, 12509, 12691–12692, 13023–13024.

tion to be antagonistic to established stations, to determine whether the application violates any provisions of the Communications Act or the rules and regulations of the Commission or whether or not the applicant is legally, financially, and technically qualified to contest the use of a radio facility with an existing station. Under such a provision, applications found to be inconsistent with law or regulation and applications of those found not to be qualified to operate stations could be refused without requiring the presence of licensees of existing stations to be present at hearings. The provisions limiting station licenses to short periods and requiring stations to live up to a standard of public interest lest their licenses be not renewed are necessary to prevent a fixed broadcasting setup and to maintain high standards of broadcast service; but there is no reason why established stations, especially those operated by nonprofit organizations which have difficulty in carrying on, should be continually hailed before the Commission to defend their licenses against irresponsible applicants.

As a result of its findings in the preceding investigation, the Commission recommended that Congress should at this time set aside no fixed proportion of broadcasting facilities for nonprofit broadcasting and assigned the following reasons:

There is no need for a change in the existing law to accomplish the helpful purposes of the proposal.

Flexibility in the provisions of the law is essential to regulation if growth and development in the art of broadcasting is to be encouraged and regulated for the best interest of the public as a whole.

There are insufficient broadcast facilities available in the present development of the art to provide for specialized broadcast service consistent with a fair and equitable distribution of facilities and services throughout the country.

No feasible plan for a definite allocation of broadcast facilities to nonprofit organizations has been presented.

The hearings developed no evidence of a real demand on the part of the great body of nonprofit organizations or on the part of the general public for the proposed allocation of definite percentages of broadcast facilities to particular types or kinds of nonprofit activities.

It would appear that the interests of the nonprofit organizations may be better served by the use of the existing facilities, thus giving them access to costly and efficient equipment and to established audiences, than by the establishment of new stations for their peculiar needs. In

order for nonprofit organizations to obtain the maximum service possible, cooperation in good faith by the broadcasters is required. Such cooperation should, therefore, be under the direction and supervision of the Commission.

In its report to the Congress, the Commission proposed to hold an educational conference, at which time plans for mutual cooperation between broadcasters and educational organizations could be made. That conference was held on May 15, 1935, and from it developed the Federal Radio Education Committee, with Dr. John W. Studebaker, United States Commissioner of Education, as chairman. The committee is composed of representative people from many walks of life, as well as government officials and representatives of the broadcasting industry. Funds for its work are provided by the National Advisory Council on Radio in Education and the National Association of Broadcasters.

Censorship of broadcasting programs is a matter that long has been the subject of much controversy as well as of thoughtful consideration, but too often the real underlying issues have not been fully recognized. Here we shall state as clearly as we can the issues involved and in the light of them consider whether or not substantial changes should be made in present practice. It may be taken as self-evident that censorship of broadcasting programs is a matter of great public importance, involving as it does freedom of speech over the air, and that no form of censorship should be exercised except by parties having obligations to the public for which they are specifically and directly answerable. In the last analysis, the listeners who turn the dials are the real censors; but if such control were adequate, few problems would exist. Neither public authorities nor the broadcasters can evade their obligations to see that broadcasting shall be of such a nature as to serve the public interest by pointing out that listeners may exercise choice and avoid what is objectionable; for listeners may choose only as between programs actually broadcast, and only indirectly may they influence the selection of those programs in the first instance from all that might be broadcast. This responsibility rests first with the owners and operators of broadcasting stations. The fundamental question then is as to whether or not some control other than that exercised

by the broadcasters is necessary. But first let us inquire into the control exercised by the broadcasters.

Broadcasters have on certain occasions been accused of activities that in the eyes of the accusers have constituted a most objectionable form of control over broadcasting programs. Many cases are on record where speakers whose views have been distasteful to the broadcasters or their patrons have been refused facilities or where "objectionable" parts of speeches have been deleted. The stock answer to such accusations by the stations has been that they have exercised no censorship in restraint of freedom of speech over the air but merely editorial selection and that there is a fundamental difference between the two. Editorial selection, the broadcasters say, must be exercised because broadcasting time is limited. It cannot be added to, like pages to a newspaper; and since the number of applicants for opportunity to address the public is greater than can be provided for, it is necessary to determine the subjects that are of interest to the public and to choose groups or individuals of such standing and authority as to warrant their ability to discuss these subjects adequately. The broadcasters contend that they are actually handicapped in their efforts to establish freedom of speech over the air by the requirements of law to which we have referred in previous chapters. They must prevent the broadcasting of matter prohibited by law or not in the public interest on the penalty of the loss of their licenses, and they have been held liable, as well as the speakers, for matter of a libelous or slanderous nature broadcast over their stations.[1]

On the other hand, the broadcasting industry has been criticized for not exercising more control over certain aspects of commercial programs. Criticism on this ground has been based upon the amount and quality of advertising matter appearing in broadcast programs, advertising offensive to the good taste and the finer sensibilities of listeners, the advertising of products injurious to life and health, false and misleading advertising, and the use of broadcasting facilities by all sorts of fakers and charlatans. Much of the criticism has been merited. Too often, the record of commercial broadcasting has been blackened by those

[1] *Sorenson v. Wood* and *KFAB Broadcasting Co., supra;* see also NAB Brief, in the matter of Sec. 30c of the Communications Act of 1934, Federal Communications Commission.

who have placed monetary greed above considerations of public interest. But the implication so often conveyed in such criticism that the broadcasters make no serious attempts to correct these evils is not only unfair to a large number of broadcasters but is unfounded.

In a study of 210 replies[1] to a questionnaire recently mailed by one of the authors to all the broadcasting stations in the United States, it was found that 70 per cent of those stations definitely limited the time that might be devoted to commercial announcements in broadcasting programs to a fixed proportion of the total broadcast time. On full-hour night programs, 57 per cent of the stations set the limit at 10 per cent or less of the total program time, and 66 per cent set the limit on full-hour day programs at 15 per cent or less. On the shorter programs, the allowance was more liberal, although 46 per cent of the stations set the limit at 10 per cent or less on night 30-min. programs, and about 54 per cent of the stations at 15 per cent or less of night 15-min. programs; while about 70 per cent of the stations set the limit at 15 per cent or less on day 30-min. programs, and about 40 per cent of the stations at 15 per cent of day 15-min. programs. Answers to questions regarding attempts to prevent the making of false, misleading, or unwarranted statements in advertising continuities and to protect listeners from the use of worthless or injurious products showed it to be the general practice to require that continuities be submitted 24 or 48 hr. in advance for checking and editing by employees of the stations. Many of the larger stations, like the major networks, had set up continuity acceptance or similar departments, whose function it was to attend to such matters. In addition, a large number of the stations had made use of the facilities of governmental departments and private expert services to aid them in arriving at judgments regarding the merits of products or advertising claims. Ninety-three stations had at one time or another consulted the Federal Trade Commission; 51, the United States

[1] These replies came from 28 clear-channel, 105 regional, and 77 local stations; 43 were owned and operated by, or affiliated with, the Columbia Broadcasting System, and 37 were owned and operated by, or affiliated with, the National Broadcasting Co. Together, these stations constitute about 37 per cent of the commercial stations in operation one year or more and are representative of the entire industry.

Food and Drug Administration; 8, the Proprietary Association; 29, the American Medical Association; 40, the national or local chambers of commerce or the National Better Business Bureau and affiliated better business bureaus; and 24 stations, one or more of other similar agencies, including state health, insurance, and agriculture departments, the Bureau of Better Health, private laboratories or those of educational institutions, and many others. The products concerning which information was sought covered a wide range but consisted mostly of foods, drugs, and medicines used for self-medication.

Many stations had adopted definite attitudes toward radio advertising, involving not alone the legitimacy of advertising claims but matters of good taste. Ninety-six stations stated that they refused to permit the advertising over their stations of depilatories; 81 stations, deodorants, a few stations specifying bodily deodorants; 72 stations, laxatives; and 20 stations, cosmetics. One hundred twenty stations refused liquor advertising, 101 being located in states that permitted such advertising; 79 stations, wine advertising; and 51 stations, beer advertising. Eighty-seven stations, or 41 per cent of the total, stated that it was their policy not to prohibit accounts by classes or types but to consider each product and the advertising copy on its individual merits.[1]

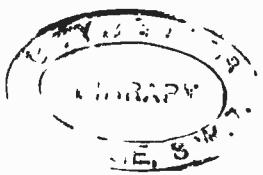
The replies to this questionnaire were not made under oath; and while they might in part have represented ideal, rather than actual, operating policies, they clearly showed that a substantial portion of the broadcasting industry was not altogether shirking its responsibilities in these important matters. The industry seems to be ready for concerted action in eliminating objectionable features from broadcasting programs if the necessary organization can be effected. Such an organization could be set up within the National Association of Broadcasters, to work directly with the stations and to advise stations and advertisers or their agencies whether particular accounts are ethically, esthetically, or otherwise acceptable for radio advertising. Ably and firmly administered self-censorship within the industry could do much to eliminate the abuses which have been the source of responsible criticism and avoid the imposition of censorship from without.

[1] Herring, J. M. "A Survey of Station Programming Policies," *Broadcasting*, vol. 10, no. 5, p. 16, 1936.

It is the opinion of the authors that under the present system the very nature of the public service obligation of commercial broadcasters places upon them not only the necessity but the duty of maintaining complete control over their programs. This is true with respect to ordinary commercial programs for which advertising rates are charged, and it is true regarding programs of a public service nature, like speeches on controversial subjects. Any other system would involve the imposition of censorship by Congress or its administrative arms. It is true that under the existing system, the Communications Commission must of necessity consider the performance of broadcasting stations from the point of view of the public interest and that, while this has been held not to be censorship by the courts, the effect is much the same. But such control by the regulatory authority provides a necessary check upon unscrupulous broadcasters or those not fully imbued with the true nature of their obligations to the public and is an essential concomitant of effective regulation. Further extension of the control of the Commission over broadcasting programs, however, is neither necessary nor desirable; and the grant of direct censorship powers, foreign to American principles.

Further direct control of broadcasting programs by Congress is something also to be viewed with distrust. The inconsistency in the present situation whereby broadcasters may not exercise censorship over the speeches of qualified candidates for public office delivered over their stations but yet may be held liable, as well as the speakers, for libel and slander appearing in them is a sample of unnecessary burdens which may be placed upon broadcasters who are really interested in making of broadcasting a great public forum. Yet there has been considerable agitation for extending similar provisions to speakers on all controversial topics of general public interest. It is admitted that the censorship privilege exercised by broadcasting stations is not above abuse, but such proposals would tend to defeat their own purposes by forcing stations to deny their facilities to all such speakers, since the law does not require that broadcasting stations grant the use of their facilities for such purposes, and it would create rather than solve problems to require them to grant time to any and all who desire to broadcast.

Machinery is available, and much has been done by public authorities to eliminate false and misleading radio advertising.



No division of the Federal Government exists with authority to examine and approve or disapprove radio advertising copy, the responsibility for what is broadcast resting solely upon the broadcasting stations. But the Federal Trade Commission, the Food and Drugs Administration, and other Federal bureaus may be contacted directly or indirectly by the stations for scientific opinions. The Federal Trade Commission under its authority to prevent unfair methods of competition in interstate commerce has issued cease and desist orders against certain advertisers or has accepted stipulations from advertisers who submit copy to the Commission—orders or stipulations made public in the published reports of the Trade Commission. If a station that is skeptical of a product or the claims made for it consults the Federal Trade Commission, the latter will advise the station whether or not it has issued a cease and desist order against, or accepted a stipulation from, the particular advertiser and will enclose a copy of the essentials of such order or stipulation. If no stipulation has been accepted, or cease and desist order issued, the Commission will advise the station that, although no facts are then available, it is engaged in the general examination of continuities furnished by broadcasting stations and is instituting proceedings in particular cases as the facts warrant to prevent the use of false and misleading advertising or statements over the radio.

False and misleading advertising matter in newspapers and magazines and broadcast over the radio is surveyed and studied by the Special Board of Investigation, consisting of three attorneys of the Federal Trade Commission. Its review of advertising-copy broadcast was started at the beginning of the fiscal year 1934–1935. First, the Commission, through its Special Board, made a survey of the continuities broadcast by all radio stations during July, 1934, and discovered that satisfactory continuous scrutiny of current programs could be maintained by the appropriate grouping of stations for sampling purposes. Since September, 1934, calls have been issued to individual radio stations to submit copies of their continuities over specified periods of 15 days, although national and regional networks submit their continuities on a continuous weekly basis, and producers of electrical transcriptions submit regular weekly and monthly returns of copies of the commercial portions of the recordings manufactured by them for broadcasting purposes.

Up to June 30, 1935, 439,253 radio continuities had been received by the Commission. Of these, a preliminary examination had been completed on 376,539, resulting in 38,873 being set aside as possibly false or misleading.[1] The Federal Trade Commission receives scientific opinions from the Food and Drug Administration, the United States Public Health Service, the National Bureau of Standards, and other divisions of the Federal government concerning matters within their particular fields of activity. Broadcasting stations thus may do a real public service by submitting their continuities to the Federal Trade Commission for examination; but other action is necessary if they would protect their listeners in the first instance, since the Commission examines only continuities that have been broadcast.

On the whole, new broadcasting legislation is not necessary at this time. By its very nature, broadcasting is more than a communication service; it is a source of entertainment, recreation, and education to the general public. But because it is so, and because tastes and interests in these matters vary widely, the fullest opportunity for ingenuity, initiative, and showmanship in the preparation and presentation of programs must be provided. Rigid control of broadcast programs by public authority, whether by allocation of facilities or by some other form of indirect censorship, is inimical to the development of the service; for the interests of the listeners, not the broadcasters, are paramount. No other developments in broadcasting in recent years have been of greater significance than the progressive rise in quality of broadcast programs, and there can be further improvement by cooperation between the commercial broadcasters and the educational and cultural groups in the United States. If further cooperation cannot be obtained, it will be time then to consider some alternative system. Prematurely to "freeze" broadcast allocation may be to stunt or warp the development of broadcasting and thus to retard, if not to defeat, the attainment of the greatest common good. The time is not ripe to speak dogmatically as to the best use that may be made of the broadcasting facilities.

Several unsatisfactory aspects of the present broadcasting situation will no doubt require some action by the Commission. One of the most important of these is the duplication of programs

[1] Annual report of the Federal Trade Commission, p. 104, 1935.

on the clear channels, a matter that has long been the subject of controversy. The reason for setting aside 40 of the 90 channels as clear channels upon each of which only one station might operate at night was to insure that service would be given to rural and sparsely settled areas over long distances under favorable conditions, each station giving service up to the extreme limit of its service range. A study of the population and area of the United States dependent for broadcasting service at night on the secondary coverage of clear-channel stations, as of December, 1933, indicated that 35.8 per cent of the population, and 76.7 per cent of the area of the United States, was within the secondary coverage of such stations. There has been no substantial change in this situation since that time. The programs available at night to the people who reside in this area, therefore, are those offered by clear-channel stations, and their program selection is limited to them. It has developed, however, as pointed out recently by Commissioner Stewart in moving that the Commission investigate and consider this matter, that of the 40 clear channels for nighttime operation 26 are used by stations of National Broadcasting Company networks, 1 of these being used also by a Mutual Broadcasting System station and another by a Columbia Broadcasting System station; 12 are used by stations of the Columbia Broadcasting System, 1 of these being used also by a National Broadcasting Company station; 3 are used by stations of the Mutual Broadcasting System network, and 1 is not used by chain stations. Commissioner Stewart contended that duplication of programs on clear-channel stations reduces the value of clear channels to persons dependent on secondary service (for whom the channels were set apart) and tends to defeat the announced purpose in the establishment of clear channels. The Broadcast Division of the Commission has for some time been making a thorough study of the broadcast structure both as to results of allocation on clear channels and on channels to which more than one station is assigned for nighttime operation, but no recommendations as to changes have so far been made.

Soon after the Federal Communications Commission took office, a permanent organization was established to carry on its work. Three divisions were created with three members each, the chairman of the Commission serving on each division: (1) the Broadcast Division, having jurisdiction over all matters

related to or connected with broadcasting; (2) the Telegraph Division, having jurisdiction over all matters relating to or connected with record communication by wire, radio, or cable and all forms and classes of fixed and mobile radiotelegraph services and amateur services; and (3) the Telephone Division, having jurisdiction over all matters relating to, or connected with, telephone communication (other than broadcasting) by wire, radio, or cable, including all forms of fixed and mobile radiotelephone service except as otherwise specifically provided for. Jurisdiction of the whole commission was established over all matters not otherwise specifically allocated to a division, over all matters that fall within the jurisdiction of two or more of the divisions established, and over the assignment of bands of frequencies to the various radio services. In any case where a conflict arises as to the jurisdiction of any division or where jurisdiction of any matter or service is not allocated to a division, the Commission is to determine whether the whole Commission or a division thereof shall have and exercise jurisdiction and, if a division, the one that shall have and exercise such jurisdiction. The technical work of the Commission was organized under the following departments or sections: (*a*) the sections concerned with licenses, dockets, minutes, public reference, correspondence, and records, accounting, duplicating and supplies, press, and clerical; (*b*) the Engineering Department, consisting of telegraph, broadcast, telephone, international, and field sections; (*c*) the Accounting, Statistics, and Tariff section; (*d*) the Valuation Department; and (*e*) the Law Department.

Since its establishment, the Commission has been concerned mostly with the requiring of reports from the communication companies, the filing of tariffs, and attention to a multitude of routine detailed matters common to the work of regulatory commissions in general. However, it has undertaken a number of investigations, some in response to mandates in the Act of 1934 and others under the general powers of the Commission to investigate matters that affect the public interest. Among the former were the hearings on the proposal to set aside a fixed proportion of broadcasting facilities for nonprofit organizations; and among the latter, the hearings on the activities of telegraph carriers regarding consolidation, to both of which reference has been made previously. Many orders have been issued by

the Commission as a whole and by the separate divisions of the Commission. The orders issued by the Telegraph Division of the Commission have dealt with the filing by the telegraph companies of verified copies of contracts, agreements, or arrangements with other carriers; verified statements regarding corporate organization, ownership, directors, capitalization, etc., of the companies; the filing of schedules of tariffs and charges; verified reports regarding the methods by which, and the extent to which, the companies furnish interstate or foreign wire-telegraph service; reports regarding the utilization of radiotelegraph circuits; information with respect to telegraph franks and telegraph messages sent free of charge; and information with respect to route, wire, and channel facilities. This division also has held a number of investigations and has issued orders that institute rules governing the issuance of telegraph franks and rates of pay for government communication by telegraph, the latter carrying out a duty transferred by the Communications Act from the Postmaster General to the Communications Commission.

Orders issued by the Telephone Division consist mostly of similar demands for essential information from the telephone companies. The Telephone Division took under consideration the records and orders of the Interstate Commerce Commission in the matter of depreciation charges of telephone companies and indefinitely postponed the effective dates of those orders. In July, 1935, the Communications Commission adopted a resolution releasing the Interstate Commerce Commission from further requests pursuant to Sec. 213*g* of the Communications Act. This deals with the valuation of the properties of communication companies.

The Broadcast Division has issued few general orders, those issued for the most part requiring information concerning the ownership and control of all broadcast stations, including all special and general experimental, visual broadcast, and relay broadcast stations. The bulk of the work of this division has involved the carrying on of administrative details similar to those which so completely occupied the former Commission. While the general framework of broadcast allocation has been maintained substantially unmodified since 1928, the Commission has been, and is now, continually besieged with requests from newcomers for authority to set up new stations and from established

stations to modify the assignments that they have received. In addition, the Commission receives many complaints from the listening public and from parties who have a more direct interest concerning the performance of broadcasting stations. In November, 1935, more than 100 stations were under investigation by the Broadcast Division for broadcasts involving some 300 different charges.

The Commission as a whole has ruled upon certain general matters coming under the jurisdiction of the entire body, notably regarding applications by certain individuals under Sec. 212 of the Communications Act of 1934 for authority to hold the positions of officer or director of more than one carrier subject to the Act. At a conference between carrier representatives and representatives of state commissions and the Communications Commission, rules were adopted governing the filing and modification of schedules of charges, classifications, or regulations by the carriers subject to the Communications Act. Under special mandate from Congress, the Commission is now engaged in an investigation of the activities of the American Telephone and Telegraph Company. Thus, it may be seen that while the Commission has devoted a large part of its time and energies so far to fact finding and organization, it has been forced of necessity to consider many problems of broad scope and of far-reaching significance to the communications industries. However, it has not yet had sufficient opportunity to consider or to develop major policies.

As in the case of most Federal commissions, the Act requires that the Communications Commission be a bipartisan body with no more than four commissioners members of the same political party. Also, the expirations of the terms of the commissioners are staggered so that at least six commissioners will be retained from one year to the next. This is an important provision, since it will provide the element of continuity of policy essential to effective work by a regulatory body. The Radio Act of 1927 required regional representation on the Federal Radio Commission, one member to be appointed from each of the five zones created by the Act; but the Communications Act places no such limitation upon the appointive power. This change is to be applauded, at least in theory, since it opens the way to the appointment of the best qualified men available, regardless

of the section or sections of the country in which they happen to reside. Regional representation by implication places upon a commissioner the duty of caring first for the needs of the section that he represents, whereas equitable Federal regulation of communications must look to the well-being of the country as a whole. The introduction of sectional interests into the Commission would be inimical to impartial administration of the law.

In conclusion, it may be said that while the Communications Act will require considerable amendment or amplification from the standpoint of effective regulation of communications, it is, on the whole, a worth-while piece of legislation. It evidences widespread appreciation on the part of Congress of the need for a practical and efficient regulatory system of all communications, and it lays down the foundation for such a system. The coming years will no doubt witness important developments in the regulation of communications, since many specific provisions have yet to be enacted; and these will determine, in large measure, the real character of the regulation to be exercised. The enactments of Congress and particularly the acts of the Commission, its administrative arm, will have great significance to the commercial communication companies and will largely determine the character, quality, and quantity of the broadcasting service received by the people of the United States. In view of the importance of their activities with respect to communications, both the Congress and the Commission need approach their duties in full realization of the remarkable development of the communication services which has taken place and in a truly constructive spirit. Regulation must be constructive as well as corrective, a fact that the history of public utility regulation clearly demonstrates. Only by thorough knowledge of the technical and economic aspects of communications and the exercise of vision can the Commission, or Congress, hope to aid in accomplishing the central purpose of the Communications Act, which is so to regulate interstate and foreign communication by wire or radio as to make available to the people of the United States a rapid, efficient, nation-wide, and world-wide service with adequate facilities and at reasonable charges.

APPENDIX A

[PUBLIC—NO. 416—73D CONGRESS]

[S. 3285]

AN ACT

To provide for the regulation of interstate and foreign communication by wire or radio, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE I—GENERAL PROVISIONS

PURPOSES OF ACT; CREATION OF FEDERAL COMMUNICATIONS COMMISSION

SECTION 1. 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, 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", which shall be constituted as hereinafter provided, and which shall execute and enforce the provisions of this Act.

APPLICATION OF ACT

SEC. 2. (a) The provisions of this Act shall apply to all interstate and foreign communication by wire or radio and all interstate and foreign transmission of energy by radio, which originates and/or is received within the United States, and to all persons engaged within the United States in such communication or such transmission of energy by radio, and to the licensing and regulating of all radio stations as hereinafter provided; but it shall not apply to persons engaged in wire or radio communication or transmission in the Philippine Islands or the Canal Zone, or to wire or radio communication or transmission wholly within the Philippine Islands or the Canal Zone.

(b) Subject to the provisions of section 301, nothing in this Act shall be construed to apply or to give the Commission jurisdiction with respect to (1) charges, classifications, practices, services, facilities, or regulations for

or in connection with intrastate communication service of any carrier, or (2) any carrier engaged in interstate or foreign communication solely through physical connection with the facilities of another carrier not directly or indirectly controlling or controlled by, or under direct or indirect common control with, such carrier; except that sections 201 to 205 of this Act, both inclusive, shall, except as otherwise provided therein, apply to carriers described in clause (2).

DEFINITIONS

SEC. 3. For the purposes of this Act, unless the context otherwise requires—

(a) "Wire communication" or "communication by wire" means the transmission of writing, signs, signals, pictures, and sounds of all kinds by aid of wire, cable, or other like connection between the points of origin and reception of such transmission, including all instrumentalities, facilities, apparatus, and services (among other things, the receipt, forwarding, and delivery of communications) incidental to such transmission.

(b) "Radio communication" or "communication by radio" means the transmission by radio of writing, signs, signals, pictures, and sounds of all kinds, including all instrumentalities, facilities, apparatus, and services (among other things, the receipt, forwarding, and delivery of communications) incidental to such transmission.

(c) "Licensee" means the holder of a radio station license granted or continued in force under authority of this Act.

(d) "Transmission of energy by radio" or "radio transmission of energy" includes both such transmission and all instrumentalities, facilities, and services incidental to such transmission.

(e) "Interstate communication" or "interstate transmission" means communication or transmission (1) from any State, Territory, or possession of the United States (other than the Philippine Islands and the Canal Zone), or the District of Columbia, to any other State, Territory, or possession of the United States (other than the Philippine Islands and the Canal Zone), or the District of Columbia, (2) from or to the United States to or from the Philippine Islands or the Canal Zone, insofar as such communication or transmission takes place within the United States, or (3) between points within the United States but through a foreign country; but shall not include wire communication between points within the same State, Territory, or possession of the United States, or the District of Columbia, through any place outside thereof, if such communication is regulated by a State commission.

(f) "Foreign communication" or "foreign transmission" means communication or transmission from or to any place in the United States to or from a foreign country, or between a station in the United States and a mobile station located outside the United States.

(g) "United States" means the several States and Territories, the District of Columbia, and the possessions of the United States, but does not include the Philippine Islands or the Canal Zone.

(h) "Common carrier" or "carrier" means any person engaged as a common carrier for hire, in interstate or foreign communication by wire or radio or in interstate or foreign radio transmission of energy, except where reference is made to common carriers not subject to this Act; but a person engaged in radio broadcasting shall not, insofar as such person is so engaged, be deemed a common carrier.

(i) "Person" includes an individual, partnership, association, joint-stock company, trust, or corporation.

(j) "Corporation" includes any corporation, joint-stock company, or association.

(k) "Radio station" or "station" means a station equipped to engage in radio communication or radio transmission of energy.

(l) "Mobile station" means a radio-communication station capable of being moved and which ordinarily does move.

(m) "Land station" means a station, other than a mobile station, used for radio communication with mobile stations.

(n) "Mobile service" means the radio-communication service carried on between mobile stations and land stations, and by mobile stations communicating among themselves.

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

(p) "Chain broadcasting" means simultaneous broadcasting of an identical program by two or more connected stations.

(q) "Amateur station" means a radio station operated by a duly authorized person interested in radio technique solely with a personal aim and without pecuniary interest.

(r) "Telephone exchange service" means service within a telephone exchange, or within a connected system of telephone exchanges within the same exchange area operated to furnish to subscribers intercommunicating service of the character ordinarily furnished by a single exchange, and which is covered by the exchange service charge.

(s) "Telephone toll service" means telephone service between stations in different exchange areas for which there is made a separate charge not included in contracts with subscribers for exchange service.

(t) "State commission" means the commission, board, or official (by whatever name designated) which under the laws of any State has regulatory jurisdiction with respect to intrastate operations of carriers.

(u) "Connecting carrier" means a carrier described in clause (2) of section 2 (b).

(v) "State" includes the District of Columbia and the Territories and possessions.

PROVISIONS RELATING TO THE COMMISSION

SEC. 4. (a) The Federal Communications Commission (in this Act referred to as the "Commission") shall be composed of seven commissioners appointed by the President, by and with the advice and consent of the Senate, one of whom the President shall designate as chairman.

(b) Each member of the Commission shall be a citizen of the United States. No member of the Commission or person in its employ shall be financially interested in the manufacture or sale of radio apparatus or of apparatus for wire or radio communication; in communication by wire or radio or in radio transmission of energy; in any company furnishing services or such apparatus to any company engaged in communication by wire or radio or to any company manufacturing or selling apparatus used for communication by wire or radio; or in any company owning stocks, bonds, or other securities of any such company; nor be in the employ of or hold any official relation to any person subject to any of the provisions of this Act, nor own stocks, bonds, or other securities of any corporation subject to any of the provisions of this Act. Such commissioners shall not engage in any other business, vocation, or employment. Not more than four commissioners shall be members of the same political party.

(c) The commissioners first appointed under this Act shall continue in office for the terms of one, two, three, four, five, six, and seven years, respectively, from the date of the taking effect of this Act, the term of each to be designated by the President, but their successors shall be appointed for terms of seven years; except that any person chosen to fill a vacancy shall be appointed only for the unexpired term of the commissioner whom he succeeds. No vacancy in the Commission shall impair the right of the remaining commissioners to exercise all the powers of the Commission.

(d) Each commissioner shall receive an annual salary of $10,000, payable in monthly installments.

(e) The principal office of the Commission shall be in the District of Columbia, where its general sessions shall be held; but whenever the convenience of the public or of the parties may be promoted or delay or expense prevented thereby, the Commission may hold special sessions in any part of the United States.

(f) Without regard to the civil-service laws or the Classification Act of 1923, as amended, (1) the Commission may appoint and prescribe the duties and fix the salaries of a secretary, a director for each division, a chief engineer and not more than three assistants, a general counsel and not more than three assistants, and temporary counsel designated by the Commission for the performance of special services, and (2) each commissioner may appoint and prescribe the duties of a secretary at an annual salary not to exceed $4,000. The general counsel and the chief engineer shall each receive an annual salary of not to exceed $9,000; the secretary shall receive an annual salary of not to exceed $7,500; the director of each division shall receive an annual salary of not to exceed $7,500; and no assistant shall receive an annual salary in excess of $7,500. The Commission shall have authority, subject to the provisions of the civil-service laws and the Classification Act of 1923, as amended, to appoint such other officers, engineers, inspectors, attorneys, examiners, and other employees as are necessary in the execution of its functions.

(g) The Commission may make such expenditures (including expenditures for rent and personal services at the seat of government and elsewhere, for

office supplies, law books, periodicals, and books of reference, and for printing and binding) as may be necessary for the execution of the functions vested in the Commission and as from time to time may be appropriated for by Congress. All expenditures of the Commission, including all necessary expenses for transportation incurred by the commissioners or by their employees, under their orders, in making any investigation or upon any official business in any other places than in the city of Washington, shall be allowed and paid on the presentation of itemized vouchers therefor approved by the chairman of the Commission or by such other member or officer thereof as may be designated by the Commission for that purpose.

(h) Four members of the Commission shall constitute a quorum thereof. The Commission shall have an official seal which shall be judicially noticed.

(i) The Commission may perform any and all acts, make such rules and regulations, and issue such orders, not inconsistent with this Act, as may be necessary in the execution of its functions.

(j) The Commission may conduct its proceedings in such manner as will best conduce to the proper dispatch of business and to the ends of justice. No commissioner shall participate in any hearing or proceeding in which he has a pecuniary interest. Any party may appear before the Commission and be heard in person or by attorney. Every vote and official act of the Commission shall be entered of record, and its proceedings shall be public upon the request of any party interested. The Commission is authorized to withhold publication of records or proceedings containing secret information affecting the national defense.

(k) The Commission shall make an annual report to Congress, copies of which shall be distributed as are other reports transmitted to Congress. Such report shall contain such information and data collected by the Commission as may be considered of value in the determination of questions connected with the regulation of interstate and foreign wire and radio communication and radio transmission of energy, together with such recommendations as to additional legislation relating thereto as the Commission may deem necessary: *Provided*, That the Commission shall make a special report not later than February 1, 1935, recommending such amendments to this Act as it deems desirable in the public interest.

(l) All reports of investigations made by the Commission shall be entered of record, and a copy thereof shall be furnished to the party who may have complained, and to any common carrier or licensee that may have been complained of.

(m) The Commission shall provide for the publication of its reports and decisions in such form and manner as may be best adapted for public information and use, and such authorized publications shall be competent evidence of the reports and decisions of the Commission therein contained in all courts of the United States and of the several States without any further proof or authentication thereof.

(n) Rates of compensation of persons appointed under this section shall be subject to the reduction applicable to officers and employees of the Federal Government generally.

DIVISIONS OF THE COMMISSION

SEC. 5. (a) The Commission is hereby authorized by its order to divide the members thereof into not more than three divisions, each to consist of not less than three members. Any commissioner may be assigned to and may serve upon such division or divisions as the Commission may direct, and each division shall choose its own chairman. In case of a vacancy in any division, or of absence or inability to serve thereon of any commissioner thereto assigned, the chairman of the Commission or any commissioner designated by him for that purpose may temporarily serve on said division until the Commission shall otherwise order.

(b) The Commission may by order direct that any of its work, business, or functions arising under this Act, or under any other Act of Congress, or in respect of any matter which has been or may be referred to the Commission by Congress or by either branch thereof, be assigned or referred to any of said divisions for action thereon, and may by order at any time amend, modify, supplement, or rescind any such direction. All such orders shall take effect forthwith and remain in effect until otherwise ordered by the Commission.

(c) In conformity with and subject to the order or orders of the Commission in the premises, each division so constituted shall have power and authority by a majority thereof to hear and determine, order, certify, report, or otherwise act as to any of said work, business, or functions so assigned or referred to it for action by the Commission, and in respect thereof the division shall have all the jurisdiction and powers now or then conferred by law upon the Commission, and be subject to the same duties and obligations. Any order, decision, or report made or other action taken by any of said divisions in respect of any matters so assigned or referred to it shall have the same force and effect, and may be made, evidenced, and enforced in the same manner as if made, or taken by the Commission, subject to rehearing by the Commission as provided in section 405 of this Act for rehearing cases decided by the Commission. The secretary and seal of the Commission shall be the secretary and seal of each division thereof.

(d) Nothing in this section contained, or done pursuant thereto, shall be deemed to divest the Commission of any of its powers.

(e) The Commission is hereby authorized by its order to assign or refer any portion of its work, business, or functions arising under this or any other Act of Congress or referred to it by Congress, or either branch thereof, to an individual commissioner, or to a board composed of an employee or employees of the Commission, to be designated by such order, for action thereon, and by its order at any time to amend, modify, supplement, or rescind any such assignment or reference: *Provided, however*, That this authority shall not extend to investigations instituted upon the Commission's own motion or, without the consent of the parties thereto, to contested proceedings involving the taking of testimony at public hearings, or to investigations specifically required by this Act. All such orders shall take effect forthwith and remain in effect until otherwise ordered by the Commission. In case of the absence or inability for any other reason to act

of any such individual commissioner or employee designated to serve upon any such board, the chairman of the Commission may designate another commissioner or employee, as the case may be, to serve temporarily until the Commission shall otherwise order. In conformity with and subject to the order or orders of the Commission in the premises, any such individual commissioner, or board acting by a majority thereof, shall have power and authority to hear and determine, order, certify, report, or otherwise act as to any of said work, business, or functions so assigned or referred to him or it for action by the Commission and in respect thereof shall have all the jurisdiction and powers now or then conferred by law upon the Commission and be subject to the same duties and obligations. Any order, decision, or report made or other action taken by any such individual commissioner or board in respect of any matters so assigned or referred shall have the same force and effect, and may be made, evidenced, and enforced in the same manner as if made or taken by the Commission. Any party affected by any order, decision, or report of any such individual commissioner or board may file a petition for rehearing by the Commission or a division thereof and every such petition shall be passed upon by the Commission or a division thereof. Any action by a division upon such a petition shall itself be subject to rehearing by the Commission, as provided in section 405 of this Act and in subsection (c). The Commission may make and amend rules for the conduct of proceedings before such individual commissioner or board and for the rehearing of such action before a division of the Commission or the Commission. The secretary and seal of the Commission shall be the secretary and seal of such individual commissioner or board.

TITLE II—COMMON CARRIERS

SERVICE AND CHARGES

SECTION 201. (a) It shall be the duty of every common carrier engaged in interstate or foreign communication by wire or radio to furnish such communication service upon reasonable request therefor; and, in accordance with the orders of the Commission, in cases where the Commission, after opportunity for hearing, finds such action necessary or desirable in the public interest, to establish physical connections with other carriers, to establish through routes and charges applicable thereto and the divisions of such charges, and to establish and provide facilities and regulations for operating such through routes.

(b) All charges, practices, classifications, and regulations for and in connection with such communication service, shall be just and reasonable, and any such charge, practice, classification, or regulation that is unjust or unreasonable is hereby declared to be unlawful: *Provided*, That communications by wire or radio subject to this Act may be classified into day, night, repeated, unrepeated, letter, commercial, press, Government, and such other classes as the Commission may decide to be just and reasonable, and different charges may be made for the different classes of communications: *Provided further*, That nothing in this Act or in any other provision of law shall be construed to prevent a common carrier subject to this Act from entering

into or operating under any contract with any common carrier not subject to this Act, for the exchange of their services, if the Commission is of the opinion that such contract is not contrary to the public interest.

DISCRIMINATION AND PREFERENCES

SEC. 202. (a) It shall be unlawful for any common carrier to make any unjust or unreasonable discrimination in charges, practices, classifications, regulations, facilities, or services for or in connection with like communication service, directly or indirectly, by any means or device, or to make or give any undue or unreasonable preference or advantage to any particular person, class of persons, or locality, or to subject any particular person, class of persons, or locality to any undue or unreasonable prejudice or disadvantage.

(b) Charges or services, whenever referred to in this Act, include charges for, or services in connection with, the use of wires in chain broadcasting or incidental to radio communication of any kind.

(c) Any carrier who knowingly violates the provisions of this section shall forfeit to the United States the sum of $500 for each such offense and $25 for each and every day of the continuance of such offense.

SCHEDULES OF CHARGES

SEC. 203. (a) Every common carrier, except connecting carriers, shall, within such reasonable time as the Commission shall designate, file with the Commission and print and keep open for public inspection schedules showing all charges for itself and its connecting carriers for interstate and foreign wire or radio communication between the different points on its own system, and between points on its own system and points on the system of its connecting carriers or points on the system of any other carrier subject to this Act when a through route has been established, whether such charges are joint or separate, and showing the classifications, practices, and regulations affecting such charges. Such schedules shall contain such other information, and be printed in such form, and be posted and kept open for public inspection in such places, as the Commission may by regulation require, and each such schedule shall give notice of its effective date; and such common carrier shall furnish such schedules to each of its connecting carriers, and such connecting carriers shall keep such schedules open for inspection in such public places as the Commission may require.

(b) No change shall be made in the charges, classifications, regulations, or practices which have been so filed and published except after thirty days' notice to the Commission and to the public, which shall be published in such form and contain such information as the Commission may by regulations prescribe; but the Commission may, in its discretion and for good cause shown, modify the requirements made by or under authority of this section in particular instances or by a general order applicable to special circumstances or conditions.

(c) No carrier, unless otherwise provided by or under authority of this Act, shall engage or participate in such communication unless schedules

have been filed and published in accordance with the provisions of this Act and with the regulations made thereunder; and no carrier shall (1) charge, demand, collect, or receive a greater or less or different compensation for such communication, or for any service in connection therewith, between the points named in any such schedule than the charges specified in the schedule then in effect, or (2) refund or remit by any means or device any portion of the charges so specified, or (3) extend to any person any privileges or facilities in such communication, or employ or enforce any classifications, regulations, or practices affecting such charges, except as specified in such schedule.

(d) The Commission may reject and refuse to file any schedule entering for filing which does not provide and give lawful notice of its effective date. Any schedule so rejected by the Commission shall be void and its use shall be unlawful.

(e) In case of failure or refusal on the part of any carrier to comply with the provisions of this section or of any regulation or order made by the Commission thereunder, such carrier shall forfeit to the United States the sum of $500 for each such offense, and $25 for each and every day of the continuance of such offense.

HEARING AS TO LAWFULNESS OF NEW CHARGES; SUSPENSION

SEC. 204. Whenever there is filed with the Commission any new charge, classification, regulation, or practice, the Commission may either upon complaint or upon its own initiative without complaint, upon reasonable notice, enter upon a hearing concerning the lawfulness thereof; and pending such hearing and the decision thereon the Commission, upon delivering to the carrier or carriers affected thereby a statement in writing of its reasons for such suspension, may suspend the operation of such charge, classification, regulation, or practice, but not for a longer period than three months beyond the time when it would otherwise go into effect; and after full hearing the Commission may make such order with reference thereto as would be proper in a proceeding initiated after it had become effective. If the proceeding has not been concluded and an order made within the period of the suspension, the proposed change of charge, classification, regulation, or practice shall go into effect at the end of such period; but in case of a proposed increased charge, the Commission may by order require the interested carrier or carriers to keep accurate account of all amounts received by reason of such increase, specifying by whom and in whose behalf such amounts are paid, and upon completion of the hearing and decision may by further order require the interested carrier or carriers to refund, with interest, to the persons in whose behalf such amounts were paid, such portion of such increased charges as by its decision shall be found not justified. At any hearing involving a charge increased, or sought to be increased, after the organization of the Commission, the burden of proof to show that the increased charge, or proposed increased charge, is just and reasonable shall be upon the carrier, and the Commission shall give to the hearing and decision of such questions preference over all other questions pending before it and decide the same as speedily as possible.

COMMISSION AUTHORIZED TO PRESCRIBE JUST AND REASONABLE CHARGES

SEC. 205. (a) Whenever, after full opportunity for hearing, upon a complaint or under an order for investigation and hearing made by the Commission on its own initiative, the Commission shall be of opinion that any charge, classification, regulation, or practice of any carrier or carriers is or will be in violation of any of the provisions of this Act, the Commission is authorized and empowered to determine and prescribe what will be the just and reasonable charge or the maximum or minimum, or maximum and minimum, charge or charges to be thereafter observed, and what classification, regulation, or practice is or will be just, fair, and reasonable, to be thereafter followed, and to make an order that the carrier or carriers shall cease and desist from such violation to the extent that the Commission finds that the same does or will exist, and shall not thereafter publish, demand, or collect any charge other than the charge so prescribed, or in excess of the maximum or less than the minimum so prescribed, as the case may be, and shall adopt the classification and shall conform to and observe the regulation or practice so prescribed.

(b) Any carrier, any officer, representative, or agent of a carrier, or any receiver, trustee, lessee, or agent of either of them, who knowingly fails or neglects to obey any order made under the provisions of this section shall forfeit to the United States the sum of $1,000 for each offense. Every distinct violation shall be a separate offense, and in case of continuing violation each day shall be deemed a separate offense.

LIABILITY OF CARRIERS FOR DAMAGES

SEC. 206. In case any common carrier shall do, or cause or permit to be done, any act, matter, or thing in this Act prohibited or declared to be unlawful, or shall omit to do any act, matter, or thing in this Act required to be done, such common carrier shall be liable to the person or persons injured thereby for the full amount of damages sustained in consequence of any such violation of the provisions of this Act, together with a reasonable counsel or attorney's fee, to be fixed by the court in every case of recovery, which attorney's fee shall be taxed and collected as part of the costs in the case.

RECOVERY OF DAMAGES

SEC. 207. Any person claiming to be damaged by any common carrier subject to the provisions of this Act may either make complaint to the Commission as hereinafter provided for, or may bring suit for the recovery of the damages for which such common carrier may be liable under the provisions of this Act, in any district court of the United States of competent jurisdiction; but such person shall not have the right to pursue both such remedies.

COMPLAINTS TO THE COMMISSION

SEC. 208. Any person, any body politic or municipal organization, or State commission, complaining of anything done or omitted to be done by

any common carrier subject to this Act, in contravention of the provisions thereof, may apply to said Commission by petition which shall briefly state the facts, whereupon a statement of the complaint thus made shall be forwarded by the Commission to such common carrier, who shall be called upon to satisfy the complaint or to answer the same in writing within a reasonable time to be specified by the Commission. If such common carrier within the time specified shall make reparation for the injury alleged to have been caused, the common carrier shall be relieved of liability to the complainant only for the particular violation of law thus complained of. If such carrier or carriers shall not satisfy the complaint within the time specified or there shall appear to be any reasonable ground for investigating said complaint, it shall be the duty of the Commission to investigate the matters complained of in such manner and by such means as it shall deem proper. No complaint shall at any time be dismissed because of the absence of direct damage to the complainant.

ORDERS FOR PAYMENT OF MONEY

SEC. 209. If, after hearing on a complaint, the Commission shall determine that any party complainant is entitled to an award of damages under the provisions of this Act, the Commission shall make an order directing the carrier to pay to the complainant the sum to which he is entitled on or before a day named.

FRANKS AND PASSES

SEC. 210. Nothing in this Act or in any other provision of law shall be construed to prohibit common carriers from issuing or giving franks to, or exchanging franks with each other for the use of, their officers, agents, employees, and their families, or, subject to such rules as the Commission may prescribe, from issuing, giving, or exchanging franks and passes to or with other common carriers not subject to the provisions of this Act, for the use of their officers, agents, employees, and their families. The term "employees", as used in this section, shall include furloughed, pensioned, and superannuated employees.

COPIES OF CONTRACTS TO BE FILED

SEC. 211. (a) Every carrier subject to this Act shall file with the Commission copies of all contracts, agreements, or arrangements with other carriers, or with common carriers not subject to the provisions of this Act. in relation to any traffic affected by the provisions of this Act to which it may be a party.

(b) The Commission shall have authority to require the filing of any other contracts of any carrier, and shall also have authority to exempt any carrier from submitting copies of such minor contracts as the Commission may determine.

INTERLOCKING DIRECTORATES—OFFICIALS DEALING IN SECURITIES

SEC. 212. After sixty days from the enactment of this Act it shall be unlawful for any person to hold the position of officer or director of more than

one carrier subject to this Act, unless such holding shall have been authorized by order of the Commission, upon due showing in form and manner prescribed by the Commission, that neither public nor private interests will be adversely affected thereby. After this section takes effect it shall be unlawful for any officer or director of any such carrier to receive for his own benefit, directly or indirectly, any money or thing of value in respect of negotiation, hypothecation, or sale of any securities issued or to be issued by such carrier, or to share in any of the proceeds thereof, or to participate in the making or paying of any dividends of such carrier from any funds properly included in capital account.

VALUATION OF CARRIER PROPERTY

SEC. 213. (a) The Commission may from time to time, as may be necessary for the proper administration of this Act, and after opportunity for hearing, make a valuation of all or of any part of the property owned or used by any carrier subject to this Act, as of such date as the Commission may fix.

(b) The Commission may at any time require any such carrier to file with the Commission an inventory of all or of any part of the property owned or used by said carrier, which inventory shall show the units of said property classified in such detail, and in such manner, as the Commission shall direct, and shall show the estimated cost of reproduction new of said units, and their reproduction cost new less depreciation, as of such date as the Commission may direct; and such carrier shall file such inventory within such reasonable time as the Commission by order shall require.

(c) The Commission may at any time require any such carrier to file with the Commission a statement showing the original cost at the time of dedication to the public use of all or of any part of the property owned or used by said carrier. For the showing of such original cost said property shall be classified, and the original cost shall be defined, in such manner as the Commission may prescribe; and if any part of such cost cannot be determined from accounting or other records, the portion of the property for which such cost cannot be determined shall be reported to the Commission; and, if the Commission shall so direct, the original cost thereof shall be estimated in such manner as the Commission may prescribe. If the carrier owning the property at the time such original cost is reported shall have paid more or less than the original cost to acquire the same, the amount of such cost of acquisition, and any facts which the Commission may require in connection therewith, shall be reported with such original cost. The report made by a carrier under this paragraph shall show the source or sources from which the original cost reported was obtained, and such other information as to the manner in which the report was prepared, as the Commission shall require.

(d) Nothing shall be included in the original cost reported for the property of any carrier under paragraph (c) of this section on account of any easement, license, or franchise granted by the United States or by any State or political subdivision thereof, beyond the reasonable necessary expense lawfully incurred in obtaining such easement, license, or franchise from the public

authority aforesaid, which expense shall be reported separately from all other costs in such detail as the Commission may require; and nothing shall be included in any valuation of the property of any carrier made by the Commission on account of any such easement, license, or franchise, beyond such reasonable necessary expense lawfully incurred as aforesaid.

(e) The Commission shall keep itself informed of all new construction, extensions, improvements, retirements, or other changes in the condition, quantity, use, and classification of the property of common carriers, and of the cost of all additions and betterments thereto and of all changes in the investment therein, and may keep itself informed of current changes in costs and values of carrier properties.

(f) For the purpose of enabling the Commission to make a valuation of any of the property of any such carrier, or to find the original cost of such property, or to find any other facts concerning the same which are required for use by the Commission, it shall be the duty of each such carrier to furnish to the Commission, within such reasonable time as the Commission may order, any information with respect thereto which the Commission may by order require, including copies of maps, contracts, reports of engineers, and other data, records, and papers, and to grant to all agents of the Commission free access to its property and its accounts, records, and memoranda whenever and wherever requested by any such duly authorized agent, and to cooperate with and aid the Commission in the work of making any such valuation or finding in such manner and to such extent as the Commission may require and direct, and all rules and regulations made by the Commission for the purpose of administering this section shall have the full force and effect of law. Unless otherwise ordered by the Commission, with the reasons therefor, the records and data of the Commission shall be open to the inspection and examination of the public. The Commission, in making any such valuation, shall be free to adopt any method of valuation which shall be lawful.

(g) Notwithstanding any provision of this Act the Interstate Commerce Commission, if requested to do so by the Commission, shall complete, at the earliest practicable date, such valuations of properties of carriers subject to this Act as are now in progress, and shall thereafter transfer to the Commission the records relating thereto.

(h) Nothing in this section shall impair or diminish the powers of any State commission.

EXTENSION OF LINES

SEC. 214. (a) No carrier shall undertake the construction of a new line or of an extension of any line, or shall acquire or operate any line, or extension thereof, or shall engage in transmission over or by means of such additional or extended line, unless and until there shall first have been obtained from the Commission a certificate that the present or future public convenience and necessity require or will require the construction, or operation, or construction and operation, of such additional or extended line: *Provided*, That no such certificate shall be required under this section for the construction, acquisition, operation, or extension of (1) a line within a single State

unless said line constitutes part of an interstate line, (2) local, branch, or terminal lines not exceeding ten miles in length, or (3) any lines acquired under section 221 of this Act: *Provided further*, That the Commission may, upon appropriate request being made, authorize temporary or emergency service, or the supplementing of existing facilities, without regard to the provisions of this section.

(b) Upon receipt of an application for any such certificate the Commission shall cause notice thereof to be given to and a copy filed with the Governor of each State in which such additional or extended line is proposed to be constructed or operated, with the right to be heard as provided with respect to the hearing of complaints; and the Commission may require such published notice as it shall determine.

(c) The Commission shall have power to issue such certificate as prayed for, or to refuse to issue it, or to issue it for a portion or portions of a line, or extension thereof, described in the application, or for the partial exercise only of such right or privilege, and may attach to the issuance of the certificate such terms and conditions as in its judgment the public convenience and necessity may require. After issuance of such certificate, and not before, the carrier may, without securing approval other than such certificate, comply with the terms and conditions contained in or attached to the issuance of such certificate and proceed with the construction, acquisition, operation, or extension covered thereby. Any construction, acquisition, operation, or extension contrary to the provisions of this section may be enjoined by any court of competent jurisdiction at the suit of the United States, the Commission, the State commission, any State affected, or any party in interest.

(d) The Commission may, after full opportunity for hearing, in a proceeding upon complaint or upon its own initiative without complaint, authorize or require by order any carrier, party to such proceeding, to provide itself with adequate facilities for performing its service as a common carrier and to extend its line; but no such authorization or order shall be made unless the Commission finds, as to such extension, that it is reasonably required in the interest of public convenience and necessity, or as to such extension or facilities that the expense involved therein will not impair the ability of the carrier to perform its duty to the public. Any carrier which refuses or neglects to comply with any order of the Commission made in pursuance of this paragraph shall forfeit to the United States $100 for each day during which such refusal or neglect continues.

TRANSACTIONS RELATING TO SERVICES, EQUIPMENT, AND SO FORTH

SEC. 215. (a) The Commission shall examine into transactions entered into by any common carrier which relate to the furnishing of equipment, supplies, research, services, finances, credit, or personnel to such carrier and/or which may affect the charges made or to be made and/or the services rendered or to be rendered by such carrier, in wire or radio communication subject to this Act, and shall report to the Congress whether any such transactions have affected or are likely to affect adversely the ability of the carrier to render adequate service to the public, or may result in any undue or

unreasonable increase in charges or in the maintenance of undue or unreasonable charges for such service; and in order to fully examine into such transactions the Commission shall have access to and the right of inspection and examination of all accounts, records, and memoranda, including all documents, papers, and correspondence now or hereafter existing, of persons furnishing such equipment, supplies, research, services, finances, credit, or personnel. The Commission shall include in its report its recommendations for necessary legislation in connection with such transactions, and shall report specifically whether in its opinion legislation should be enacted (1) authorizing the Commission to declare any such transactions void or to permit such transactions to be carried out subject to such modification of their terms and conditions as the Commission shall deem desirable in the public interest; and/or (2) subjecting such transactions to the approval of the Commission where the person furnishing or seeking to furnish the equipment, supplies, research, services, finances, credit, or personnel is a person directly or indirectly controlling or controlled by, or under direct or indirect common control with, such carrier; and/or (3) authorizing the Commission to require that all or any transactions of carriers involving the furnishing of equipment, supplies, research, services, finances, credit, or personnel to such carrier be upon competitive bids on such terms and conditions and subject to such regulations as it shall prescribe as necessary in the public interest.

(b) The Commission shall investigate the methods by which and the extent to which wire telephone companies are furnishing wire telegraph service and wire telegraph companies are furnishing wire telephone service, and shall report its findings to Congress, together with its recommendations as to whether additional legislation on this subject is desirable.

(c) The Commission shall examine all contracts of common carriers subject to this Act which prevent the other party thereto from dealing with another common carrier subject to this Act, and shall report its findings to Congress, together with its recommendations as to whether additional legislation on this subject is desirable.

APPLICATION OF ACT TO RECEIVERS AND TRUSTEES

SEC. 216. The provisions of this Act shall apply to all receivers and operating trustees of carriers subject to this Act to the same extent that it applies to carriers.

LIABILITY OF CARRIER FOR ACTS AND OMISSIONS OF AGENTS

SEC. 217. In construing and enforcing the provisions of this Act, the act, omission, or failure of any officer, agent, or other person acting for or employed by any common carrier or user, acting within the scope of his employment, shall in every case be also deemed to be the act, omission, or failure of such carrier or user as well as that of the person.

INQUIRIES INTO MANAGEMENT

SEC. 218. The Commission may inquire into the management of the business of all carriers subject to this Act, and shall keep itself informed as

to the manner and method in which the same is conducted and 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. The Commission may obtain from such carriers and from persons directly or indirectly controlling or controlled by, or under direct or indirect common control with, such carriers full and complete information necessary to enable the Commission to perform the duties and carry out the objects for which it was created.

ANNUAL AND OTHER REPORTS

SEC. 219. (a) The Commission is authorized to require annual reports under oath from all carriers subject to this Act, and from persons directly or indirectly controlling or controlled by, or under direct or indirect common control with, any such carrier, to prescribe the manner in which such reports shall be made, and to require from such persons specific answers to all questions upon which the Commission may need information. Such annual reports shall show in detail the amount of capital stock issued, the amount and privileges of each class of stock, the amounts paid therefor, and the manner of payment for the same; the dividends paid and the surplus fund, if any; the number of stockholders (and the names of the thirty largest holders of each class of stock and the amount held by each); the funded and floating debts and the interest paid thereon; the cost and value of the carrier's property, franchises, and equipments; the number of employees and the salaries paid each class; the names of all officers and directors, and the amount of salary, bonus, and all other compensation paid to each; the amounts expended for improvements each year, how expended, and the character of such improvements; the earnings and receipts from each branch of business and from all sources; the operating and other expenses; the balances of profit and loss; and a complete exhibit of the financial operations of the carrier each year, including an annual balance sheet. Such reports shall also contain such information in relation to charges or regulations concerning charges, or agreements, arrangements, or contracts affecting the same, as the Commission may require.

(b) Such reports shall be for such twelve months' period as the Commission shall designate and shall be filed with the Commission at its office in Washington within three months after the close of the year for which the report is made, unless additional time is granted in any case by the Commission; and if any person subject to the provisions of this section shall fail to make and file said annual reports within the time above specified, or within the time extended by the Commission, for making and filing the same, or shall fail to make specific answer to any question authorized by the provisions of this section within thirty days from the time it is lawfully required so to do, such person shall forfeit to the United States the sum of $100 for each and every day it shall continue to be in default with respect thereto. The Commission may by general or special orders require any such carriers to file monthly reports of earnings and expenses and to file periodical and/or special reports concerning any matters with respect to which the Commission

is authorized or required by law to act; and such periodical or special reports shall be under oath whenever the Commission so requires. If any such carrier shall fail to make and file any such periodical or special report within the time fixed by the Commission, it shall be subject to the forfeitures above provided.

ACCOUNTS, RECORDS, AND MEMORANDA; DEPRECIATION CHARGES

SEC. 220. (a) The Commission may, in its discretion, prescribe the forms of any and all accounts, records, and memoranda to be kept by carriers subject to this Act, including the accounts, records, and memoranda of the movement of traffic, as well as of the receipts and expenditures of moneys.

(b) The Commission shall, as soon as practicable, prescribe for such carriers the classes of property for which depreciation charges may be properly included under operating expenses, and the percentages of depreciation which shall be charged with respect to each of such classes of property, classifying the carriers as it may deem proper for this purpose. The Commission may, when it deems necessary, modify the classes and percentages so prescribed. Such carriers shall not, after the Commission has prescribed the clasess[1] of property for which depreciation charges may be included, charge to operating expenses any depreciation charges on classes of property other than those prescribed by the Commission, or, after the Commission has prescribed percentages of depreciation, charge with respect to any class of property a percentage of depreciation other than that prescribed therefor by the Commission. No such carrier shall in any case include in any form under its operating or other expenses any depreciation or other charge or expenditure included elsewhere as a depreciation charge or otherwise under its operating or other expenses.

(c) The Commission shall at all times have access to and the right of inspection and examination of all accounts, records, and memoranda, including all documents, papers, and correspondence now or hereafter existing, and kept or required to be kept by such carriers, and the provisions of this section respecting the preservation and destruction of books, papers, and documents shall apply thereto. The burden of proof to justify every accounting entry questioned by the Commission shall be on the person making, authorizing, or requiring such entry and the Commission may suspend a charge or credit pending submission of proof by such person. Any provision of law prohibiting the disclosure of the contents of messages or communications shall not be deemed to prohibit the disclosure of any matter in accordance with the provisions of this section.

(d) In case of failure or refusal on the part of any such carrier to keep such accounts, records, and memoranda on the books and in the manner prescribed by the Commission, or to submit such accounts, records, memoranda, documents, papers, and correspondence as are kept to the inspection of the Commission or any of its authorized agents, such carrier shall forfeit to the United States the sum of $500 for each day of the continuance of each such offense.

[1] So in original.

(e) Any person who shall willfully make any false entry in the accounts of any book of accounts or in any record or memoranda kept by any such carrier, or who shall willfully destroy, mutilate, alter, or by any other means or device falsify any such account, record, or memoranda, or who shall willfully neglect or fail to make full, true, and correct entries in such accounts, records, or memoranda of all facts and transactions appertaining to the business of the carrier, shall be deemed guilty of a misdemeanor, and shall be subject, upon conviction, to a fine of not less than $1,000 nor more than $5,000 or imprisonment for a term of not less than one year nor more than three years, or both such fine and imprisonment: *Provided*, That the Commission may in its discretion issue orders specifying such operating, accounting, or financial papers, records, books, blanks, or documents which may, after a reasonable time, be destroyed, and prescribing the length of time such books, papers, or documents shall be preserved.

(f) No member, officer, or employee of the Commission shall divulge any fact or information which may come to his knowledge during the course of examination of books or other accounts, as hereinbefore provided, except insofar as he may be directed by the Commission or by a court.

(g) After the Commission has prescribed the forms and manner of keeping of accounts, records, and memoranda to be kept by any person as herein provided, it shall be unlawful for such person to keep any other accounts, records, or memoranda than those so prescribed or such as may be approved by the Commission or to keep the accounts in any other manner than that prescribed or approved by the Commission. Notice of alterations by the Commission in the required manner or form of keeping accounts shall be given to such persons by the Commission at least six months before the same are to take effect.

(h) The Commission may classify carriers subject to this Act and prescribe different requirements under this section for different classes of carriers, and may, if it deems such action consistent with the public interest, except the carriers of any particular class or classes in any State from any of the requirements under this section in cases where such carriers are subject to State commission regulation with respect to matters to which this section relates.

(i) The Commission, before prescribing any requirements as to accounts, records, or memoranda, shall notify each State commission having jurisdiction with respect to any carrier involved, and shall give reasonable opportunity to each such commission to present its views, and shall receive and consider such views and recommendations.

(j) The Commission shall investigate and report to Congress as to the need for legislation to define further or harmonize the powers of the Commission and of State commissions with respect to matters to which this section relates.

SPECIAL PROVISIONS RELATING TO TELEPHONE COMPANIES

SEC. 221. (a) Upon application of one or more telephone companies for authority to consolidate their properties or a part thereof into a single company, or for authority for one or more such companies to acquire the whole

or any part of the property of another telephone company or other telephone companies or the control thereof by the purchase of securities or by lease or in any other like manner, when such consolidated company would be subject to this Act, the Commission shall fix a time and place for a public hearing upon such application and shall thereupon give reasonable notice in writing to the Governor of each of the States in which the physical property affected, or any part thereof, is situated, and to the State commission having jurisdiction over telephone companies, and to such other persons as it may deem advisable. After such public hearing, if the Commission finds that the proposed consolidation, acquisition, or control will be of advantage to the persons to whom service is to be rendered and in the public interest, it shall certify to that effect; and thereupon any Act or Acts of Congress making the proposed transaction unlawful shall not apply. Nothing in this subsection shall be construed as in anywise limiting or restricting the powers of the several States to control and regulate telephone companies.

(b) Nothing in this Act shall be construed to apply, or to give the Commission jurisdiction, with respect to charges, classifications, practices, services, facilities, or regulations for or in connection with wire telephone exchange service, even though a portion of such exchange service constitutes inter-state or foreign communication, in any case where such matters are subject to regulation by a State commission or by local governmental authority.

(c) For the purpose of administering this Act as to carriers engaged in wire telephone communication, the Commission may classify the property of any such carrier used for wire telephone communication, and determine what property of said carrier shall be considered as used in interstate or foreign telephone toll service. Such classification shall be made after hearing, upon notice to the carrier, the State commission (or the Governor, if the State has no State commission) of any State in which the property of said carrier is located, and such other persons as the Commission may prescribe.

(d) In making a valuation of the property of any wire telephone carrier the Commission, after making the classification authorized in this section, may in its discretion value only that part of the property of such carrier determined to be used in interstate or foreign telephone toll service.

TITLE III—SPECIAL PROVISIONS RELATING TO RADIO

LICENSE FOR RADIO COMMUNICATION OR TRANSMISSION OF ENERGY

SECTION 301. It is the purpose of this Act, among other things, to maintain the control of the United States over all the channels of interstate and foreign radio transmission; and to provide for the use of such channels, but not the ownership thereof, by persons for limited periods of time, under licenses granted by Federal authority, and no such license shall be construed to create any right, beyond the terms, conditions, and periods of the license. No person shall use or operate any apparatus for the transmission of energy or communications or signals by radio (a) from one place in any Territory or possession of the United States or in the District of Columbia to another place in the same Territory, possession, or District; or (b) from any State.

Territory, or possession of the United States, or from the District of Columbia to any other State, Territory, or possession of the United States; or (c) from any place in any State, Territory, or possession of the United States, or in the District of Columbia, to any place in any foreign country or to any vessel; or (d) within any State when the effects of such use extend beyond the borders of said State, or when interference is caused by such use or operation with the transmission of such energy, communications, or signals from within said State to any place beyond its borders, or from any place beyond its borders to any place within said State, or with the transmission or reception of such energy, communications, or signals from and/or to places beyond the borders of said State; or (e) upon any vessel or aircraft of the United States; or (f) upon any other mobile stations within the jurisdiction of the United States, except under and in accordance with this Act and with a license in that behalf granted under the provisions of this Act.

ZONES[1]

SEC. 302. (a) For the purposes of this title the United States is divided into five zones, as follows: The first zone shall embrace the States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Delaware, Maryland, and the District of Columbia; the second zone shall embrace the States of Pennsylvania, Virginia, West Virginia, Ohio, Michigan, and Kentucky; the third zone shall embrace the States of North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee, Mississippi, Arkansas, Louisiana, Texas, and Oklahoma; the fourth zone shall embrace the States of Indiana, Illinois, Wisconsin, Minnesota, North Dakota, South Dakota, Iowa, Nebraska, Kansas, and Missouri; and the fifth zone shall embrace the States of Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, and California.

(b) The Virgin Islands, Puerto Rico, Alaska, Guam, American Samoa, and the Territory of Hawaii are expressly excluded from the zones herein established.

GENERAL POWERS OF COMMISSION

SEC. 303. Except as otherwise provided in this Act, the Commission from time to time, as public convenience, interest, or necessity requires, shall—

(a) Classify radio stations;

(b) Prescribe the nature of the service to be rendered by each class of licensed stations and each station within any class;

(c) Assign bands of frequencies to the various classes of stations, and assign frequencies for each individual station and determine the power which each station shall use and the time during which it may operate;

(d) Determine the location of classes of stations or individual stations;

(e) Regulate the kind of apparatus to be used with respect to its external effects and the purity and sharpness of the emissions from each station and from the apparatus therein;

[1] By Act of Congress, June 5, 1936, Sec. 302 was repealed.

(f) Make such regulations not inconsistent with law as it may deem necessary to prevent interference between stations and to carry out the provisions of this Act: *Provided, however*, That changes in the frequencies, authorized power, or in the times of operation of any station, shall not be made without the consent of the station licensee unless, after a public hearing, the Commission shall determine that such changes will promote public convenience or interest or will serve public necessity, or the provisions of this Act will be more fully complied with;

(g) Study new uses for radio, provide for experimental uses of frequencies, and generally encourage the larger and more effective use of radio in the public interest;

(h) Have authority to establish areas or zones to be served by any station;

(i) Have authority to make special regulations applicable to radio stations engaged in chain broadcasting;

(j) Have authority to make general rules and regulations requiring stations to keep such records of programs, transmissions of energy, communications, or signals as it may deem desirable;

(k) Have authority to exclude from the requirements of any regulations in whole or in part any radio station upon railroad rolling stock, or to modify such regulations in its discretion;

(l) Have authority to prescribe the qualifications of station operators, to classify them according to the duties to be performed, to fix the forms of such licenses, and to issue them to such citizens of the United States as the Commission finds qualified;

(m) Have authority to suspend the license of any operator for a period not exceeding two years upon proof sufficient to satisfy the Commission that the licensee (1) has violated any provision of any Act or treaty binding on the United States which the Commission is authorized by this Act to administer or any regulation made by the Commission under any such Act or treaty; or (2) has failed to carry out the lawful orders of the master of the vessel on which he is employed; or (3) has willfully damaged or permitted radio apparatus to be damaged; or (4) has transmitted superfluous radio communications or signals or radio communications containing profane or obscene words or language; or (5) has willfully or maliciously interfered with any other radio communications or signals;

(n) Have authority to inspect all transmitting apparatus to ascertain whether in construction and operation it conforms to the requirements of this Act, the rules and regulations of the Commission, and the license under which it is constructed or operated;

(o) Have authority to designate call letters of all stations;

(p) Have authority to cause to be published such call letters and such other announcements and data as in the judgment of the Commission may be required for the efficient operation of radio stations subject to the jurisdiction of the United States and for the proper enforcement of this Act;

(q) Have authority to require the painting and/or illumination of radio towers if and when in its judgment such towers constitute, or there is a reasonable possibility that they may constitute, a menace to air navigation.

WAIVER BY LICENSEE

SEC. 304. No station license shall be granted by the Commission until the applicant therefor shall have signed a waiver of any claim to the use of any particular frequency or of the ether as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise.

GOVERNMENT-OWNED STATIONS

SEC. 305. (a) Radio stations belonging to and operated by the United States shall not be subject to the provisions of sections 301 and 303 of this Act. All such Government stations shall use such frequencies as shall be assigned to each or to each class by the President. All such stations, except stations on board naval and other Government vessels while at sea or beyond the limits of the continental United States, when transmitting any radio communication or signal other than a communication or signal relating to Government business, shall conform to such rules and regulations designed to prevent interference with other radio stations and the rights of others as the Commission may prescribe.

(b) Radio stations on board vessels of the United States Shipping Board Bureau or the United States Shipping Board Merchant Fleet Corporation or the Inland and Coastwise Waterways Service shall be subject to the provisions of this title.

(c) All stations owned and operated by the United States, except mobile stations of the Army of the United States, and all other stations on land and sea, shall have special call letters designated by the Commission.

FOREIGN SHIPS

SEC. 306. Section 301 of this Act shall not apply to any person sending radio communications or signals on a foreign ship while the same is within the jurisdiction of the United States, but such communications or signals shall be transmitted only in accordance with such regulations designed to prevent interference as may be promulgated under the authority of this Act.

ALLOCATION OF FACILITIES; TERM OF LICENSES

SEC. 307. (a) The Commission, if public convenience, interest, or necessity will be served thereby, subject to the limitations of this Act, shall grant to any applicant therefor a station license provided for by this Act.

(b)[1] It is hereby declared that the people of all the zones established by this title are entitled to equality of radio broadcasting service, both of transmission and of reception, and in order to provide said equality the Commission shall as nearly as possible make and maintain an equal alloca-

[1] By Act of Congress, June 5, 1936, subsection (b) of Section 307 was amended to read as follows: "(b) In considering applications for licenses, and modifications and renewals thereof, when and insofar as there is demand for the same, the Commission shall make such distribution of licenses, frequencies, hours of operation, and of power among the several States and communities as to provide a fair, efficient, and equitable distribution of radio service to each of the same."

tion of broadcasting licenses, of bands of frequency, of periods of time for operation, and of station power, to each of said zones when and insofar as there are applications therefor; and shall make a fair and equitable allocation of licenses, frequencies, time for operation, and station power to each of the States and the District of Columbia, within each zone, according to population. The Commission shall carry into effect the equality of broadcasting service hereinbefore directed, whenever necessary or proper, by granting or refusing licenses or renewals of licenses, by changing periods of time for operation, and by increasing or decreasing station power, when applications are made for licenses or renewals of licenses: *Provided*, That if and when there is a lack of applications from any zone for the proportionate share of licenses, frequencies, time of operation, or station power to which such zone is entitled, the Commission may issue licenses for the balance of the proportion not applied for from any zone, to applicants from other zones for a temporary period of ninety days each, and shall specifically designate that said apportionment is only for said temporary period. Allocations shall be charged to the State or District wherein the studio of the station is located and not where the transmitter is located: *Provided further*, That the Commission may also grant applications for additional licenses for stations not exceeding one hundred watts of power if the Commission finds that such stations will serve the public convenience, interest, or necessity, and that their operation will not interfere with the fair and efficient radio service of stations licensed under the provisions of this section.

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

(d) No license granted for the operation of a broadcasting station shall be for a longer term than three years and no license so granted for any other class of station shall be for a longer term than five years, and any license granted may be revoked as hereinafter provided. Upon the expiration of any license, upon application therefor, a renewal of such license may be granted from time to time for a term of not to exceed three years in the case of broadcasting licenses and not to exceed five years in the case of other licenses, but action of the Commission with reference to the granting of such application for the renewal of a license shall be limited to and governed by the same considerations and practice which affect the granting of original applications.

(e) No renewal of an existing station license shall be granted more than thirty days prior to the expiration of the original license.

APPLICATIONS FOR LICENSES; CONDITIONS IN LICENSE FOR FOREIGN COMMUNICATION

SEC. 308. (a) The Commission may grant licenses, renewal of licenses, and modification of licenses only upon written application therefor received by it: *Provided, however*, That in cases of emergency found by the Commission, licenses, renewals of licenses, and modifications of licenses, for

stations on vessels or aircraft of the United States, may be issued under such conditions as the Commission may impose, without such formal application. Such licenses, however, shall in no case be for a longer term than three months: *Provided further*, That the Commission may issue by cable, telegraph, or radio a permit for the operation of a station on a vessel of the United States at sea, effective in lieu of a license until said vessel shall return to a port of the continental United States.

(b) All such applications shall set forth such facts as the Commission by regulation may prescribe as to the citizenship, character, and financial, technical, and other qualifications of the applicant to operate the station; the ownership and location of the proposed station and of the stations, if any, with which it is proposed to communicate; the frequencies and the power desired to be used; the hours of the day or other periods of time during which it is proposed to operate the station; the purposes for which the station is to be used; and such other information as it may require. The Commission, at any time after the filing of such original application and during the term of any such license, may require from an applicant or licensee further written statements of fact to enable it to determine whether such original application should be granted or denied or such license revoked. Such application and/or such statement of fact shall be signed by the applicant and/or licensee under oath or affirmation.

(c) The Commission in granting any license for a station intended or used for commercial communication between the United States or any Territory or possession, continental or insular, subject to the jurisdiction of the United States, and any foreign country, may impose any terms, conditions, or restrictions authorized to be imposed with respect to submarine-cable licenses by section 2 of an Act entitled "An Act relating to the landing and the operation of submarine cables in the United States," approved May 24, 1921.

HEARINGS ON APPLICATIONS FOR LICENSES; FORM OF LICENSES; CONDITIONS ATTACHED TO LICENSES

SEC. 309. (a) If upon examination of any application for a station license or for the renewal or modification of a station license the Commission shall determine that public interest, convenience, or necessity would be served by the granting thereof, it shall authorize the issuance, renewal, or modification thereof in accordance with said finding. In the event the Commission upon examination of any such application does not reach such decision with respect thereto, it shall notify the applicant thereof, shall fix and give notice of a time and place for hearing thereon, and shall afford such applicant an opportunity to be heard under such rules and regulations as it may prescribe.

(b) Such station licenses as the Commission may grant shall be in such general form as it may prescribe, but each license shall contain, in addition to other provisions, a statement of the following conditions to which such license shall be subject:

(1) The station license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license

beyond the term thereof nor in any other manner than authorized therein.

(2) Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of this Act.

(3) Every license issued under this Act shall be subject in terms to the right of use or control conferred by section 606 hereof.

LIMITATION ON HOLDING AND TRANSFER OF LICENSES

SEC. 310. (a) The station license required hereby shall not be granted to or held by—

(1) Any alien or the representative of any alien;

(2) Any foreign government or the representative thereof;

(3) Any corporation organized under the laws of any foreign government;

(4) Any corporation of which any officer or director is an alien or of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof, or by any corporation organized under the laws of a foreign country;

(5) Any corporation directly or indirectly controlled by any other corporation of which any officer or more than one-fourth of the directors are aliens, or of which more than one-fourth of the capital stock is owned of record or voted, after June 1, 1935, by aliens, their representatives, or by a foreign government or representative thereof, or by any corporation organized under the laws of a foreign country, if the Commission finds that the public interest will be served by the refusal or the revocation of such license.

Nothing in this subsection shall prevent the licensing of radio apparatus on board any vessel, aircraft, or other mobile station of the United States when the installation and use of such apparatus is required by Act of Congress or any treaty to which the United States is a party.

(b) The station license required hereby, the frequencies authorized to be used by the licensee, and the rights therein granted shall not be transferred, assigned, or in any manner either voluntarily or involuntarily disposed of, or indirectly by transfer of control of any corporation holding such license, to any person, unless the Commission shall, after securing full information, decide that said transfer is in the public interest, and shall give its consent in writing.

REFUSAL OF LICENSES AND PERMITS IN CERTAIN CASES

SEC. 311. The Commission is hereby directed to refuse a station license and/or the permit hereinafter required for the construction of a station to any person (or to any person directly or indirectly controlled by such person) whose license has been revoked by a court under section 313, and is hereby authorized to refuse such station license and/or permit to any other person (or to any person directly or indirectly controlled by such person) which has been finally adjudged guilty by a Federal court of unlawfully monopolizing or attempting unlawfully to monopolize, radio communication, directly or indirectly, through the control of the manufacture or sale of radio apparatus, through exclusive traffic arrangements, or by any other means,

or to have been using unfair methods of competition. The granting of a license shall not estop the United States or any person aggrieved from proceeding against such person for violating the law against unfair methods of competition or for a violation of the law against unlawful restraints and monopolies and/or combinations, contracts, or agreements in restraint of trade, or from instituting proceedings for the dissolution of such corporation.

REVOCATION OF LICENSES

SEC. 312. (a) Any station license may be revoked for false statements either in the application or in the statement of fact which may be required by section 308 hereof, or because of conditions revealed by such statements of fact as may be required from time to time which would warrant the Commission in refusing to grant a license on an original application, or for failure to operate substantially as set forth in the license, or for violation of or failure to observe any of the restrictions and conditions of this Act or of any regulation of the Commission authorized by this Act or by a treaty ratified by the United States: *Provided, however*, That no such order of revocation shall take effect until fifteen days' notice in writing thereof, stating the cause for the proposed revocation, has been given to the licensee. Such licensee may make written application to the Commission at any time within said fifteen days for a hearing upon such order, and upon the filing of such written application said order of revocation shall stand suspended until the conclusion of the hearing conducted under such rules as the Commission may prescribe. Upon the conclusion of said hearing the Commission may affirm, modify, or revoke said order of revocation.

(b) Any station license hereafter granted under the provisions of this Act or the construction permit required hereby and hereafter issued, may be modified by the Commission either for a limited time or for the duration of the term thereof, if in the judgment of the Commission such action will promote the public interest, convenience, and necessity, or the provisions of this Act or of any treaty ratified by the United States will be more fully complied with: *Provided, however*, That no such order of modification shall become final until the holder of such outstanding license or permit shall have been notified in writing of the proposed action and the grounds or reasons therefor and shall have been given reasonable opportunity to show cause why such an order of modification should not issue.

APPLICATION OF ANTITRUST LAWS

SEC. 313. All laws of the United States relating to unlawful restraints and monopolies and to combinations, contracts, or agreements in restraint of trade are hereby declared to be applicable to the manufacture and sale of and to trade in radio apparatus and devices entering into or affecting interstate or foreign commerce and to interstate or foreign radio communications. Whenever in any suit, action, or proceeding, civil or criminal, brought under the provisions of any of said laws or in any proceedings brought to enforce or to review findings and orders of the Federal Trade Commission or other governmental agency in respect of any matters as to which said Commission or other governmental agency is by law authorized to act, any licensee shall

be found guilty of the violation of the provisions of such laws or any of them, the court, in addition to the penalties imposed by said laws, may adjudge, order, and/or decree that the license of such licensee shall, as of the date the decree or judgment becomes finally effective or as of such other date as the said decree shall fix, be revoked and that all rights under such license shall thereupon cease: *Provided, however,* That such licensee shall have the same right of appeal or review as is provided by law in respect of other decrees and judgments of said court.

PRESERVATION OF COMPETITION IN COMMERCE

SEC. 314. After the effective date of this Act no person engaged directly, or indirectly through any person directly or indirectly controlling or controlled by, or under direct or indirect common control with, such person, or through an agent, or otherwise, in the business of transmitting and/or receiving for hire energy, communications, or signals by radio in accordance with the terms of the license issued under this Act, shall by purchase, lease, construction, or otherwise, directly or indirectly, acquire, own, control, or operate any cable or wire telegraph or telephone line or system between any place in any State, Territory, or possession of the United States or in the District of Columbia, and any place in any foreign country, or shall acquire, own, or control any part of the stock or other capital share or any interest in the physical property and/or other assets of any such cable, wire, telegraph, or telephone line or system, if in either case the purpose is and/or the effect thereof may be to substantially lessen competition or to restrain commerce between any place in any State, Territory, or possession of the United States, or in the District of Columbia, and any place in any foreign country, or unlawfully to create monopoly in any line of commerce; nor shall any person engaged directly, or indirectly through any person directly or indirectly controlling or controlled by, or under direct or indirect common control with, such person, or through an agent, or otherwise, in the business of transmitting and/or receiving for hire messages by any cable, wire, telegraph, or telephone line or system (a) between any place in any State, Territory, or possession of the United States, or in the District of Columbia, and any place in any other State, Territory, or possession of the United States; or (b) between any place in any State, Territory, or possession of the United States, or the District of Columbia, and any place in any foreign country, by purchase, lease, construction, or otherwise, directly or indirectly acquire, own, control, or operate any station or the apparatus therein, or any system for transmitting and/or receiving radio communications or signals between any place in any State, Territory, or possession of the United States, or in the District of Columbia, and any place in any foreign country, or shall acquire, own, or control any part of the stock or other capital share or any interest in the physical property and/or other assets of any such radio station, apparatus, or system, if in either case the purpose is and/or the effect thereof may be to substantially lessen competition or to restrain commerce between any place in any State, Territory, or possession of the United States, or in the District of Columbia, and any place in any foreign country, or unlawfully to create monopoly in any line of commerce.

FACILITIES FOR CANDIDATES FOR PUBLIC OFFICE

SEC. 315. If any licensee shall permit any person who is a legally qualified candidate for any public office to use a broadcasting station, he shall afford equal opportunities to all other such candidates for that office in the use of such broadcasting station, and the Commission shall make rules and regulations to carry this provision into effect: *Provided*, That such licensee shall have no power of censorship over the material broadcast under the provisions of this section. No obligation is hereby imposed upon any licensee to allow the use of its station by any such candidate.

LOTTERIES AND OTHER SIMILAR SCHEMES

SEC. 316. No person shall broadcast by means of any radio station for which a license is required by any law of the United States, and no person operating any such station shall knowingly permit the broadcasting of, any advertisement of or information concerning any lottery, gift enterprise, or similar scheme, offering prizes dependent in whole or in part upon lot or chance, or any list of the prizes drawn or awarded by means of any such lottery, gift enterprise, or scheme, whether said list contains any part or all of such prizes. Any person violating any provision of this section shall, upon conviction thereof, be fined not more than $1,000 or imprisoned not more than one year, or both, for each and every day during which such offense occurs.

ANNOUNCEMENT THAT MATTER IS PAID FOR

SEC. 317. All matter broadcast by any radio station for which service, money, or any other valuable consideration is directly or indirectly paid, or promised to or charged or accepted by, the station so broadcasting, from any person, shall, at the time the same is so broadcast, be announced as paid for or furnished, as the case may be, by such person.

OPERATION OF TRANSMITTING APPARATUS

SEC. 318. The actual operation of all transmitting apparatus in any radio station for which a station license is required by this Act shall be carried on only by a person holding an operator's license issued hereunder. No person shall operate any such apparatus in such station except under and in accordance with an operator's license issued to him by the Commission.

CONSTRUCTION PERMITS

SEC. 319. (a) No license shall be issued under the authority of this Act for the operation of any station the construction of which is begun or is continued after this Act takes effect, unless a permit for its construction has been granted by the Commission upon written application therefor. The Commission may grant such permit if public convenience, interest, or necessity will be served by the construction of the station. This application shall set forth such facts as the Commission by regulation may prescribe as to the citizenship, character, and the financial, technical, and other ability of the applicant to construct and operate the station, the ownership and

location of the proposed station and of the station or stations with which it is proposed to communicate, the frequencies desired to be used, the hours of the day or other periods of time during which it is proposed to operate the station, the purpose for which the station is to be used, the type of transmitting apparatus to be used, the power to be used, the date upon which the station is expected to be completed and in operation, and such other information as the Commission may require. Such application shall be signed by the applicant under oath or affirmation.

(b) Such permit for construction shall show specifically the earliest and latest dates between which the actual operation of such station is expected to begin, and shall provide that said permit will be automatically forfeited if the station is not ready for operation within the time specified or within such further time as the Commission may allow, unless prevented by causes not under the control of the grantee. The rights under any such permit shall not be assigned or otherwise transferred to any person without the approval of the Commission. A permit for construction shall not be required for Government stations, amateur stations, or stations upon mobile vessels, railroad rolling stock, or aircraft. Upon the completion of any station for the construction or continued construction of which a permit has been granted, and upon it being made to appear to the Commission that all the terms, conditions, and obligations set forth in the application and permit have been fully met, and that no cause or circumstance arising or first coming to the knowledge of the Commission since the granting of the permit would, in the judgment of the Commission, make the operation of such station against the public interest, the Commission shall issue a license to the lawful holder of said permit for the operation of said station. Said license shall conform generally to the terms of said permit.

DESIGNATION OF STATIONS LIABLE TO INTERFERE WITH DISTRESS SIGNALS

SEC. 320. The Commission is authorized to designate from time to time radio stations the communications or signals of which, in its opinion, are liable to interfere with the transmission or reception of distress signals of ships. Such stations are required to keep a licensed radio operator listening in on the frequencies designated for signals of distress and radio communications relating thereto during the entire period the transmitter of such station is in operation.

DISTRESS SIGNALS AND COMMUNICATIONS

SEC. 321. (a) Every radio station on shipboard shall be equipped to transmit radio communications or signals of distress on the frequency specified by the Commission, with apparatus capable of transmitting and receiving messages over a distance of at least one hundred miles by day or night. When sending radio communications or signals of distress and radio communications relating thereto the transmitting set may be adjusted in such a manner as to produce a maximum of radiation irrespective of the amount of interference which may thus be caused.

(b) All radio stations, including Government stations and stations on board foreign vessels when within the territorial waters of the United States,

shall give absolute priority to radio communications or signals relating to ships in distress; shall cease all sending on frequencies which will interfere with hearing a radio communication or signal of distress, and, except when engaged in answering or aiding the ship in distress, shall refrain from sending any radio communications or signals until there is assurance that no interference will be caused with the radio communications or signals relating thereto, and shall assist the vessel in distress, so far as possible, by complying with its instructions.

INTERCOMMUNICATION IN MOBILE SERVICE

SEC. 322. Every land station open to general public service between the coast and vessels at sea shall be bound to exchange radio communications or signals with any ship station without distinction as to radio systems or instruments adopted by such stations, respectively, and each station on shipboard shall be bound to exchange radio communications or signals with any other station on shipboard without distinction as to radio systems or instruments adopted by each station.

INTERFERENCE BETWEEN GOVERNMENT AND COMMERCIAL STATIONS

SEC. 323. (a) At all places where Government and private or commercial radio stations on land operate in such close proximity that interference with the work of Government stations cannot be avoided when they are operating simultaneously, such private or commercial stations as do interfere with the transmission or reception of radio communications or signals by the Government stations concerned shall not use their transmitters during the first fifteen minutes of each hour, local standard time.

(b) The Government stations for which the above-mentioned division of time is established shall transmit radio communications or signals only during the first fifteen minutes of each hour, local standard time, except in case of signals or radio communications relating to vessels in distress and vessel requests for information as to course, location, or compass direction.

USE OF MINIMUM POWER

SEC. 324. (a) In all circumstances, except in case of radio communications or signals relating to vessels in distress, all radio stations, including those owned and operated by the United States, shall use the minimum amount of power necessary to carry out the communication desired.

FALSE DISTRESS SIGNALS; REBROADCASTING; STUDIOS OF FOREIGN STATIONS

SEC. 325. (a) No person within the jurisdiction of the United States shall knowingly utter or transmit, or cause to be uttered or transmitted, any false or fraudulent signal of distress, or communication relating thereto, nor shall any broadcasting station rebroadcast the program or any part thereof of another broadcasting station without the express authority of the originating station.

(b) No person shall be permitted to locate, use, or maintain a radio broadcast studio or other place or apparatus from which or whereby sound waves are converted into electrical energy, or mechanical or physical

reproduction of sound waves produced, and caused to be transmitted or delivered to a radio station in a foreign country for the purpose of being broadcast from any radio station there having a power output of sufficient intensity and/or being so located geographically that its emissions may be received consistently in the United States, without first obtaining a permit from the Commission upon proper application therefor.

(c) Such application shall contain such information as the Commission may by regulation prescribe, and the granting or refusal thereof shall be subject to the requirements of section 309 hereof with respect to applications for station licenses or renewal or modification thereof, and the license or permission so granted shall be revocable for false statements in the application so required or when the Commission, after hearings, shall find its continuation no longer in the public interest.

CENSORSHIP; INDECENT LANGUAGE

SEC. 326. Nothing in this Act shall be understood or construed to give the Commission the power of censorship over the radio communications or signals transmitted by any radio station, and no regulation or condition shall be promulgated or fixed by the Commission which shall interfere with the right of free speech by means of radio communication. No person within the jurisdiction of the United States shall utter any obscene, indecent, or profane language by means of radio communication.

USE OF NAVAL STATIONS FOR COMMERCIAL MESSAGES

SEC. 327. The Secretary of the Navy is hereby authorized, unless restrained by international agreement, under the terms and conditions and at rates prescribed by him, which rates shall be just and reasonable, and which, upon complaint, shall be subject to review and revision by the Commission, to use all radio stations and apparatus, wherever located, owned by the United States and under the control of the Navy Department, (a) for the reception and transmission of press messages offered by any newspaper published in the United States, its Territories or possessions, or published by citizens of the United States in foreign countries, or by any press association of the United States, and (b) for the reception and transmission of private commercial messages between ships, between ship and shore, between localities in Alaska and between Alaska and the continental United States: *Provided*, That the rates fixed for the reception and transmission of all such messages, other than press messages between the Pacific coast of the United States, Hawaii, Alaska, Guam, American Samoa, the Philippine Islands, and the Orient, and between the United States and the Virgin Islands, shall not be less than the rates charged by privately owned and operated stations for like messages and service: *Provided further*, That the right to use such stations for any of the purposes named in this section shall terminate and cease as between any countries or localities or between any locality and privately operated ships whenever privately owned and operated stations are capable of meeting the normal communication requirements between such countries or localities or between any locality and privately

operated ships, and the Commission shall have notified the Secretary of the Navy thereof.

SPECIAL PROVISION AS TO PHILIPPINE ISLANDS AND CANAL ZONE

SEC. 328. This title shall not apply to the Philippine Islands or to the Canal Zone. In international radio matters the Philippine Islands and the Canal Zone shall be represented by the Secretary of State.

ADMINISTRATION OF RADIO LAWS IN TERRITORIES AND POSSESSIONS

SEC. 329. The Commission is authorized to designate any officer or employee of any other department of the Government on duty in any Territory or possession of the United States other than the Philippine Islands and the Canal Zone, to render therein such services in connection with the administration of the radio laws of the United States as the Commission may prescribe: *Provided*, That such designation shall be approved by the head of the department in which such person is employed.

TITLE IV—PROCEDURAL AND ADMINISTRATIVE PROVISIONS

JURISDICTION TO ENFORCE ACT AND ORDERS OF COMMISSION

SECTION 401. (a) The district courts of the United States shall have jurisdiction, upon application of the Attorney General of the United States at the request of the Commission, alleging a failure to comply with or a violation of any of the provisions of this Act by any person, to issue a writ or writs of mandamus commanding such person to comply with the provisions of this Act.

(b) If any person fails or neglects to obey any order of the Commission other than for the payment of money, while the same is in effect, the Commission or any party injured thereby, or the United States, by its Attorney General, may apply to the appropriate district court of the United States for the enforcement of such order. If, after hearing, that court determines that the order was regularly made and duly served, and that the person is in disobedience of the same, the court shall enforce obedience to such order by a writ of injunction or other proper process, mandatory or otherwise, to restrain such person or the officers, agents, or representatives of such person, from further disobedience of such order, or to enjoin upon it or them obedience to the same.

(c) Upon the request of the Commission it shall be the duty of any district attorney of the United States to whom the Commission may apply to institute in the proper court and to prosecute under the direction of the Attorney General of the United States all necessary proceedings for the enforcement of the provisions of this Act and for the punishment of all violations thereof, and the costs and expenses of such prosecutions shall be paid out of the appropriations for the expenses of the courts of the United States.

(d) The provisions of the Expediting Act, approved February 11, 1903, as amended, and of section 238 (1) of the Judicial Code, as amended, shall

be held to apply to any suit in equity arising under Title II of this Act, wherein the United States is complainant.

PROCEEDINGS TO ENFORCE OR SET ASIDE THE COMMISSION'S ORDERS—APPEAL IN CERTAIN CASES

SEC. 402. (a) The provisions of the Act of October 22, 1913 (38 Stat. 219), relating to the enforcing or setting aside of the orders of the Interstate Commerce Commission, are hereby made applicable to suits to enforce, enjoin, set aside, annul, or suspend any order of the Commission under this Act (except any order of the Commission granting or refusing an application for a construction permit for a radio station, or for a radio station license, or for renewal of an existing radio station license, or for modification of an existing radio station license), and such suits are hereby authorized to be brought as provided in that Act.

(b) An appeal may be taken, in the manner hereinafter provided, from decisions of the Commission to the Court of Appeals of the District of Columbia in any of the following cases:

(1) By any applicant for a construction permit for a radio station, or for a radio station license, or for renewal of an existing radio station license, or for modification of an existing radio station license, whose application is refused by the Commission.

(2) By any other person aggrieved or whose interests are adversely affected by any decision of the Commission granting or refusing any such application.

(c) Such appeal shall be taken by filing with said court within twenty days after the decision complained of is effective, notice in writing of said appeal and a statement of the reasons therefor, together with proof of service of a true copy of said notice and statement upon the Commission. Unless a later date is specified by the Commission as part of its decision, the decision complained of shall be considered to be effective as of the date on which public announcement of the decision is made at the office of the Commission in the city of Washington. The Commission shall thereupon immediately, and in any event not later than five days from the date of such service upon it, mail or otherwise deliver a copy of said notice of appeal to each person shown by the records of the Commission to be interested in such appeal and to have a right to intervene therein under the provisions of this section, and shall at all times thereafter permit any such person to inspect and make copies of the appellant's statement of reasons for said appeal at the office of the Commission in the city of Washington. Within thirty days after the filing of said appeal the Commission shall file with the court the originals or certified copies of all papers and evidence presented to it upon the application involved, and also a like copy of its decision thereon, and shall within thirty days thereafter file a full statement in writing of the facts and grounds for its decision as found and given by it, and a list of all interested persons to whom it has mailed or otherwise delivered a copy of said notice of appeal.

(d) Within thirty days after the filing of said appeal any interested person may intervene and participate in the proceedings had upon said appeal by

filing with the court a notice of intention to intervene and a verified statement showing the nature of the interest of such party, together with proof of service of true copies of said notice and statement, both upon appellant and upon the Commission. Any person who would be aggrieved or whose interests would be adversely affected by a reversal or modification of the decision of the Commission complained of shall be considered an interested party.

(e) At the earliest convenient time the court shall hear and determine the appeal upon the record before it, and shall have power, upon such record, to enter a judgment affirming or reversing the decision of the Commission, and in event the court shall render a decision and enter an order reversing the decision of the Commission, it shall remand the case to the Commission to carry out the judgment of the court: *Provided, however*, That the review by the court shall be limited to questions of law and that findings of fact by the Commission, if supported by substantial evidence, shall be conclusive unless it shall clearly appear that the findings of the Commission are arbitrary or capricious. The court's judgment shall be final, subject, however, to review by the Supreme Court of the United States upon writ of certiorari on petition therefor under section 240 of the Judicial Code, as amended, by appellant, by the Commission, or by any interested party intervening in the appeal.

(f) The court may, in its discretion, enter judgment for costs in favor of or against an appellant, and/or other interested parties intervening in said appeal, but not against the Commission, depending upon the nature of the issues involved upon said appeal and the outcome thereof.

INQUIRY BY COMMISSION ON ITS OWN MOTION

SEC. 403. The Commission shall have full authority and power at any time to institute an inquiry, on its own motion, in any case and as to any matter or thing concerning which complaint is authorized to be made, to or before the Commission by any provision of this Act, or concerning which any question may arise under any of the provisions of this Act, or relating to the enforcement of any of the provisions of this Act. The Commission shall have the same powers and authority to proceed with any inquiry instituted on its own motion as though it had been appealed to by complaint or petition under any of the provisions of this Act, including the power to make and enforce any order or orders in the case, or relating to the matter or thing concerning which the inquiry is had, excepting orders for the payment of money.

REPORTS OF INVESTIGATIONS

SEC. 404. Whenever an investigation shall be made by the Commission it shall be its duty to make a report in writing in respect thereto, which shall state the conclusions of the Commission, together with its decision, order, or requirement in the premises; and in case damages are awarded such report shall include the findings of fact on which the award is made.

REHEARING BEFORE COMMISSION

SEC. 405. After a decision, order, or requirement has been made by the Commission in any proceeding, any party thereto may at any time make application for rehearing of the same, or any matter determined therein, and it shall be lawful for the Commission in its discretion to grant such a rehearing if sufficient reason therefor be made to appear: *Provided, however,* That in the case of a decision, order, or requirement made under Title III, the time within which application for rehearing may be made shall be limited to twenty days after the effective date thereof, and such application may be made by any party or any person aggrieved or whose interests are adversely affected thereby. Applications for rehearing shall be governed by such general rules as the Commission may establish. No such application shall excuse any person from complying with or obeying any decision, order, or requirement of the Commission, or operate in any manner to stay or postpone the enforcement thereof, without the special order of the Commission. In case a rehearing is granted, the proceedings thereupon shall conform as nearly as may be to the proceedings in an original hearing, except as the Commission may otherwise direct; and if, in its judgment, after such rehearing and the consideration of all facts, including those arising since the former hearing, it shall appear that the original decision, order, or requirement is in any respect unjust or unwarranted, the Commission may reverse, change, or modify the same accordingly. Any decision, order, or requirement made after such rehearing, reversing, changing, or modifying the original determination, shall be subject to the same provisions as an original order.

MANDAMUS TO COMPEL FURNISHING OF FACILITIES

SEC. 406. The district courts of the United States shall have jurisdiction upon the relation of any person alleging any violation, by a carrier subject to this Act, of any of the provisions of this Act which prevent the relator from receiving service in interstate or foreign communication by wire or radio, or in interstate or foreign transmission of energy by radio, from said carrier at the same charges, or upon terms or conditions as favorable as those given by said carrier for like communication or transmission under similar conditions to any other person, to issue a writ or writs of mandamus against said carrier commanding such carrier to furnish facilities for such communication or transmission to the party applying for the writ: *Provided,* That if any question of fact as to the proper compensation to the carrier for the service to be enforced by the writ is raised by the pleadings, the writ of peremptory mandamus may issue, notwithstanding such question of fact is undetermined, upon such terms as to security, payment of money into the court, or otherwise, as the court may think proper pending the determination of the question of fact: *Provided further,* That the remedy hereby given by writ of mandamus shall be cumulative and shall not be held to exclude or interfere with other remedies provided by this Act.

PETITION FOR ENFORCEMENT OF ORDER FOR PAYMENT OF MONEY

SEC. 407. If a carrier does not comply with an order for the payment of money within the time limit in such order, the complainant, or any person

for whose benefit such order was made, may file in the district court of the United States for the district in which he resides or in which is located the principal operating office of the carrier, or through which the line of the carrier runs, or in any State court of general jurisdiction having jurisdiction of the parties, a petition setting forth briefly the causes for which he claims damages, and the order of the Commission in the premises. Such suit in the district court of the United States shall proceed in all respects like other civil suits for damages, except that on the trial of such suits the findings and order of the Commission shall be prima facie evidence of the facts therein stated, except that the petitioner shall not be liable for costs in the district court nor for costs at any subsequent stage of the proceedings unless they accrue upon his appeal. If the petitioner shall finally prevail, he shall be allowed a reasonable attorney's fee, to be taxed and collected as a part of the costs of the suit.

ORDERS NOT FOR PAYMENT OF MONEY—WHEN EFFECTIVE

SEC. 408. Except as otherwise provided in this Act, all orders of the Commission, other than orders for the payment of money, shall take effect within such reasonable time, not less than thirty days after service of the order, and shall continue in force until its further order, or for a specified period of time, according as shall be prescribed in the order, unless the same shall be suspended or modified or set aside by the Commission, or be suspended or set aside by a court of competent jurisdiction.

GENERAL PROVISIONS RELATING TO PROCEEDINGS—WITNESSES AND DEPOSITIONS

SEC. 409. (a) Any member or examiner of the Commission, or the director of any division, when duly designated by the Commission for such purpose, may hold hearings, sign and issue subpenas, administer oaths, examine witnesses, and receive evidence at any place in the United States designated by the Commission; except that in the administration of Title III an examiner may not be authorized to exercise such powers with respect to a matter involving (1) a change of policy by the Commission, (2) the revocation of a station license, (3) new devices or developments in radio, or (4) a new kind of use of frequencies. In all cases heard by an examiner the Commission shall hear oral arguments on request of either party.

(b) For the purposes of this Act the Commission shall have the power to require by subpena the attendance and testimony of witnesses and the production of all books, papers, schedules of charges, contracts, agreements, and documents relating to any matter under investigation. Witnesses summoned before the Commission shall be paid the same fees and mileage that are paid witnesses in the courts of the United States.

(c) Such attendance of witnesses, and the production of such documentary evidence, may be required from any place in the United States, at any designated place of hearing. And in case of disobedience to a subpena the Commission, or any party to a proceeding before the Commission, may invoke the aid of any court of the United States in requiring the attendance

and testimony of witnesses and the production of books, papers, and documents under the provisions of this section.

(d) Any of the district courts of the United States within the jurisdiction of which such inquiry is carried on may, in case of contumacy or refusal to obey a subpena issued to any common carrier or licensee or other person, issue an order requiring such common carrier, licensee, or other person to appear before the Commission (and produce books and papers if so ordered) and give evidence touching the matter in question; and any failure to obey such order of the court may be punished by such court as a contempt thereof.

(e) The testimony of any witness may be taken, at the instance of a party, in any proceeding or investigation pending before the Commission, by deposition, at any time after a cause or proceeding is at issue on petition and answer. The Commission may also order testimony to be taken by deposition in any proceeding or investigation pending before it, at any stage of such proceeding or investigation. Such depositions may be taken before any judge of any court of the United States, or any United States commissioner, or any clerk of a district court, or any chancellor, justice, or judge of a supreme or superior court, mayor, or chief magistrate of a city, judge of a county court, or court of common pleas of any of the United States, or any notary public, not being of counsel or attorney to either of the parties, nor interested in the event of the proceeding or investigation. Reasonable notice must first be given in writing by the party or his attorney proposing to take such deposition to the opposite party or his attorney of record, as either may be nearest, which notice shall state the name of the witness and the time and place of the taking of his deposition. Any person may be compelled to appear and depose, and to produce documentary evidence, in the same manner as witnesses may be compelled to appear and testify and produce documentary evidence before the Commission, as hereinbefore provided.

(f) Every person deposing as herein provided shall be cautioned and sworn (or affirm, if he so request) to testify the whole truth, and shall be carefully examined. His testimony shall be reduced to writing by the magistrate taking the deposition, or under his direction, and shall, after it has been reduced to writing, be subscribed by the deponent.

(g) If a witness whose testimony may be desired to be taken by deposition be in a foreign country, the deposition may be taken before an officer or person designated by the Commission, or agreed upon by the parties by stipulation in writing to be filed with the Commission. All depositions must be promptly filed with the Commission.

(h) Witnesses whose depositions are taken as authorized in this Act, and the magistrate or other officer taking the same, shall severally be entitled to the same fees as are paid for like services in the courts of the United States.

(i) No person shall be excused from attending and testifying or from producing books, papers, schedules of charges, contracts, agreements, and documents before the Commission, or in obedience to the subpena of the Commission, whether such subpena be signed or issued by one or more

commissioners, or in any cause or proceeding, criminal or otherwise, based upon or growing out of any alleged violation of this Act, or of any amendments thereto, on the ground or for the reason that the testimony or evidence, documentary or otherwise, required of him may tend to incriminate him or subject him to a penalty or forfeiture; but no individual shall be prosecuted or subjected to any penalty or forfeiture for or on account of any transaction, matter, or thing concerning which he is compelled, after having claimed his privilege against self-incrimination, to testify or produce evidence, documentary or otherwise, except that any individual so testifying shall not be exempt from prosecution and punishment for perjury committed in so testifying.

(j) Any person who shall neglect or refuse to attend and testify, or to answer any lawful inquiry, or to produce books, papers, schedules of charges, contracts, agreements, and documents, if in his power to do so, in obedience to the subpena or lawful requirement of the Commission, shall be guilty of a misdemeanor and upon conviction thereof by a court of competent jurisdiction shall be punished by a fine of not less than $100 nor more than $5,000, or by imprisonment for not more than one year, or by both such fine and imprisonment.

USE OF JOINT BOARDS—COOPERATION WITH STATE COMMISSIONS

SEC. 410. (a) The Commission may refer any matter arising in the administration of this Act to a joint board to be composed of a member, or of an equal number of members, as determined by the Commission, from each of the States in which the wire or radio communication affected by or involved in the proceeding takes place or is proposed, and any such board shall be vested with the same powers and be subject to the same duties and liabilities as in the case of a member of the Commission when designated by the Commission to hold a hearing as hereinbefore authorized. The action of a joint board shall have such force and effect and its proceedings shall be conducted in such manner as the Commission shall by regulations prescribe. The joint board member or members for each State shall be nominated by the State commission of the State or by the Governor if there is no State commission, and appointed by the Federal Communications Commission. The Commission shall have discretion to reject any nominee. Joint board members shall receive such allowances for expenses as the Commission shall provide.

(b) The Commission may confer with any State commission having regulatory jurisdiction with respect to carriers, regarding the relationship between rate structures, accounts, charges, practices, classifications, and regulations of carriers subject to the jurisdiction of such State commission and of the Commission; and the Commission is authorized under such rules and regulations as it shall prescribe to hold joint hearings with any State commission in connection with any matter with respect to which the Commission is authorized to act. The Commission is authorized in the administration of this Act to avail itself of such cooperation, services, records, and facilities as may be afforded by any State commission.

JOINDER OF PARTIES

SEC. 411. (a) In any proceeding for the enforcement of the provisions of this Act, whether such proceeding be instituted before the Commission or be begun originally in any district court of the United States, it shall be lawful to include as parties, in addition to the carrier, all persons interested in or affected by the charge, regulation, or practice under consideration, and inquiries, investigations, orders, and decrees may be made with reference to and against such additional parties in the same manner, to the same extent, and subject to the same provisions as are or shall be authorized by law with respect to carriers.

(b) In any suit for the enforcement of an order for the payment of money all parties in whose favor the Commission may have made an award for damages by a single order may be joined as plaintiffs, and all of the carriers parties to such order awarding such damages may be joined as defendants, and such suit may be maintained by such joint plaintiffs and against such joint defendants in any district where any one of such joint plaintiffs could maintain such suit against any one of such joint defendants; and service of process against any one of such defendants as may not be found in the district where the suit is brought may be made in any district where such defendant carrier has its principal operating office. In case of such joint suit, the recovery, if any, may be by judgment in favor of any one of such plaintiffs, against the defendant found to be liable to such plaintiff.

DOCUMENTS FILED TO BE PUBLIC RECORDS—USE IN PROCEEDINGS

SEC. 412. The copies of schedules of charges, classifications, and of all contracts, agreements, and arrangements between common carriers filed with the Commission as herein provided, and the statistics, tables, and figures contained in the annual or other reports of carriers and other persons made to the Commission as required under the provisions of this Act shall be preserved as public records in the custody of the secretary of the Commission, and shall be received as prima facie evidence of what they purport to be for the purpose of investigations by the Commission and in all judicial proceedings; and copies of and extracts from any of said schedules, classifications, contracts, agreements, arrangements, or reports, made public records as aforesaid, certified by the secretary, under the Commission's seal, shall be received in evidence with like effect as the originals: *Provided*, That the Commission may, if the public interest will be served thereby, keep confidential any contract, agreement, or arrangement relating to foreign wire or radio communication when the publication of such contract, agreement, or arrangement would place American communication companies at a disadvantage in meeting the competition of foreign communication companies.

DESIGNATION OF AGENT FOR SERVICE

SEC. 413. It shall be the duty of every carrier subject to this Act, within sixty days after the taking effect of this Act, to designate in writing an agent in the District of Columbia, upon whom service of all notices and process and all orders, decisions, and requirements of the Commission may

be made for and on behalf of said carrier in any proceeding or suit pending before the Commission, and to file such designation in the office of the secretary of the Commission, which designation may from time to time be changed by like writing similarly filed; and thereupon service of all notices and process and orders, decisions, and requirements of the Commission may be made upon such carrier by leaving a copy thereof with such designated agent at his office or usual place of residence in the District of Columbia, with like effect as if made personally upon such carrier, and in default of such designation of such agent, service of any notice or other process in any proceeding before said Commission, or of any order, decision, or requirement of the Commission, may be made by posting such notice, process, order, requirement, or decision in the office of the secretary of the Commission.

REMEDIES IN THIS ACT NOT EXCLUSIVE

SEC. 414. Nothing in this Act contained shall in any way abridge or alter the remedies now existing at common law or by statute, but the provisions of this Act are in addition to such remedies.

LIMITATIONS AS TO ACTIONS

SEC. 415. (a) All actions at law by carriers for recovery of their lawful charges, or any part thereof, shall be begun within one year from the time the cause of action accrues, and not after.

(b) All complaints against carriers for the recovery of damages not based on overcharges shall be filed with the Commission within one year from the time the cause of action accrues, and not after, subject to subsection (d) of this section.

(c) For recovery of overcharges action at law shall be begun or complaint filed with the Commission against carriers within one year from the time the cause of action accrues, and not after, subject to subsection (d) of this section, except that if claim for the overcharge has been presented in writing to the carrier within the one-year period of limitation said period shall be extended to include one year from the time notice in writing is given by the carrier to the claimant of disallowance of the claim, or any part or parts thereof, specified in the notice.

(d) If on or before expiration of the period of limitation in subsection (b) or (c) a carrier begins action under subsection (a) for recovery of lawful charges in respect of the same service, or, without beginning action, collects charges in respect of that service, said period of limitation shall be extended to include ninety days from the time such action is begun or such charges are collected by the carrier.

(e) The cause of action in respect of the transmission of a message shall, for the purposes of this section, be deemed to accrue upon delivery or tender of delivery thereof by the carrier, and not after.

(f) A petition for the enforcement of an order of the Commission for the payment of money shall be filed in the district court or the State court within one year from the date of the order, and not after.

(g) The term "overcharges" as used in this section shall be deemed to mean charges for services in excess of those applicable thereto under the schedules of charges lawfully on file with the Commission.

PROVISIONS RELATING TO ORDERS

SEC. 416. (a) Every order of the Commission shall be forthwith served upon the designated agent of the carrier in the city of Washington or in such other manner as may be provided by law.

(b) Except as otherwise provided in this Act, the Commission is hereby authorized to suspend or modify its orders upon such notice and in such manner as it shall deem proper.

(c) It shall be the duty of every person, its agents and employees, and any receiver or trustee thereof, to observe and comply with such orders so long as the same shall remain in effect.

TITLE V—PENAL PROVISIONS—FORFEITURES

GENERAL PENALTY

SECTION 501. Any person who willfully and knowingly does or causes or suffers to be done any act, matter, or thing, in this Act prohibited or declared to be unlawful, or who willfully and knowingly omits or fails to do any act, matter, or thing in this Act required to be done, or willfully and knowingly causes or suffers such omission or failure, shall, upon conviction thereof, be punished for such offense, for which no penalty (other than a forfeiture) is provided herein, by a fine of not more than $10,000 or by imprisonment for a term of not more than two years, or both.

VIOLATIONS OF RULES, REGULATIONS, AND SO FORTH

SEC. 502. Any person who willfully and knowingly violates any rule, regulation, restriction, or condition made or imposed by the Commission under authority of this Act, or any rule, regulation, restriction, or condition made or imposed by any international radio or wire communications treaty or convention, or regulations annexed thereto, to which the United States is or may hereafter become a party, shall, in addition to any other penalties provided by law, be punished, upon conviction thereof, by a fine of not more than $500 for each and every day during which such offense occurs.

FORFEITURE IN CASES OF REBATES AND OFFSETS

SEC. 503. Any person who shall deliver messages for interstate or foreign transmission to any carrier, or for whom as sender or receiver, any such carrier shall transmit any interstate or foreign wire or radio communication, who shall knowingly by employee, agent, officer, or otherwise, directly or indirectly, by or through any means or device whatsoever, receive or accept from such common carrier any sum of money or any other valuable consideration as a rebate or offset against the regular charges for transmission of such messages as fixed by the schedules of charges provided for in this Act, shall in addition to any other penalty provided by this Act forfeit to the United States a sum of money three times the amount of money so received or

accepted and three times the value of any other consideration so received or accepted, to be ascertained by the trial court; and in the trial of said action all such rebates or other considerations so received or accepted for a period of six years prior to the commencement of the action, may be included therein, and the amount recovered shall be three times the total amount of money, or three times the total value of such consideration, so received or accepted, or both, as the case may be.

PROVISIONS RELATING TO FORFEITURES

SEC. 504. The forfeitures provided for in this Act shall be payable into the Treasury of the United States, and shall be recoverable in a civil suit in the name of the United States, brought in the district where the person or carrier has its principal operating office, or in any district through which the line or system of the carrier runs. Such forfeitures shall be in addition to any other general or specific penalties herein provided. It shall be the duty of the various district attorneys, under the direction of the Attorney General of the United States, to prosecute for the recovery of forfeitures under this Act. The costs and expenses of such prosecutions shall be paid from the appropriation for the expenses of the courts of the United States.

VENUE OF OFFENSES

SEC. 505. The trial of any offense under this Act shall be in the district in which it is committed; or if the offense is committed upon the high seas, or out of the jurisdiction of any particular State or district, the trial shall be in the district where the offender may be found or into which he shall be first brought. Whenever the offense is begun in one jurisdiction and completed in another it may be dealt with, inquired of, tried, determined, and punished in either jurisdiction in the same manner as if the offense had been actually and wholly committed therein.

TITLE VI—MISCELLANEOUS PROVISIONS

TRANSFER TO COMMISSION OF DUTIES, POWERS, AND FUNCTIONS UNDER EXISTING LAW

SECTION 601. (a) All duties, powers, and functions of the Interstate Commerce Commission under the Act of August 7, 1888 (25 Stat. 382), relating to operation of telegraph lines by railroad and telegraph companies granted Government aid in the construction of their lines, are hereby imposed upon and vested in the Commission: *Provided*, That such transfer of duties, powers, and functions shall not be construed to affect the duties, powers, functions, or jurisdiction of the Interstate Commerce Commission under, or to interfere with or prevent the enforcement of, the Interstate Commerce Act and all Acts amendatory thereof or supplemental thereto.

(b) All duties, powers, and functions of the Postmaster General with respect to telegraph companies and telegraph lines under any existing provision of law are hereby imposed upon and vested in the Commission.

REPEALS AND AMENDMENTS

SEC. 602. (a) The Radio Act of 1927, as amended, is hereby repealed.

(b) The provisions of the Interstate Commerce Act, as amended, insofar as they relate to communication by wire or wireless, or to telegraph, telephone, or cable companies operating by wire or wireless, except the last proviso of section 1 (5) and the provisions of section 1 (7), are hereby repealed.

(c) The last sentence of section 2 of the Act entitled "An Act relating to the landing and operation of submarine cables in the United States", approved May 27, 1921, is amended to read as follows: "Nothing herein contained shall be construed to limit the power and jurisdiction of the Federal Communications Commission with respect to the transmission of messages."

(d) The first paragraph of section 11 of the Act entitled "An Act to supplement existing laws against unlawful restraints and monopolies, and for other purposes," approved October 15, 1914, is amended to read as follows:

"SEC. 11. That authority to enforce compliance with sections 2, 3, 7, and 8 of this Act by the persons respectively subject thereto is hereby vested: In the Interstate Commerce Commission where applicable to common carriers subject to the Interstate Commerce Act, as amended; in the Federal Communications Commission where applicable to common carriers engaged in wire or radio communication or radio transmission of energy; in the Federal Reserve Board where applicable to banks, banking associations, and trust companies; and in the Federal Trade Commission where applicable to all other character of commerce, to be exercised as follows:".

TRANSFER OF EMPLOYEES, RECORDS, PROPERTY, AND APPROPRIATIONS

SEC. 603. (a) All officers and employees of the Federal Radio Commission (except the members thereof, whose offices are hereby abolished) whose services in the judgment of the Commission are necessary to the efficient operation of the Commission are hereby transferred to the Commission, without change in classification or compensation; except that the Commission may provide for the adjustment of such classification or compensation to conform to the duties to which such officers and employees may be assigned.

(b) There are hereby transferred to the jurisdiction and control of the Commission (1) all records and property (including office furniture and equipment, and including monitoring radio stations) under the jurisdiction of the Federal Radio Commission, and (2) all records under the jurisdiction of the Interstate Commerce Commission and of the Postmaster General relating to the duties, powers, and functions imposed upon and vested in the Commission by this Act.

(c) All appropriations and unexpended balances of appropriations available for expenditure by the Federal Radio Commission shall be available for expenditure by the Commission for any and all objects of expenditure authorized by this Act in the discretion of the Commission, without regard

to the requirement of apportionment under the Antideficiency Act of February 27, 1906.

EFFECT OF TRANSFERS, REPEALS, AND AMENDMENTS

SEC. 604. (a) All orders, determinations, rules, regulations, permits, contracts, licenses, and privileges which have been issued, made, or granted by the Interstate Commerce Commission, the Federal Radio Commission, or the Postmaster General, under any provision of law repealed or amended by this Act or in the exercise of duties, powers, or functions transferred to the Commission by this Act, and which are in effect at the time this section takes effect, shall continue in effect until modified, terminated, superseded, or repealed by the Commission or by operation of law.

(b) Any proceeding, hearing, or investigation commenced or pending before the Federal Radio Commission, the Interstate Commerce Commission, or the Postmaster General, at the time of the organization of the Commission, shall be continued by the Commission in the same manner as though originally commenced before the Commission, if such proceeding, hearing, or investigation (1) involves the administration of duties, powers, and functions transferred to the Commission by this Act, or (2) involves the exercise of jurisdiction similar to that granted to the Commission under the provisions of this Act.

(c) All records transferred to the Commission under this Act shall be available for use by the Commission to the same extent as if such records were originally records of the Commission. All final valuations and determinations of depreciation charges by the Interstate Commerce Commission with respect to common carriers engaged in radio or wire communication, and all orders of the Interstate Commerce Commission with respect to such valuations and determinations, shall have the same force and effect as though made by the Commission under this Act.

(d) The provisions of this Act shall not affect suits commenced prior to the date of the organization of the Commission; and all such suits shall be continued, proceedings therein had, appeals therein taken and judgments therein rendered, in the same manner and with the same effect as if this Act had not been passed. No suit, action, or other proceeding lawfully commenced by or against any agency or officer of the United States, in relation to the discharge of official duties, shall abate by reason of any transfer of authority, power, and duties from such agency or officer to the Commission under the provisions of this Act, but the court, upon motion or supplemental petition filed at any time within twelve months after such transfer, showing the necessity for a survival of such suit, action, or other proceeding to obtain a settlement of the questions involved, may allow the same to be maintained by or against the Commission.

UNAUTHORIZED PUBLICATION OF COMMUNICATIONS

SEC. 605. No person receiving or assisting in receiving, or transmitting, or assisting in transmitting, any interstate or foreign communication by wire or radio shall divulge or publish the existence, contents, substance, purport, effect, or meaning thereof, except through authorized channels of

transmission or reception, to any person other than the addressee, his agent, or attorney, or to a person employed or authorized to forward such communication to its destination, or to proper accounting or distributing officers of the various communicating centers over which the communication may be passed, or to the master of a ship under whom he is serving, or in response to a subpena issued by a court of competent jurisdiction, or on demand of other lawful authority; and no person not being authorized by the sender shall intercept any communication and divulge or publish the existence, contents, substance, purport, effect, or meaning of such intercepted communication to any person; and no person not being entitled thereto shall receive or assist in receiving any interstate or foreign communication by wire or radio and use the same or any information therein contained for his own benefit or for the benefit of another not entitled thereto; and no person having received such intercepted communication or having become acquainted with the contents, substance, purport, effect, or meaning of the same or any part thereof, knowing that such information was so obtained, shall divulge or publish the existence, contents, substance, purport, effect, or meaning of the same or any part thereof, or use the same or any information therein contained for his own benefit or for the benefit of another not entitled thereto: *Provided*, That this section shall not apply to the receiving, divulging, publishing, or utilizing the contents of any radio communication broadcast, or transmitted by amateurs or others for the use of the general public, or relating to ships in distress.

WAR EMERGENCY—POWERS OF PRESIDENT

SEC. 606. (a) During the continuance of a war in which the United States is engaged, the President is authorized, if he finds it necessary for the national defense and security, to direct that such communications as in his judgment may be essential to the national defense and security shall have preference or priority with any carrier subject to this Act. He may give these directions at and for such times as he may determine, and may modify, change, suspend, or annul them and for any such purpose he is hereby authorized to issue orders directly, or through such person or persons as he designates for the purpose, or through the Commission. Any carrier complying with any such order or direction for preference or priority herein authorized shall be exempt from any and all provisions in existing law imposing civil or criminal penalties, obligations, or liabilities upon carriers by reason of giving preference or priority in compliance with such order or direction.

(b) It shall be unlawful for any person during any war in which the United States is engaged to knowingly or willfully, by physical force or intimidation by threats of physical force, obstruct or retard or aid in obstructing or retarding interstate or foreign communication by radio or wire. The President is hereby authorized, whenever in his judgment the public interest requires, to employ the armed forces of the United States to prevent any such obstruction or retardation of communication: *Provided*, That nothing in this section shall be construed to repeal, modify, or affect either section 6 or section 20 of an Act entitled "An Act to supplement existing

laws against unlawful restraints and monopolies, and for other purposes", approved October 15, 1914.

(c) Upon proclamation by the President that there exists war or a threat of war or a state of public peril or disaster or other national emergency, or in order to preserve the neutrality of the United States, the President may suspend or amend, for such time as he may see fit, the rules and regulations applicable to any or all stations within the jurisdiction of the United States as prescribed by the Commission, and may cause the closing of any station for radio communication and the removal therefrom of its apparatus and equipment, or he may authorize the use or control of any such station and/or its apparatus and equipment by any department of the Government under such regulations as he may prescribe, upon just compensation to the owners.

(d) The President shall ascertain the just compensation for such use or control and certify the amount ascertained to Congress for appropriation and payment to the person entitled thereto. If the amount so certified is unsatisfactory to the person entitled thereto, such person shall be paid only 75 per centum of the amount and shall be entitled to sue the United States to recover such further sum as added to such payment of 75 per centum will make such amount as will be just compensation for the use and control. Such suit shall be brought in the manner provided by paragraph 20 of section 24, or by section 145, of the Judicial Code, as amended.

EFFECTIVE DATE OF ACT

SEC. 607. This Act shall take effect upon the organization of the Commission, except that this section and sections 1 and 4 shall take effect July 1, 1934. The Commission shall be deemed to be organized upon such date as four members of the Commission have taken office.

SEPARABILITY CLAUSE

SEC. 608. If any provision of this Act or the application thereof to any person or circumstance is held invalid, the remainder of the Act and the application of such provision to other persons or circumstances shall not be affected thereby.

SHORT TITLE

SEC. 609. This Act may be cited as the "Communications Act of 1934."

Approved, June 19, 1934.

APPENDIX B

AGREEMENT REACHED AT THE NORTH AND CENTRAL AMERICAN REGIONAL CONFERENCE, MEXICO CITY, JULY 10 TO AUG. 9, 1933

The delegations from Canada, Costa Rica, Cuba, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and the United States of America to the North and Central American Regional Radio Conference which met in this Capital, July 10, 1933, on the invitation of the Government of Mexico, unanimously submit to their respective governments the following recommendations:

A. Services Other than Broadcasting

I. The participating Governments may assign any frequency and any type of wave to any radio stations under their authority, upon the sole condition that no interference with any service of another country results therefrom.

II. The participating Governments undertake to assign frequencies to the stations, under their jurisdiction, in conformity with the table "Distribution of Frequencies to Services."

III.

Table I.—Distribution of Frequencies to Services

General frequency band, kc.	Exact limits of the band, kc.*	Service allocation
1600–1650	1605–1650	Maritime Mobile
1650–1655	1650–1654	General Experimental
1655–1715	1654–1715	Fixed and Mobile (primarily police)
1715–2000	1715–2000	Amateur
2000–2100	2000–2102	Fixed and Mobile (available for visual broadcasting)
2100–2200	2102–2202	Mobile (primarily ship stations)
2200–2300	2202–2302	Fixed and Mobile
2300–2395	2302–2396	Mobile (primarily police)

* Table II may be used as a guide for the designation of frequencies to be assigned to stations.

Note: The band of frequencies between 1500–1600 kc. has been left unassigned pending a decision in regard to the allocation of frequencies to broadcasting in North and Central America.

TABLE I.—DISTRIBUTION OF FREQUENCIES TO SERVICES.—(*Continued*)

General frequency band, kc.	Exact limits of the band, kc.*	Service allocation
2395–2400	2396–2402	General Experimental
2400–2500	2402–2502	Mobile (primarily police)
2500–2600	2502–2602	Mobile (primarily coast stations)
2600–2735	2602–2734	Aeronautical and mobile
2735–2740	2734–2742	Mobile (primarily intership, assignable frequency 2738 kc)
2740–2850	2742–2850	Fixed and Mobile (available for visual broadcasting)
2850–3000	2850–3002.5	Aeronautical and mobile
3000–3065	3002.5–3062.5	Fixed and Mobile
3065–3100	3062.5–3097.5	Air Mobile
3100–3110	3097.5–3112.5	Mobile—Primarily Air Mobile—calling frequency 3105 kc
3110–3150	3112.5–3152.5	Mobile
3150–3265	3152.5–3267.5	Fixed and Mobile—Primarily Air Mobile
3265–3320	3267.5–3322.5	Fixed
3320–3440	3322.5–3442.5	Fixed and Mobile
3440–3485	3442.5–3487.5	Fixed and Mobile—Primarily air mobile
3485–3500	3487.5–3500	General Experimental
3500–4000	3500–4000	Amateur

* Table II may be used as a guide for the designation of frequencies to be assigned to stations.

Note: The band of frequencies between 1500–1600 kc. has been left unassigned pending a decision in regard to the allocation of frequencies to broadcasting in North and Central America.

IV. The participating Governments in allocating frequencies above 4000 kc. agree to adhere to the provisions of Appendix No. 1, except that the band of frequencies from 5600 to 5700 kc. shall be assigned exclusively to the Air Mobile Service.

V. In general, in the frequency range 1600–3000 kc., the frequencies assigned shall be integral multiples of 4 kc. and in the range 3000–6000 kc. integral multiples of 5 kc. Communication channels wider than 4 kc. or 5 kc. may be assigned where the authorized band width of the emission requires the use of such wider channels. For example, two adjoining telegraph channels may be assigned for telephony, in which case the frequency assigned to a station should be the mid-frequency of such channels. The frequencies to be assigned to stations are given in Table II. Departure from these assignments may be made in order to make more efficient use of the frequency space available.

VI.

TABLE II.—ASSIGNABLE FREQUENCIES BASED ON RADIOTELEGRAPH EMISSION*

1600	2060	2228	2396	2564
1604	2064	2232	2400	2568
1608	2068	2236	2404	2572
1612	2072	2240	2408	2576
....	....	....	....	....
....	....	....	....	....

* Complete table agreed to but not reproduced.

VII. The frequency tolerance of the carrier wave of the stations authorized by the respective governments in the band 1600–6000 kc. shall be equal to or less than the values specified in Table III.

TABLE III.—TOLERANCE TABLE

Frequency band, 1600 to 6000 kc.	Applicable immediately to existing equipment, per cent	Applicable for new transmitters after effective date of this treaty, per cent
A. Fixed stations	0.05	0.03
B. Land stations	0.05	0.04
C. Mobile stations using frequencies not normally used for ship radio telegraph transmissions	0.05	0.04
D. Other mobile stations	0.1	0.1

VIII. The participating governments agree to require stations under their jurisdiction to use transmitters which are as free as practicable from all spurious emissions such as those due to harmonics, decrement, spacing waves, frequency modulation, key clicks, type of keying, etc., not essential to the type of communication being carried on.

IX. The procedure to be followed in the elimination of interference between radio stations under the jurisdiction of the participating governments shall be covered by separate agreements.

X. The restriction against certain types of emission in the band 325 to 345 kc., contained in Appendix No. 1, Sec. 11 (1), will not be applicable to the region of North and Central America.

XI. All the coastal stations (except those in Hudson Bay) under the jurisdiction of the participating governments shall be considered as being in a region of heavy traffic in the sense of Appendix No. 2, Sec. 1 (6)-a. As a

result, traffic on the wave 500 kc. (410 kc. on the Great Lakes) shall be limited to the conditions fixed in said Appendix No. 2, Sec. 6 (a).

XII. Definitions of Terms

1. *Telecommunication:* Any telegraph or telephone communication of signs, signals, writing, images and sounds of any nature, by wire, radio or other systems or processes of electrical or visual (semaphore) signalling.

2. *Radiocommunication:* Any telecommunication by means of Hertzian waves.

3. *Radiotelegram:* Telegram originating in or destined to a mobile station, transmitted on all or part of its route over the radio channels of the mobile service.

4. *Public correspondence:* Any telecommunication which the offices and stations, by reason of their being at the disposal of the public, must accept for transmission.

5. *Private operating agency:* Any individual, company or corporation, other than a governmental institution or agency, which is recognized by the government concerned and which operates telecommunication installations for the purpose of exchanging public correspondence.

6. *Administration:* A government administration.

7. *International service:* A telecommunication service between offices or stations under the jurisdiction of different countries, or between stations of the mobile service except when the latter are of the same nationality and are within the limits of the country to which they belong. An internal or national telecommunication service which is likely to cause interference with other services beyond the limits of the country in which it operates, shall be considered as international service from the standpoint of interference.

8. *Limited service:* A service which can be used only by specified persons or for special purposes.

9. *Mobile service:* A radiocommunication service carried on between mobile and land stations and by mobile stations communicating among themselves, special services being excluded.

10. *Fixed station:* A station not capable of being moved, and communicating by radio with one or more stations primarily established.

11. *Land station:* A station not capable of being moved, carrying on a mobile service.

12. *Coast station:* A land station carrying on a service with ship stations. This may be a fixed station used also for communication with ship stations; in this case, it shall be considered as a coast station only for the duration of its service with ship stations.

13. *Aeronautical station:* A land station carrying on a service with aircraft stations. This may be a fixed station also for communication with aircraft stations; in this case, it shall be considered as an aeronautical station only for the duration of its service with aircraft stations.

14. *Mobile station:* A station capable of being moved and which ordinarily does move.

15. *On-board station:* A station on board either of a ship which is not permanently moored, or an aircraft.

16. *Ship station:* A station on board a ship which is not permanently moored.

17. *Aircraft station:* A station on board any aerial vehicle.

18. *Radiobeacon station:* A special station the emissions of which are intended to enable an on-board station to determine its bearing or a direction with reference to the radiobeacon station, and in some cases also the distance which separates it from the latter.

19. *Radiodirection-finding station:* A station equipped with special apparatus for determining the direction of the emissions of other stations.

20. *Telephone broadcasting station:* A station carrying on a telephone broadcasting service.

21. *Visual broadcasting station:* A station carrying on a visual broadcasting service.

22. *Amateur station:* A station used by an amateur, that is, by a duly authorized person interested in radio technique solely with a personal aim and without pecuniary interest.

23. *Private experimental station:* A private station for experiments looking to the development of radio technique or science.

24. *Private radio station:* A private station, not open to public correspondence, which is authorized solely to exchange with other "private radio stations" communications concerning the private business of the license holder or holders.

25. *Frequency assigned to a station:* The frequency assigned to a station is the frequency occupying the center of the frequency band in which the station is authorized to work. In general this frequency is that of the carrier wave.

26. *Frequency band of an emission:* The frequency band of an emission is the frequency band actually occupied by the emission for the type of transmission and for the signalling speed used.

27. *Frequency tolerance:* The frequency tolerance is the maximum permissible separation between the frequency assigned to a station and the actual frequency of emission.

28. *Power of a radio transmitter:* The power of a radio transmitter is the power supplied to the antenna.

In the case of a modulated-wave transmitter, the power in the antenna shall be represented by two numbers, one indicating the power of the carrier supplied to the antenna and the other the actual maximum rate of modulation used.

29. *Aeronautical service:* A radio service carried on between aircraft stations and land stations, and by aircraft stations communicating among themselves. This term shall also apply to fixed and special radio services intended to insure the safety of aerial navigation.

30. *Fixed service:* A service carrying on radio communication of any kind between fixed points excluding broadcasting services and special services.

31. *Special service:* A telecommunication service carried on especially for the needs of a specific service of general interest and not open to public correspondence, such as: a service of radiobeacons, radio direction-finding, time signals, regular meteorological bulletins, notices to navigators, press

messages addressed to all, medical notices (medical consultations) standard frequencies, emissions for scientific purposes, etc.

32. *Telephone broadcasting service:* A service carrying on the broadcasting of radiotelephone emissions primarily intended to be received by the general public.

33. *Visual broadcasting service:* A service carrying on the broadcasting of visual images, either fixed or moving, intended to be received by the general public primarily.

34. *Amateur service:* A radio service carried on between amateur stations.

35. *Air mobile service:* A radio service carried on between aircraft carriers and by aircraft stations communicating among themselves.

36. *General experimental service:* A radio service carried on by experimental stations engaged in research or development in the radio art.

37. *Police service:* The radio service carried on by provincial, state, or municipal police authorities for emergency services principally with mobile police units.

38. The term "channel" means the portion of the radio spectrum of a width sufficient to permit of its use by a radio station for communication purposes; it comprises the following three elements, all defined below:

(*a*) the "frequency band of emission,"

(*b*) twice the specified "frequency tolerance," (See 27)

(*c*) the "interference guard bands," if required.

39. *The term "frequency band of emission"* means that the frequency band of an emission is the frequency band actually occupied by this emission for the type of transmission and for the signalling speed used.

40. *The term "interference guard bands"* means the frequency bands additional to the frequency band of emission and frequency tolerance which may be allowed in order that there shall be no interference between stations having adjacent frequency assignments. In general, this provision is dependent upon receiver selectivity and transmitter characteristics.

41. *The term "primarily"* used in connection with certain bands in the allocation table of this agreement, signifies that as duly authorized installations of the primary services are undertaken, they will have preference on the available channels in that particular band.

The assignment of channels to other services in the general allocation for each of these bands will be carried out in such a manner as to prevent undue interference with existing stations of the primary service.

B. Broadcasting

I. The participating governments shall make observations and measurements necessary to determine the conditions under which each of them receives the signals of the broadcasting stations of other countries as well as its own with the object that at a later time the specifications and characteristics of the stations to operate on different frequencies can be duly considered.

II. The present width of 10 kc. for broadcast channels shall be maintained.

III. The frequencies of the carrier waves for broadcasting shall be assigned in multiple numbers of 10.

IV. In the participating countries the broadcasting stations shall control the frequency of operation in such a way that the frequency of the emitted wave shall not differ more than 50 cycles per second, plus or minus, from the nominal frequency assigned.

V. The participating countries shall exchange information respecting the assignment of frequency to end the alteration of power of broadcasting stations in their respective countries.

VI. Directional antennae, the synchronization of stations and other technical means shall be employed where possible in order to reduce the number of frequencies required for a certain number of stations.

VII. The assignment of frequencies for broadcasting to the various participating countries shall be left pending for the time being.

APPENDIX I

Allocation and use of frequencies (wavelengths) and of types of emission:

§ 1. Subject to the provisions of subparagraph (5) of § 5 below, the administrations of the contracting countries may assign any frequency and any type of wave to any radio station under their jurisdiction on the sole condition that no interference with any service of another country will result therefrom.

§ 2. The administrations, however, agree to assign to stations which by their very nature are capable of causing serious international interference, frequencies and types of waves in conformity with the rules for allocation and use of waves, as set forth below.

§ 3. The administrations also agree to assign frequencies to these stations, according to the kind of service they perform, in conformity with the table of allocation of frequencies (see table, pp. 366–371).

§ 4. In the case where bands of frequencies are assigned to a specific service, the stations of that service must use frequencies sufficiently separated from the limits of these bands so as not to produce harmful interference with the operation of stations belonging to services to which the frequency bands immediately adjoining have been assigned.

§ 5. (1) The frequencies assigned by administrations to all fixed, land, and broadcasting stations, as well as the upper limit of power contemplated, must be notified to the Bureau of the Union with a view to their publication, when the stations in question carry on a regular service and are capable of causing international interference. Frequencies on which a coast station receives in carrying on a particular service with ship stations using stabilized transmitters must also be notified to the Bureau of the Union with a view to their publication. Frequencies must be selected in such a way as to avoid, so far as possible, interfering with international services belonging to the contracting countries and operated by existing stations, of which the frequencies have already been notified to the Bureau of the Union. The aforesaid notification must be made in accordance with the provisions of article 15, § 1 (*b*) and appendix 6 before the frequency is put into service and sufficiently in advance thereof to allow administrations to take any action which they may deem necessary to insure the efficient operation of their services.

(2) (*a*) However, when the frequency which an administration intends to assign to a station is outside the bands authorized by the present Regulations for the service involved, this administration shall, in a special report, make the notification mentioned in the preceding subparagraph at least 6 months before this frequency is put into service, and in urgent cases, at least 3 months before that date.

(*b*) The notification procedure laid down above shall also be observed when an administration intends to increase or to authorize the increase of the power or a change in the conditions of radiation of a station already operating outside the authorized bands, even if the frequency used is to remain the same.

(*c*) With regard to stations which, when the present Regulations go into force, are already operating outside the bands authorized therein, the frequency and the power used shall be notified immediately to the Bureau of the Union, with a view to their publication, if such a notification has not been made previously.

(3) (*a*) The administrations concerned shall conclude agreements, when needed, for determining the waves to be assigned to the stations in question, as well as for laying down the conditions of use of the waves thus assigned.

(*b*) The administrations of any region may, in accordance with article 13 of the Convention, conclude regional arrangements regarding the allocation either of frequency bands to the services of the participating countries, or of frequencies to stations of these countries, and concerning the conditions for the use of the waves so assigned. The provisions of § 1 and those of § 5 (1) and (2) shall also apply to any arrangement of this nature.

(4) The administrations concerned shall conclude the necessary agreements to avoid interference and, when needed, shall, for this purpose, in conformity with the procedure which will be agreed among them in bilateral or regional agreements, call upon organs of expert investigation or of expert investigation and conciliation. If no agreement can be reached with regard to avoiding interference, the provisions of article 15 of the Convention can be applied.

(5) (*a*) With regard to European broadcasting and subject to any right to which the extra-European administrations might be entitled by virtue of the present Regulations, the detailed provisions below, which can be abrogated or changed by agreement among the European administrations and which in no way change the provisions of subparagraph (2) above, shall be brought to bear in applying the principle laid down in § 1.

(*b*) Failing a preliminary agreement between the administrations of the European contracting countries, the right contemplated in § 1 cannot, within the limits of the European region, be used for the purpose of carrying on a broadcasting service outside the bands authorized by the present Regulations on frequencies below 1,500 kc (wavelengths above 200 m).

(*c*) An administration wishing to establish such a service or to obtain a change in the conditions laid down by a previous agreement with regard to such a service (frequency, power, geographic position, etc.) shall submit the request to the European administrations through the Bureau of the Union. Any administration which does not answer within 6 weeks after the

receipt of the said communication shall be considered as having given its assent.

(*d*) It is fully understood that such a preliminary agreement shall also be necessary whenever, in a European broadcasting station, operating outside the authorized frequency bands, a change is made in the characteristics previously reported to the Bureau of the Union, and when such change is capable of affecting the condition of international interference.

§ 6. (1) In principle, the power of broadcasting stations must not exceed the value necessary to insure economically an effective high-quality national service within the limits of the country considered.

(2) In principle, the location of powerful broadcasting stations, and especially of those which operate near the limits of the frequency bands reserved to broadcasting, must be chosen in such a way as to avoid, so far as possible, interference caused to the broadcasting services of other countries or to other services operating on neighboring frequencies.

§ 7. The following table shows the allocation of frequencies (approximate wavelengths) to the various services.

(This table appears on pp. 366–371.)

§ 8. (1) The use of type-B waves shall be forbidden on all frequencies, except the following:

375 kc (800 m)
410 kc (730 m)
425 kc (705 m)
454 kc (660 m)
500 kc (600 m)
1,364 kc (220 m)*

(2) No new installation of transmitters of type-B waves may be made on ships or aircraft, except when these transmitters, working at full power, use less than 300 watts measured at the input of the audiofrequency supply transformer.

(3) The use of type-B waves on all frequencies shall be forbidden, beginning January 1, 1940, except for transmitters meeting the power requirements stated in subparagraph (2) above.

(4) No new installation of type-B-wave transmitters may be made in a land or fixed station. The waves of this type shall be forbidden in all land stations beginning January 1, 1935.

(5) The administrations shall endeavor to abandon type-B waves, other than the 500-kc (600-m) wave, as soon as possible.

§ 9. The use of type-A1 waves only shall be authorized between 100 and 160 kc (3,000 and 1,875 m); the only exception to this rule shall be for type-A2 waves which may be used in the band 100 to 125 kc (3,000 to 2,400 m) for time signals exclusively.

§ 10. In the band 460 to 550 kc (652 to 545 m) no type of emission capable of rendering inoperative the distress, alarm, safety, or urgent signals sent on 500 kc (600 m) shall be authorized.

*See footnote 10 to the allocation table.

§ 11. (1) In the band 325 to 345 kc (923 to 870 m), no type of emission capable of rendering inoperative distress, safety, or urgent signals shall be authorized.

(2) This rule shall not apply to regions in which special agreements provide otherwise.

§ 12. (1) In principle, any station carrying on a service between fixed points on a wave with a frequency below 110 kc (wavelengths above 2,727 m) must use only one frequency, chosen from the bands allocated to the said service (§ 7 above), for each of its transmitters capable of simultaneous operation.

(2) A station shall not be permitted to use a frequency other than that allocated as stated above, for a service between fixed points.

§ 13. In principle, the stations shall use the same frequencies and the same types of emission for the transmission of messages by the unilateral method as for their normal service. Regional arrangements may, however, be made for the purpose of exempting the stations concerned from complying with this rule.

§ 14. A fixed station may, as secondary service, on its normal working frequency, make transmissions intended for mobile stations on the following conditions:

(*a*) that the administrations concerned deem it necessary to use this exceptional working method;

(*b*) that no increase in interference results therefrom.

§ 15. In order to facilitate the exchange of synoptic meteorological messages in the European regions, the frequencies of 41.6 kc and 89.5 kc (7,210 m and 3,352 m) shall be allocated to this service.

§ 16. To facilitate rapid transmission and distribution of information of value in the detection of crime and pursuit of criminals, a frequency between 37.5 and 100 kc (between 8,000 and 3,000 m) shall be reserved for this purpose by regional arrangements.

§ 17. Each administration may allocate to amateur stations frequency bands in accordance with the allocation table (§ 7 above).

§ 18. In order to decrease interference in the frequency bands above 4,000 kc (wavelengths below 75 m), used by the mobile service, and particularly in order to avoid interfering with the long-distance telephone communications of this service, the administrations agree to adopt the following rules, wherever possible, taking into account current engineering development:

(1) (*a*) In the frequency bands above 5,500 kc (wavelengths below 54.55 m) allocated exclusively to the mobile service, the frequencies (wavelengths) which must be used by ship stations carrying on commercial service shall be on the low-frequency (longwave) side of the band, and especially in the limits of the harmonic bands enumerated below:

5,500 to	5,550 kc (54.55 to 54.05 m)
6,170 to	6,250 kc (48.62 to 48.00 m)
8,230 to	8,330 kc (36.45 to 36.01 m)
11,000 to	11,100 kc (27.27 to 27.03 m)

12,340 to 12,500 kc (24.31 to 24.00 m)
16,460 to 16,660 kc (18.23 to 18.01 m)
22,000 to 22,200 kc (13.64 to 13.51 m)

NOTE.—The frequency bands 4,115 to 4,165 kc (72.90 to 72.03 m) may also be used by the stations mentioned above [see also (2) (*c*) below].

(*b*) However, any commercial ship station the emissions of which comply with the frequency tolerances required of land stations under § 2 (2) of article 6, may transmit on the same frequency as the coast station with which it communicates.

(*c*) When a communication for which no special arrangement has been made must be established between a ship station, on one hand, and another ship station or a coast station, on the other hand, the mobile station shall use one of the following frequencies situated approximately in the middle of the bands:

4,140 kc (72.46 m)
5,520 kc (54.35 m)
6,210 kc (48.31 m)
8,280 kc (36.23 m)
11,040 kc (27.17 m)
12,420 kc (24.15 m)
16,560 kc (18.12 m)
22,080 kc (13.59 m)

NOTE.—The administrations agree, in reporting the frequency of a coast station, to indicate on which one of the waves specified in subparagraph (1) (*c*) listening will be carried on.

(2) (*a*) Ship stations carrying on commercial service shall use the shared bands above 4,000 kc (wavelengths below 75 m) only when their emissions comply with the frequency tolerances specified for land stations in § 2 (2) of article 6. In this case, the frequencies used must be chosen on the higher-frequency (shorterwave) side of the shared band and, more especially, in the limits of the harmonic bands enumerated below:

4,400 to 4,450 kc (68.18 to 67.42 m)
8,800 to 8,900 kc (34.09 to 33.71 m)
13,200 to 13,350 kc (22.73 to 22.47 m)
17,600 to 17,750 kc (17.05 to 16.90 m)
22,900 to 23,000 kc (13.10 to 13.04 m)

(*b*) Frequencies chosen in the portion of the band reserved to mobile services from 6,600 to 6,675 kc (45.45 to 44.94 m), in harmonic relation with the preceding bands, may also be used.

(*c*) The provisions of subparagraph (2) (*a*) shall not apply to the portion of the shared band between 4,115 and 4,165 kc (72.90 and 72.03 m) which may be used by any ship station carrying on a commercial service.

(3) In selecting frequencies for new fixed and coast stations, the administrations shall avoid using the frequencies in the bands specified in subparagraphs (1) (*a*), (2) (*a*), (2) (*b*), and (2) (*c*).

§ 19. (1) It is recognized that the frequencies between 6,000 and 30,000 kc (50 and 10 m) are very efficient for long-distance communications.

(2) The administrations shall make the greatest possible effort to reserve the frequencies of this band for this purpose, except when their use for short- or medium-distance communication is not likely to interfere with long-distance communications.

§ 20. In Europe, Africa, and Asia, low-power directional radiobeacons the range of which does not exceed about 50 km may use any frequency in the band 1,500 to 3,500 kc (200 to 85.71 m) except the guard band of 1,630 to 1,670 kc (184 to 180 m) subject to agreements with the countries whose services are likely to be interfered with.

Appendix II

Use of waves in the mobile service:

§ 1. (1) In the bands included between 365 and 515 kc (822 and 583 m), the only type-B waves permissible shall be the following:

375, 410, 425, 454, and 500 kc (800, 730, 705, 660, and 600 m).

(2) The general calling-wave which must be used by all ship stations and by all coast stations working in radiotelegraphy in the authorized bands between 365 and 515 kc (822 and 583 m), as well as by aircraft wishing to enter into communication with a coast station or a ship station, shall be the wave 500 kc (600 m) (A1, A2, or B).

(3) The wave of 333 kc (900 m) shall be the international calling-wave for aerial services, except as indicated in article 9, §10 (2).

(4) The wave of 143 kc (2,100 m) (Type-A1 only), shall be the international calling-wave for use in long-distance communications of the mobile service in the band 100 to 160 kc (3,000 to 1,875 m).

(5) The wave of 500 kc (600 m) shall be the international distress wave; it shall be used for that purpose by ship stations and aircraft stations in requesting help from the maritime services. It may be used in a general way only for calls and replies as well as for distress traffic, urgent and safety messages, and signals.

(6) However, on condition that the distress, urgent, safety, calling, and reply signals are not interfered with, the wave of 500 kc (600 m) may be used:

(*a*) in the regions of heavy traffic for the transmission of a single short radiotelegram;[1]

(*b*) in other regions, for other purposes, but with discretion.

(7) Besides the wave of 500 kc (600 m), the use of waves of all types between 485 and 515 kc (620 and 583 m) shall be forbidden.

(8) Except for the wave of 143 kc (2,100 m) the use of any wave between 140 and 146 kc (2,143 and 2,055 m) shall be forbidden.

[1] The regions of heavy traffic are indicated in the nomenclature of coast stations. These regions consist of the service areas of the coast stations indicated as not accepting traffic on 500 kc (600 m).

(9) Coast and ship stations working within the authorized band between 365 and 515 kc (822 and 583 m) must be able to use at least one wave besides that of 500 kc (600 m); when an additional wave is printed in heavy type in the nomenclature, this is the normal working-wave of the station. The additional waves thus chosen for coast stations may or may not be the same as those of ship stations. In any case, the working-waves of coast stations must be chosen in such a way as to avoid interference with neighboring stations.

(10) Besides their normal working-waves, printed in heavy type in the nomenclature, land and on-board stations may use, in the authorized bands, supplementary waves which shall be mentioned in the nomenclature in ordinary print. However, the band of frequencies from 365 to 385 kc (822 to 779 m) shall be reserved to the radio direction-finding service; it can be used by the mobile service, for radiotelegraph correspondence, only subject to the conditions set forth in article 7.

(11) (*a*) The wave for the reply to a call transmitted on the general calling-wave [see § 1 (2)] shall be the wave of 500 kc (600 m), the same as that for calling.

(*b*) The wave for the reply to a call, for aircraft stations and aeronautical stations working in the band 315 to 365 kc (952 to 822 m) shall be the wave of 333 kc (900 m), the same as that for calling.

(*c*) The wave for the reply to a call transmitted on the international calling-wave of 143 kc (2,100 m) [see § 1 (4)] shall be:

the wave of 143 kc (2,100 m) for a mobile station;
the normal working-wave, for a coast station.

§ 2. (1) In order to increase safety of life at sea (ships), and over the sea (aircraft), all the stations of the maritime mobile service which normally listen on the waves of the authorized bands between 365 and 515 kc (822 and 583 m) must, during their working hours, make the necessary provisions to insure the watch on the distress wave [500 kc (600 m)] twice per hour, for 3 minutes, beginning at x:15 and at x:45 o'clock, Greenwich mean time.

(2) During the intervals indicated above, outside the transmissions mentioned in article 22 (§§ 22 to 28):

A. Transmissions must cease in the bands of 460 to 550 kc (652 to 545 m);

B. Outside these bands:

(*a*) transmissions of type-B waves shall be forbidden;

(*b*) other transmissions of the mobile service stations may continue; stations of the maritime mobile service may listen to these transmissions on the express condition that these stations shall first insure the watch on the distress wave, as provided for in subparagraph (1) of this paragraph.

§ 3. Since calls in the authorized bands between 365 and 515 kc (822 and 583 m) and from 315 to 365 kc (952 to 822 m) are normally made on the international calling-waves [§ 1 (2) and (3) above], mobile service stations open to the service of public correspondence and using waves from these bands for their work must, during their hours of watch, remain on watch on the calling-wave of their service. These stations, while observing the

provisions of article 19, § 2 (1) and (2) and § 4 D, are authorized to abandon this watch only when they are engaged in a communication on other waves.

§ 4. The following rules must be followed in the operation of stations of the mobile service using type-A1 waves in the band 100 to 160 kc (3,000 to 1,875 m):

A. (*a*) Any coast station carrying on a communication on one of these waves must listen on the wave of 143 kc (2,100 m), unless otherwise indicated in the nomenclature.

(*b*) The coast station shall transmit all its traffic on the wave or on the waves which are specifically assigned to it.

(*c*) A coast station to which one or more waves within the band 125 to 150 kc (2,400 to 2,000 m) have been allocated, shall have a prior right to this or these waves.

(*d*) Any other mobile service station transmitting public traffic on this or these waves and thereby causing interference with the said coast station must discontinue its work at the request of the latter.

B. (*a*) When a mobile station wishes to establish communication on one of these waves with another station of the mobile service, it must use the wave of 143 kc (2,100 m), unless otherwise indicated in the nomenclature.

(*b*) This wave, designated as a general calling-wave, must be used exclusively in the North Atlantic:

1. for making individual calls and answering these calls;
2. for transmitting signals preliminary to the transmission of traffic.

C. A mobile station, after having established communication with another station of the mobile service on the general calling-wave of 143 kc (2,100 m) must, so far as possible, transmit its traffic on some other wave of the authorized bands, provided it does not interfere with the work in progress of another station.

D. As a general rule, any mobile station equipped for service on type-A1 waves in the band 100 to 160 kc (3,000 to 1,875m) and which is not engaged in a communication on another wave, must, in order to permit the exchange of traffic with other stations of the mobile service, return each hour to the wave of 143 kc (2,100 m) for 5 minutes beginning at x:35 o'clock Greenwich mean time, during the specified hours, according to the category to which the station in question belongs.

E. (*a*) Land stations must, so far as possible, transmit calls in the form of call lists; in this case, the stations shall transmit their call lists at specified hours published in the nomenclature, on the wave or waves allocated to them, in the band 100 to 160 kc (3,000 to 1,875 m), but not on the wave of 143 kc (2,100 m).

(*b*) Land stations may, however, call mobile stations individually at any other time, outside the hours fixed for the transmission of call lists, according to circumstances or according to the work which they have to perform.

(*c*) The wave of 143 kc (2,100 m) may be used for individual calls and shall preferably be used for this purpose during the period indicated in § 4, D.

§ 5. Radio communications from aeronautical and aircraft stations shall, in principle, be exchanged in the following manner:

1. For aircraft stations:

(*a*) In radiotelephony (calling and working) for aircraft of which the crew does not include a radiotelegraph operator.

(*b*) In radiotelegraphy on continuous waves for aircraft of which the crew includes a radiotelegraph operator.

Calling: type-A2 waves.
Working: type-A1 waves (type A2 shall be permitted in the case of work on short waves).

2. For aeronautical stations:

(*a*) In radiotelephony (calling and working) when the station must communicate with an aircraft of which the crew does not include a radiotelegraph operator.

(*b*) In radiotelegraphy, when the station must communicate with an aircraft of which the crew includes a radiotelegraph operator.

Type-A1 waves (calling and working).
Type-A2 waves shall be permitted (calling and working) in the case of short waves.

APPENDIX C

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA[1]

PREAMBLE

The Governments of Germany, the Commonwealth of Australia, Belgium, Canada, Denmark, Spain, the Irish Free State, the United States of America, Finland, France, the United Kingdom of Great Britain and Northern Ireland, India, Italy, Japan, Norway, the Netherlands, Sweden, the Union of Socialist Soviet Republics; being desirous of promoting safety of life at sea by establishing in common agreement uniform principles and rules directed thereto;

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[1] On June 19, 1936 the United States Senate passed the following Resolution of Ratification:

Resolved (two-thirds of the Senators present concurring therein), That the Senate advise and consent to the ratification of the International Convention for Promoting Safety of Life at Sea, signed at London, May 31, 1929, subject to the following understandings:

(1) That nothing in this convention shall be so construed as to authorize any person to hold any seaman, whether a citizen of the United States of America or an alien, on board any merchant vessel, domestic or foreign, against his will, in a safe harbor within the jurisdiction of the United States of America, when such seaman has been officially admitted thereto as a member of the crew of such vessel or to compel such seaman to proceed to sea on such vessel against his will;

(2) That nothing in this convention shall be so construed as to nullify or modify section 4 of the Seaman's Act approved March 4, 1915 (38 Stat. 1164), as interpreted by the Supreme Court of the United States in *Strathearn v. Dillon* (252 U.S. 348); and

(3) That nothing in this convention shall be so construed as to prevent the officers of the United States of America who exercise the control over vessels provided for in article 54 from making such inspection of any vessel within the jurisdiction of the United States as may be necessary to determine that the condition of the vessel's seaworthiness corresponds substantially with the particulars set forth in its certificate; that the vessel is sufficiently and efficiently manned, and that it may proceed to sea without danger to either passengers or crew, or to prevent such officers from withholding clearance to any vessel which they find may not proceed to sea with safety, until such time as any such vessel shall be put in condition so that it can proceed to sea without danger to the passengers or crew.

Considering that this end may best be achieved by the conclusion of a Convention;

Have appointed their plenipotentiaries, namely:

[Here follow the names of the delegates.]

Who, having communicated their full powers, found in good and due form, have agreed as follows:

CHAPTER I—PRELIMINARY

ARTICLE 1

The Contracting Governments undertake to give effect to the provisions of the present Convention for the purpose of promoting safety of life at sea, to promulgate all regulations and to take all other steps which may be necessary to give the present Convention full and complete effect.

The provisions of the present Convention are completed by Regulations contained in Annex I, which have the same force and take effect at the same time as the present Convention. Every reference to the present Convention implies at the same time a reference to the Regulations annexed thereto.

ARTICLE 2

Applications and Definitions

1. The provisions of the present Convention shall apply to ships belonging to countries the Governments of which are Contracting Governments, and to ships belonging to territories to which the present Convention is applied under Article 62, as follows:

Chapter II.—(*Construction*), to passenger ships (mechanically propelled) on international voyages.

Chapter III.—(*Life-saving Appliances*), to passenger ships (mechanically propelled) on international voyages.

Chapter IV.—(*Radiotelegraphy*), to all ships engaged on international voyages except cargo ships of less than 1,600 tons gross tonnage.

Chapter V.—(*Safety of Navigation*), to all ships on all voyages.

Chapter VI.—(*Certificates*), to all the ships to which Chapters II, III and IV apply.

2. The classes of ships to which each chapter applies are more precisely defined, and the extent of the application is shown, in each chapter.

3. In the present Convention, unless expressly provided otherwise—

(*a*) a ship is regarded as belonging to a country if it is registered at a port of that country;

(*b*) the expression "Administration" means the Government of the country in which the ship is registered;

(*c*) an international voyage is a voyage from a country to which the present Convention applies to a port outside such country, or conversely; and for this purpose every colony, overseas territory, protectorate or territory under suzerainty or mandate is regarded as a separate country;

(*d*) a ship is a passenger ship if it carries more than 12 passengers;

(*e*) the expression "Regulations" means the Regulations contained in Annex I.

4. The present Convention, unless expressly provided otherwise, does not apply to ships of war.

ARTICLE 3

Cases of Force Majeure

No ship, which is not subject to the provisions of the present Convention at the time of its departure on any voyage, shall become subject to the provisions of the present Convention on account of any deviation from its intended voyage due to stress of weather or any other cause of *force majeure.*

Persons who are on board a ship by reason of *force majeure* or in consequence of the obligation laid upon the master to carry shipwrecked or other persons shall not be taken into account for the purpose of ascertaining the application to a ship of any provisions of the present Convention.

CHAPTER II.—CONSTRUCTION

[Articles 4, 5, 6, 7, 8, 9, and 10 do not relate to communications.]

CHAPTER III.—LIFE-SAVING APPLIANCES, &C.

[Articles 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, and 25 do not relate to communications.]

CHAPTER IV.—RADIOTELEGRAPHY

ARTICLE 26

Application and Definition

1. This chapter applies to all ships engaged on international voyages except cargo ships of less than 1,600 tons gross tonnage.

2. For the purposes of this chapter a cargo ship means any ship not being a passenger ship.

ARTICLE 27

Fitting of Radio Installation

1. All ships to which this chapter applies shall, unless exempted under Article 28, be fitted with a radiotelegraph installation complying with the provisions of Article 31, as follows:

(*a*) All passenger ships, irrespective of size.

(*b*) All cargo ships of 1,600 tons gross tonnage and upwards.

2. Each Administration may delay the application of the provisions of paragraph 1 (*b*) to cargo ships belonging to its country of less than 2,000 tons gross tonnage for a period not exceeding five years from the date of the coming into force of the present Convention.

ARTICLE 28

Exemptions from the Requirements of Article 27

1. Each Administration may, if it considers that the route and the conditions of the voyage are such as to render a radiotelegraph installation unreasonable or unnecessary, exempt ships belonging to its country from the requirements of Article 27 as follows:

I.—*Passenger Ships.*

(*a*) Individual passenger ships or classes of passenger ships which, in the course of their voyage, do not go more than—

(i) 20 miles from the nearest land;

or

(ii) 200 miles in the open sea between two consecutive ports.

(*b*) Passenger ships which make voyages entirely within the restricted areas specified in the Annex to this article.

II.—*Cargo Ships.*

Individual cargo ships or classes of cargo ships which, in the course of their voyage, do not go more than 150 miles from the nearest land.

2. Each Administration may, in addition, exempt ships belonging to its country of the following classes:

I.—Barges in tow and existing sailing ships.

An existing sailing ship is one the keel of which is laid before the 1st July, 1931.

II.—Ships of primitive build, such as dhows, junks, &c., if it is practically impossible to fit them with a radiotelegraph installation.

III.—Ships which are not normally engaged on international voyages, but which in exceptional circumstances are required to undertake a single voyage of that kind.

Annex to Article 28

1. The Baltic Sea and approaches thereto East of a line drawn from Utsire (Norway) in the North to Texel (Netherlands) in the South, outside the territorial jurisdiction of the Union of Socialist Soviet Republics.

2. The portions of the Gulf of Tartary and the Sea of Okhotsk covered in voyages between ports in Hokkaido and ports in Japanese Sakhalin.

3. The Chosen (Tyosen) Strait between a line in the North drawn from Kawajiri Misaki (Cape Natsungu) to Fusan, and a line in the South drawn from Nagasaki to Giffard Island (off the South-West point of Quelpart Island) and thence to Tin To (Amherst Island).

4. The Yellow Sea North of Parallel 37° North.

5. The Formosa Strait between a line in the North drawn from Fuki Kaku (Syauki Point) to Foochow and a line in the South drawn from South Cape (the South point of Formosa) to Hong Kong.

6. The area within the following limits:

Parallel 10° N. from long. 94° E. to the coast of Asia, coast of Asia to Saigon (Cape Tiwan), straight lines between Cape Tiwan, lat. 4° 30′ N. long. 110° E., south point of Palawan Island, Palmas (Miangas) Island, lat. 0° long. 140° E., lat. 0° long. 148° E., lat. 10° S. long. 148° E., Cape York, north coast of Australia from Cape York to Port Darwin (Cape Charles), straight lines between Cape Charles, Ashmore Reef (East Island), lat. 10° S. long. 109° E., Christmas Island, lat. 2° N. long. 94° E., lat. 10° N. long. 94° E., outside the territorial jurisdiction of Australia and of the United States of America.

7. The Caribbean Sea, outside the territorial jurisdiction of the United States of America, in relation to voyages made by sailing ships only.

8. The area of the South Pacific Ocean bounded by the Equator, Meridian 130° W., Parallel 34° S., and the coast of Australia, outside the territorial jurisdiction of Australia.

9. The Tong King Gulf and portions of the China Sea lying to the West of a line drawn from Hong Kong to Lat. 17° N. Long. 110° E., thence due South to Latitude 10° N., and thence West to Saigon.

10. The portions of the Indian Ocean covered in voyages between ports in Madagascar, Reunion and the Mauritius Islands.

11. The portions of the North Atlantic Ocean and Mediterranean Sea covered in voyages between Casablanca (Morocco) and Oran (Algeria) and intermediate ports.

ARTICLE 29

Watches

1. *Passenger Ships.*

Each passenger ship which, in accordance with Article 27, is required to be fitted with a radiotelegraph installation, shall, for safety purposes, carry a qualified operator, and, if not fitted with an auto-alarm, shall, whilst at sea, keep watches by means of a qualified operator or a certified watcher, as under:

(*a*) All passenger ships under 3,000 tons gross tonnage, as determined by the Administration concerned;

(*b*) All passenger ships of 3,000 tons gross tonnage and over, continuous watch.

Each Administration is authorised to exempt passenger ships belonging to its country from 3,000 tons to 5,500 tons gross tonnage, both included, from the requirement of a continuous watch for a period not exceeding one year from the date of the coming into force of the present Convention, provided that during the period of such exemption they shall maintain a watch of at least 8 hours per day.

2. *Cargo Ships.*

Each cargo ship which, in accordance with Article 27, is required to be fitted with a radiotelegraph installation, shall, for safety purposes, carry a qualified operator, and, if not fitted with an auto-alarm, shall, whilst at

sea, keep watches by means of a qualified operator or a certified watcher, as under:

(*a*) All cargo ships under 3,000 tons gross tonnage, as determined by the Administration concerned;

(*b*) Cargo ships from 3,000 to 5,500 tons gross tonnage, both included, at least 8 hours' watch per day;

(*c*) Cargo ships over 5,500 tons gross tonnage, continuous watch.

Each Administration is authorized to exempt ships belonging to its country included in (*c*) above from the requirement of a continuous watch for a period not exceeding one year from the date of the coming into force of the present Convention, provided that during the period of such exemption they shall maintain a watch of at least 8 hours per day.

Each Administration is also authorised to exempt ships belonging to its country from 5,500 tons to 8,000 tons gross tonnage from the requirement of a continuous watch for a further period of one year, provided that during this further period of exemption they shall maintain a watch of at least 16 hours per day.

3. On all ships fitted with an auto-alarm this auto-alarm shall, whilst the ship is at sea, always be in operation when the operator or watcher is not on watch.

On ships for which the hours of watch are to be determined by the Administration concerned, such watch should be maintained preferably at hours prescribed for radiotelegraph service by the International Radiotelegraph Convention in force.

On ships which are required to keep 8 hours' or 16 hours' watch per day, such watch shall be maintained at the hours prescribed for radiotelegraph service by the International Radiotelegraph Convention in force.

4. By *auto-alarm* is meant an automatic alarm receiver which complies with the requirements of Article 19, § 21, of the General Regulations annexed to the International Radiotelegraph Convention, 1927.

5. By *qualified operator* is meant a person holding a certificate complying with the provisions of the General Regulations annexed to the International Radiotelegraph Convention in force.

6. By *certified watcher* is meant any person holding a watcher's certificate issued under the authority of the Administration.

ARTICLE 30

Watchers

1. A watcher's certificate shall not be granted by a Contracting Government unless the applicant proves that he is capable—

(*a*) of receiving and understanding the alarm, distress, safety and urgency signals when these signals occur among a series of other signals;

(*b*) of correct reception by ear of code groups (mixed letters, figures and punctuation marks) at a speed of sixteen groups per minute, each group being composed of five characters and each figure or punctuation mark counting as two characters;

(*c*) of regulating the receivers used in the ship's radiotelegraph installation.

2. The Contracting Governments undertake to take steps to ensure that certified watchers observe the secrecy of correspondence.

ARTICLE 31

Technical Requirements

The radiotelegraph installations required by Article 27 above and the direction-finding apparatus required by Article 47 shall comply with the following requirements:

1. The ship's station must be placed in accordance with the detailed Regulations of the Government of the country to which the ship belongs, in the upper part of the ship in a position of the greatest possible safety, as high as practicable above the deepest load water line.

2. There shall be provided, between the bridge of the ship and the wireless telegraph room, means of communication either by voice pipe or by telephone or in some other manner equally efficient.

3. A reliable clock with a seconds hand must be provided in the wireless telegraph room.

4. A reliable emergency light must be provided in the wireless telegraph room.

5. The installation shall comprise a main installation and an emergency (reserve) installation. If, however, the main installation complies with all the requirements of an emergency (reserve) installation the latter is not then obligatory.

6. The main and emergency (reserve) installations must be capable of transmitting and receiving on the frequencies (wave lengths) and types of waves assigned by the International Radiotelegraph Convention in force for the purpose of distress and safety of navigation to ships compulsorily fitted with radiotelegraph installations in accordance with the present Convention.

7. The main and emergency (reserve) transmitters shall have a note frequency of at least 100.

8. The main transmitter shall have a *normal range* of 100 nautical miles, that is to say, it must be capable of transmitting clearly perceptible signals from ship to ship over a range of at least 100 nautical miles by day under normal conditions and circumstances, the receiver being assumed to be one employing a rectifier of the crystal type without amplification.[1]

[1] Unless a more precise and practical method is available to determine the range of transmitters it is recommended that, as a guide, the following relations between the range in nautical miles (from ship to ship under normal conditions in daytime) and the power of the ship transmitter in metre ampères for 500 kilocycles per second (600 m) be used:

100 nautical miles	60 M A
80 nautical miles	45 M A
50 nautical miles	25 M A

M being the actual height in metres of the aerial from its highest point to the load line.

A being the current in ampères measured at the base of the aerial in case of B, or fully modulated A 2, transmitters.

9. Sufficient power must be available in a ship station at all times to operate the main radiotelegraph installation efficiently under normal conditions over the above range.

10. All parts of the emergency (reserve) installation shall be placed in the upper part of the ship, in a position of the greatest possible safety, as high above the deepest load water line as practicable. The emergency (reserve) installation must be provided with a source of energy independent of the propelling power of the ship and of the main electricity system and must be capable of being put into operation rapidly and of working for at least six continuous hours.

For the emergency (reserve) installation, the normal range as defined in paragraph 8 above must be at least 80 nautical miles for ships required to maintain a continuous watch and at least 50 nautical miles for all other ships.[1]

11. The receiving installation must permit of the reception of such of the waves used for the transmission of time signals and meteorological messages as may be considered necessary by the Administration.

12. The receiver must be so arranged as to be capable of maintaining reception by means of a rectifier of the crystal type.

13. In ships in which watch is kept by means of an automatic alarm receiver a means of giving audible warning shall be provided in the wireless telegraph room, in the wireless operator's cabin, and on the bridge, which shall operate continuously after the receiver has been operated by the alarm signal or distress call until stopped. Only one switch for stopping the warning shall be provided and this shall be situated in the wireless telegraph room.

14. In such ships the wireless operator, when going off watch, shall connect the automatic alarm receiver to the aerial and test its efficiency. He shall report to the master or the officer on watch on the bridge whether it is in working order.

15. Whilst the ship is at sea the emergency source of power shall be maintained at its full efficiency and the automatic alarm receiver shall be tested at least once every 24 hours. A statement that both these requirements have been fulfilled must be inserted in the ship's official log daily.

16. A wireless log shall be carried by every ship compulsorily equipped with wireless transmitting apparatus. This document shall be kept in the wireless telegraph room, and in it shall be inserted the names of the operators and watchers as well as all incidents and occurrences connected with the wireless service which may appear to be of importance to safety of life at sea, and in particular all distress messages and distress traffic in full.

17. The direction-finding apparatus required by Article 47 shall be efficient and capable of receiving clearly perceptible signals and of taking bearings from which the true bearing and direction may be determined. It shall be capable of receiving signals on the frequencies prescribed for distress, direction finding and wireless telegraph beacons by the International Radiotelegraph Convention in force.

Efficient communication shall be provided between the apparatus and the bridge.

[1] See note on p. 507.

ARTICLE 32

Competence

The matters governed by the International Radiotelegraph Convention, Washington, 1927, and the regulations annexed thereto remain, and will continue, subject to the provisions:

(1) Of that convention and of the regulations annexed thereto, and of any convention and regulations which may in the future be substituted therefor;

(2) Of the present Convention in regard to all the points in which it supplements the aforementioned documents.

CHAPTER V.—SAFETY OF NAVIGATION

ARTICLE 33

Application

The provisions of this chapter referring to ships, unless otherwise expressly provided, apply to all ships on all voyages.

ARTICLE 34

Danger Messages

The master of every ship which meets with dangerous ice, a dangerous derelict, a dangerous tropical storm or any other direct danger to navigation is bound to communicate the information, by all the means of communication at his disposal, to the ships in the vicinity, and also to the competent authorities at the first point of the coast with which he can communicate. It is desirable that the said information be sent in the manner set out in Regulation XLVI.

Each Administration will take all steps which it thinks necessary to ensure that when intelligence of any of the dangers specified in the previous paragraph is received, it will be promptly brought to the knowledge of those concerned and communicated to other Administrations interested.

The transmission of messages respecting the dangers specified is free of cost to the ships concerned.

ARTICLE 35

Meteorological Services

The Contracting Governments undertake to encourage the collection of meteorological data by ships at sea, and to arrange for their examination, dissemination and exchange in the manner most suitable for the purpose of aiding navigation.

In particular, the Contracting Governments undertake to cooperate in carrying out, as far as practicable, the following meteorological arrangements:

(*a*) to warn ships of gales, storms and tropical storms, both by the issue of wireless messages and by the display of appropriate signals at coastal points:

(*b*) to issue daily, by radio, weather bulletins suitable for shipping, containing data of existing weather conditions and forecasts;

(*c*) to arrange for certain selected ships to take meteorological observations at specified hours, and to transmit such observations by wireless telegraphy for the benefit of other ships and of the various official meteorological services; and to provide coast stations for the reception of the messages transmitted;

(*d*) to encourage all ship-masters to inform surrounding ships whenever they experience wind force of 10 or above on the Beaufort scale (force 8 or above on the decimal scale.)

The information provided for in paragraphs (*a*) and (*b*) of this article will be furnished in form for transmission in accordance with Article 31, §§ 1, 3 and 5, and Article 19, § 25, of the General Regulations annexed to the International Radiotelegraph Convention, Washington, 1927, and during transmission "to all stations" of meteorological information, forecasts and warnings, all ship stations must conform to the provisions of Article 31, § 2, of those General Regulations.

Weather observations from ships addressed to national meteorological services will be transmitted with the priority specified in Article 3, Additional Regulations, International Radiotelegraph Convention, Washington, 1927.

Forecasts, warnings, synoptic and other meteorological reports intended for ships shall be issued and disseminated by the national service in the best position to serve various zones and areas, in accordance with mutual arrangements made by the countries concerned.

Every endeavour will be made to obtain a uniform procedure in regard to the international meteorological services specified in this article, and, as far as is practicable, to conform to the recommendations made by the International Meteorological Organization, to which organization the Contracting Governments may refer for study and advice any meteorological questions which may arise in carrying out the present Convention.

[Articles 36, 37, 38, 39, 40, and 41 do not relate to communications.]

ARTICLE 42

Misuse of Distress Signals

The use of an international distress signal, except for the purpose of indicating that a vessel is in distress, and the use of any signal which may be confused with an international distress signal, are prohibited on every ship.

ARTICLE 43

Alarm, Distress and Urgency Signals

The alarm signal and the distress signal may only be used by ships in serious and imminent danger which require immediate assistance. In all other cases in which assistance is required, or in which a vessel desires to issue a warning that it may become necessary to send out the alarm signal or the distress signal at a later stage, use must be made of the urgency signal

(XXX) established by the International Radiotelegraph Convention, Washington, 1927.

If a ship has sent out the alarm or distress signal and subsequently finds that assistance is no longer required such ship shall immediately notify all stations concerned as provided for by the Radiotelegraph Convention in force.

ARTICLE 44

Speed of Distress Messages

The speed of transmission of messages in connection with cases of distress, urgency or safety, shall not exceed 16 words per minute.

ARTICLE 45

Distress Messages—Procedure

1. The master of a ship on receiving on his ship a wireless distress signal from any other ship, is bound to proceed with all speed to the assistance of the persons in distress, unless he is unable, or in the special circumstances of the case, considers it unreasonable or unnecessary to do so, or unless he is released under the provisions of paragraphs 3 and 4 of this article.

2. The master of a ship in distress, after consultation, so far as may be possible, with the masters of the ships which answer his call for assistance, has the right to requisition such one or more of those ships as he considers best able to render assistance, and it shall be the duty of the master or masters of the ship or ships requisitioned to comply with the requisition by continuing to proceed with all speed to the assistance of the persons in distress.

3. A master shall be released from the obligation imposed by paragraph 1 of this article as soon as he is informed by the master of the ship requisitioned, or, where more ships than one are requisitioned, all the masters of the ships requisitioned, that he or they are complying with the requisition.

4. A master shall be released from the obligation imposed by paragraph 1 of this article, and, if his ship has been requisitioned, from the obligation imposed by paragraph 2 of this article, if he is informed by a ship which has reached the persons in distress, that assistance is no longer necessary.

5. If a master of a ship, on receiving a wireless distress call from another ship, is unable, or in the special circumstances of the case considers it unreasonable or unnecessary to go to the assistance of that other ship, he must immediately inform the master of that other ship accordingly, and enter in his log book his reasons for failing to proceed to the assistance of the persons in distress.

[Article 46 does not relate to communications.]

ARTICLE 47

Direction-Finding Apparatus

Every passenger ship of 5,000 tons gross tonnage and upwards shall, within two years from the date on which the present Convention comes in

force, be provided with an approved direction-finding apparatus (radio compass), complying with the provisions of Article 31 (17) of the present Convention.

[Article 48 does not relate to communications.]

CHAPTER VI.—CERTIFICATES

ARTICLE 49

Issue of Certificates

A certificate called a *Safety Certificate* shall be issued, after inspection and survey, to every passenger ship which complies in an efficient manner with the requirements of Chapters II, III and IV of the Convention.

A certificate called a *Safety Radiotelegraphy Certificate* shall be issued after inspection to every ship other than a passenger ship which complies in an efficient manner with the requirements of Chapter IV of the present Convention.

A certificate called an *Exemption Certificate* shall be issued to every ship to which exemption is granted by a Contracting Government under, and in accordance with, the provisions of Chapters II, III and IV of the present Convention.

The inspection and survey of ships, so far as regards the enforcement of the provisions of the present Convention and the annexed Regulations applicable to such ships and the granting of exemptions therefrom, shall be carried out by officers of the country in which the ship is registered, provided that the Government of each country may entrust the inspection and survey of its ships either to Surveyors nominated for this purpose or to organisations recognised by it. In every case the Government concerned fully guarantees the completeness and efficiency of the inspection and survey.

A Safety Certificate, Safety Radiotelegraphy Certificate, and Exemption Certificate shall be issued either by the Government of the country in which the ship is registered or by any person or organisation duly authorised by that Government. In every case that Government assumes full responsibility for the certificate.

ARTICLE 50

Issue of Certificate by Another Government

A Contracting Government may, at the request of the Government of a country in which a ship coming under the present Convention is registered, cause that ship to be surveyed, and, if satisfied that the requirements of the present Convention are complied with, issue a Safety Certificate or Safety Radiotelegraphy Certificate to such ship, under its own responsibility. Any certificate so issued must contain a statement to the effect that it has been issued at the request of the Government of the country in which the ship is registered, and it shall have the same force and receive the same recognition as a certificate issued under Article 49 of the present Convention.

ARTICLE 51

Form of Certificates

All certificates shall be drawn up in the official language or languages of the country by which they are issued.

The form of the certificates shall be that of the models given in Regulation XLVII. The arrangement of the printed part of the standard certificates shall be exactly reproduced in the certificates issued, or in certified copies thereof, and the particulars inserted by hand shall in the certificates issued, or in certified copies thereof, be inserted in Roman characters and Arabic figures.

The Contracting Governments undertake to communicate one to another a sufficient number of specimens of their certificates for the information of their officers. This exchange shall be made, so far as possible, before the 1st January, 1932.

ARTICLE 52

Duration of Certificates

Certificates shall not be issued for a period of more than twelve months.

If a ship at the time when its certificate expires is not in a port of the country in which it is registered the certificate may be extended by a duly authorised officer of the country to which the ship belongs; but such extension shall be granted only for the purpose of allowing the ship to complete its return voyage to its own country, and then only in cases in which it appears proper and reasonable so to do.

No certificate shall be extended for a longer period than five months, and a ship to which such extension is granted shall not, on returning to its own country, be entitled by virtue of such extension to leave that country again without having obtained a new certificate.

ARTICLE 53

Acceptance of Certificates

Certificates issued under the authority of a Contracting Government shall be accepted by the other Contracting Governments for all purposes covered by the present Convention. They shall be regarded by the other Contracting Governments as having the same force as the certificates issued by them to their own ships.

ARTICLE 54

Control

Every ship holding a certificate issued under Article 49 or Article 50 is subject, in the ports of the other Contracting Governments, to control by officers duly authorised by such Governments in so far as this control is

directed towards verifying that there is on board a valid certificate, and if necessary, that the conditions of the vessel's seaworthiness correspond substantially with the particulars of that certificate; that is to say, so that the ship can proceed to sea without danger to the passengers and the crew.

In the event of this control giving rise to intervention of any kind, the officer carrying out the control shall forthwith inform the Consul of the country in which the ship is registered of all the circumstances in which intervention is deemed to be necessary.

ARTICLE 55

Privileges

The privileges of the present Convention may not be claimed in favour of any ship unless it holds a proper valid certificate.

[Article 56 does not relate to communications.]

CHAPTER VII.—GENERAL PROVISIONS

ARTICLE 57

Equivalents

Where in the present Convention it is provided that a particular fitting, appliance or apparatus, or type thereof, shall be fitted or carried in a ship, or that any particular arrangement shall be adopted, any Administration may accept in substitution therefor any other fitting, appliance or apparatus, or type thereof, or any other arrangement, provided that such Administration shall have been satisfied by suitable trials that the fitting, appliance or apparatus, or type thereof, or the arrangement substituted is at least as effective as that specified in the present Convention.

Any Administration which so accepts a new fitting, appliance or apparatus, or type thereof, or new arrangement, shall communicate the fact to the other Administrations, and, upon request, the particulars thereof, together with a report on the trials made.

ARTICLE 58

Laws, Regulations, Reports

The Contracting Governments undertake to communicate to each other—

(1) the text of laws, decrees and regulations which shall have been promulgated on the various matters within the scope of the present Convention;

(2) all available official reports or official summaries of reports in so far as they show the results of the provisions of the present Convention, provided always that such reports or summaries are not of a confidential nature.

The Government of the United Kingdom of Great Britain and Northern Ireland is invited to serve as an intermediary for collecting all this information and for bringing it to the knowledge of the other Contracting Governments.

ARTICLE 59

Measures Taken after Agreement

Where the present Convention provides that a measure may be taken after agreement between all or some of the Contracting Governments, the Government of the United Kingdom of Great Britain and Northern Ireland is invited to approach the other Contracting Governments with a view to ascertaining whether they accept such proposals as may be made by any Contracting Government for effecting such a measure, and to inform the other Contracting Governments of the results of the enquiries thus made.

ARTICLE 60

Prior Treaties and Conventions

1. The present Convention replaces and abrogates the Convention for the Safety of Life at Sea, which was signed at London on the 20th January, 1914.

2. All other treaties, conventions and arrangements relating to safety of life at sea, or matters appertaining thereto, at present in force between Governments parties to the present Convention, shall continue to have full and complete effect during the terms thereof as regards—

(*a*) ships to which the present Convention does not apply;

(*b*) ships to which the present Convention applies, in respect of subjects for which it has not expressly provided.

To the extent, however, that such treaties, conventions or arrangements conflict with the provisions of the present Convention, the provisions of the present Convention shall prevail.

3. All subjects which are not expressly provided for in the present Convention remain subject to the legislation of the Contracting Governments.

ARTICLE 61

Modifications—Future Conferences

1. Modifications of the present Convention which may be deemed useful or necessary improvements may be at any time proposed by any Contracting Government to the Government of the United Kingdom of Great Britain and Northern Ireland, and such proposals shall be communicated by the latter to all the other Contracting Governments, and if any such modifications are accepted by all the Contracting Governments (including Governments which have deposited ratifications or accessions which have not yet become effective) the present Convention shall be modified accordingly.

2. Conferences for the purpose of revising the present Convention shall be held at such times and places as may be agreed upon by the Contracting Governments.

A Conference for this purpose shall be convoked by the Government of the United Kingdom of Great Britain and Northern Ireland whenever, after the present Convention has been in force for five years, one-third of the Contracting Governments express a desire to that effect.

CHAPTER VIII.—FINAL PROVISIONS

ARTICLE 62

Application to Colonies, &c.

1. A Contracting Government may, at the time of signature, ratification, accession or thereafter, by a declaration in writing addressed to the Government of the United Kingdom of Great Britain and Northern Ireland, declare its desire that the present Convention shall apply to all or any of its colonies, overseas territories, protectorates or territories under suzerainty or mandate, and the present Convention shall apply to all the territories named in such declaration, two months after the date of the receipt thereof, but failing such declaration, the present Convention will not apply to any such territories.

2. A Contracting Government may at any time by a notification in writing addressed to the Government of the United Kingdom of Great Britain and Northern Ireland express its desire that the present Convention shall cease to apply to all or any of its colonies, overseas territories, protectorates or territories under suzerainty or mandate to which the present Convention shall have, under the provisions of the preceding paragraph, been applicable for a period of not less than five years, and in such case the present Convention shall cease to apply one year after the date of the receipt of such notification by the Government of the United Kingdom of Great Britain and Northern Ireland to all territories mentioned therein.

3. The Government of the United Kingdom of Great Britain and Northern Ireland shall inform all the other Contracting Governments of the application of the present Convention to any colony, overseas territory, protectorate or territory under suzerainty or mandate under the provisions of paragraph 1 of this article, and of the cessation of any such application under the provisions of paragraph 2, stating in each case the date from which the present Convention has become or will cease to be applicable.

ARTICLE 63

Authentic Texts—Ratification

The present Convention of which both the English and French texts shall be authentic shall bear this day's date.

The present Convention shall be ratified.

The instruments of ratification shall be deposited in the archives of the Government of the United Kingdom of Great Britain and Northern Ireland which will notify all the other signatory or acceding Governments of all ratifications deposited and the date of their deposit.

ARTICLE 64

Accession

A Government (other than the Government of a territory to which Article 62 applies) on behalf of which the present Convention has not been

signed shall be allowed to accede thereto at any time after the Convention has come into force. Accessions may be effected by means of notifications in writing addressed to the Government of the United Kingdom of Great Britain and Northern Ireland, and shall take effect three months after their receipt.

The Government of the United Kingdom of Great Britain and Northern Ireland shall inform all signatory and acceding Governments of all accessions received and of the date of their receipt.

A Government which intends to accede to the present Convention but desires to add an area to those specified in the Annex to Article 28 shall, before notifying its accession, inform the Government of the United Kingdom of Great Britain and Northern Ireland of its desire for communication to all the other Contracting Governments. If all the Contracting Governments signify their assent thereto, the area shall be added to those mentioned in the aforesaid Annex when such Government notifies its accession.

ARTICLE 65

Date of Coming in Force

The present Convention shall come into force on the 1st July, 1931, as between the Governments which have deposited their ratifications by that date, and provided that at least five ratifications have been deposited with the Government of the United Kingdom of Great Britain and Northern Ireland. Should five ratifications not have been deposited on that date, the present Convention shall come into force three months after the date on which the fifth ratification is deposited. Ratifications deposited after the date on which the present Convention has come into force shall take effect three months after the date of their deposit.

ARTICLE 66

Denunciation

The present Convention may be denounced on behalf of any Contracting Government at any time after the expiration of five years from the date on which the Convention comes into force in so far as that Government is concerned. Denunciation shall be effected by a notification in writing addressed to the Government of the United Kingdom of Great Britain and Northern Ireland, which will notify all the other Contracting Governments of all denunciations received and of the date of their receipt.

A denunciation shall take effect twelve months after the date on which notification thereof is received by the Government of the United Kingdom of Great Britain and Northern Ireland.

In faith whereof, the plenipotentiaries have signed hereafter.

Done at London this thirty-first day of May, 1929, in a single copy, which shall remain deposited in the archives of the Government of the United

Kingdom of Great Britain and Northern Ireland, which shall transmit certified true copies thereof to all signatory Governments.

ANNEX I

REGULATIONS

CONSTRUCTION

[Regulations I to XXXV inclusive and XXXVI (1) do not relate to Communications.]

REGULATION XXXVI

Equipment of Boats and Life Rafts

2. Where the number of lifeboats carried on a ship is more than 13, one shall be a motor boat, and where the number is more than 19, two shall be motor boats. These motor lifeboats shall be fitted with a wireless telegraph installation and a searchlight.

The wireless telegraph installation shall comply with conditions as to range and efficiency to be decided by each Administration.

The searchlight shall include a lamp of at least 80 watts, an efficient reflector and a source of power which will give effective illumination of a light coloured object over a width of about 18 metres (60 feet) at a distance of 180 metres (200 yards) for a total period of six hours, and it shall be capable of working for three hours continuously.

Where the power for the wireless equipment and the searchlight are derived from the same source, this shall be sufficient to provide for the adequate working of both appliances.

[Sections 3 and 4 of Regulation XXXVI do not relate to communications. Regulations XXXVII, XXXVIII, XXXIX, XL, and XLI do not relate to communications.]

REGULATION XLII

Manning of Boats

A deck officer or certificated lifeboatman shall be placed in charge of each boat or life raft and a second in command shall also be nominated. The person in charge shall have a list of its crew, and shall see that the men placed under his orders are acquainted with their several duties.

A man capable of working the motor shall be assigned to each motor boat.

A man capable of working the wireless and searchlight installations shall be assigned to boats carrying this equipment.

The duty of seeing that the boats, life rafts and buoyant apparatus and other lifesaving apparatus are at all times ready for use shall be assigned to one or more officers.

[Regulations XLIII, XLIV, and XLV do not relate to communications.]

Safety of Navigation

Regulation XLVI

Transmission of Information

The transmission of information regarding ice, derelicts, tropical storms or any other direct danger to navigation is obligatory. The form in which the information is sent is not obligatory. It may be transmitted either in plain language (preferably English) or by means of the International Code of Signals (Wireless Telegraphy Section). It should be issued CQ to all ships, and should also be sent to the first point of the coast to which communication can be made with a request that it be transmitted to the appropriate authority.

All messages issued under Article 34 of the present Convention will be preceded by the safety signal TTT followed by an indication of the nature of the danger, thus: TTT Ice; TTT Derelict; TTT Storm; TTT Navigation.

Information Required

The following information is desired, the time in all cases being Greenwich mean time:

(*a*) Ice, Derelicts and Other Direct Dangers to Navigation.

(1) the kind of ice, derelict or danger observed;

(2) the position of the ice, derelict or danger when last observed;

(3) the time and date when the observation was made.

(*b*) Tropical Storms.—(Hurricanes in the West Indies, typhoons in the China seas, cyclones in Indian waters, and storms of a similar nature in other regions.)

(1) *A statement that a tropical storm has been encountered.*—This obligation should be interpreted in a broad spirit, and information transmitted whenever the master has good reason to believe that a tropical storm exists in his neighborhood.

(2) *Meteorological information.*—In view of the great assistance given by accurate meteorological data in fixing the position and movement of storm centres, each shipmaster should add to his warning message as much of the following meteorological information as he finds practicable:

(*a*) barometric pressure (millibars, inches or millimetres);

(*b*) change in barometric pressure (the change during the previous two to four hours);

(*c*) wind direction (true not magnetic);

(*d*) wind force (Beaufort or decimal scale);

(*e*) state of the sea (smooth, moderate, rough, high);

(*f*) swell (slight, medium, heavy) and the direction from which it comes.

When barometric pressure is given the word "millibars," "inches" or "millimetres," as the case may be, should be added to the reading,

and *it should always be stated whether the reading is corrected or uncorrected.*

When changes of the barometer are reported the course and speed of the ship should also be given.

All directions should be true, not magnetic.

(3) *Time and date and position of the ship.*—These should be for the time and position when the meteorological observations reported were made and not when the message was prepared or despatched. The time used in all cases should be Greenwich mean time.

(4) *Subsequent observations.*—When a master has reported a tropical storm it is desirable, but not obligatory, that other observations be made and transmitted at intervals of three hours, so long as the ship remains under the influence of the storm.

Examples

ICE.

TTT Ice. Large berg sighted in 4605 N., 4410 W., at 0800 GMT. May 15.

DERELICT.

TTT Derelict. Observed derelict almost submerged in 4006 N., 1243 W., at 1630 GMT. April 21.

DANGER TO NAVIGATION.

TTT Navigation. Alpha lightship not on station. 1800 GMT. January 3.

TROPICAL STORM.

TTT Storm. Experiencing tropical storm. Barometer corrected 994 millibars, falling rapidly. Wind NW., force 9, heavy squalls. Swell E. Course ENE., 5 knots. 2204 N., 11354 E. 0030 GMT. August 18.

TTT Storm. Appearances indicate approach of hurricane. Barometer corrected 29.64 inches falling. Wind NE., force 8. Swell medium from NE. Frequent rain squalls. Course 35°, 9 knots. 2200 N., 7236 W. 1300 GMT. September 14.

TTT Storm. Conditions indicate intense cyclone has formed. Wind S. by W. force 5. Barometer uncorrected 753 millimetres, fell 5 millimetres last three hours. Course N. 60 W., 8 knots. 1620 N., 9302 E. 0200 GMT. May 4.

TTT Storm. Typhoon to south-east. Wind increasing from N. and barometer falling rapidly. Position 1812 N., 12605 E. 0300 GMT. June 12.

CERTIFICATES

REGULATION XLVII

Form of Safety Certificate for Passenger Ships

SAFETY CERTIFICATE

(*Official Seal*) (*Country*)

for $\frac{\text{an}}{\text{a short}}$ international voyage.

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR SAFETY OF LIFE AT SEA, 1929

Name of ship	Distinctive number or letters	Port of registry	Gross tonnage

$\frac{\text{The}}{\text{I, the undersigned,}}$ $\frac{\text{(*Name*) Government certifies}}{\text{(*Name*) certify}}$

I. That the above-mentioned ship has been duly surveyed in accordance with the provisions of the International Convention referred to above.

II. That the survey showed that the ship complied with the requirements of the said Convention as regards—

(1) the hull, main and auxiliary boilers and machinery;

(2) the watertight subdivision arrangements and details;

(3) the following subdivision loadlines:

Subdivision loadlines assigned and marked on the ship's side at amidships (Convention Article 5)	Freeboard	To apply when the spaces in which passengers are carried include the following alternative spaces
C. 1.....	.....	.....
C. 2.....	.....	.....
C. 3.....	.....	.....

(4) the boats, life rafts and life-saving appliances which provide for a total number (crew and passengers) of.....persons, and no more, viz.:

.....boats capable of accommodating.....persons.
.....life rafts " " ..... "
.....buoyant apparatus capable of supporting.....persons.
.....life-buoys.
.....life-jackets.
.....certificated lifeboatmen.

(5) the radiotelegraph installations:

	Requirements of Articles.....of the said Convention.	Actual provision
Hours of watch	.....	.....
Whether approved auto-alarm fitted	.....	.....
Whether separate emergency installation fitted	.....	.....
Minimum number of operators	.....	.....
Additional operators or watchers	.....	.....
Whether direction-finding apparatus fitted	.....	.....

III. That in all other respects the ship complies with the requirements of the said Convention, so far as those requirements apply thereto.

This certificate is issued under the authority of the Government. It will remain in force until

Issued at the day of

Here follows the seal or signature of the authority entitled to issue this certificate.

(*Seal*)

If signed, the following paragraph is to be added:

The undersigned declares that he is duly authorised by the said Government to issue this certificate.

(*Signature*)

Form of Safety Radiotelegraphy Certificate

SAFETY RADIOTELEGRAPHY CERTIFICATE

(*Official Seal*) (*Country*)

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR SAFETY OF LIFE AT SEA, 1929

Name of ship	Distinctive number or letters	Port of registry	Gross tonnage

The (*Name*) Government certify
I, the undersigned, (*Name*) certify

That the above-mentioned ship complies with the provisions of the International Convention referred to above as regards radiotelegraphy:

	Requirements of Articles.....of the said Convention.	Actual provision
Hours of watch	.....	.....
Whether approved auto-alarm fitted	.....	.....
Whether separate emergency installation fitted	.....	.....
Minimum number of operators	.....	.....
Additional operators or watchers	.....	.....
Whether direction-finding apparatus fitted	.....	.....

This certificate is issued under the authority of the Government. It will remain in force until

Issued at the day of

Here follows the seal or signature of the authority entitled to issue this certificate.

(*Seal*)

If signed, the following paragraph is to be added:

The undersigned declares that he is duly authorised by the said Government to issue this certificate.

(*Signature*)

Form of Exemption Certificate

EXEMPTION CERTIFICATE

(*Official Seal*) (*Country*)

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR SAFETY OF LIFE AT SEA, 1929

Name of ship	Distinctive number or letters	Port of registry	Gross tonnage

I, the undersigned, The (*Name*) Government certify

(*Name*) certify

That the above-mentioned ship is under the authority conferred by Article.....of the International Convention referred to above exempted from the requirements of†.....
of the Convention on the voyages.....
to.....

*Insert here the conditions, if any, on which the exemption certificate is granted. *

This certificate is issued under the authority of the Government. It will remain in force until

Issued at the day of

Here follows the seal or signature of the authority entitled to issue this certificate.

(*Seal*)

If signed, the following paragraph is to be added:

The undersigned declares that he is duly authorised by the said Government to issue this certificate.

(*Signature*)

ANNEX II

INTERNATIONAL REGULATIONS FOR PREVENTING COLLISIONS AT SEA

[Articles 1 to 31 inclusive do not relate to Communications.]

FINAL ACT OF THE INTERNATIONAL CONFERENCE ON SAFETY OF LIFE AT SEA, 1929

The Governments of Germany, the Commonwealth of Australia, Belgium, Canada, Denmark, Spain, the Irish Free State, the United States of America, Finland, France, the United Kingdom of Great Britain and Northern Ireland, India, Italy, Japan, Norway, the Netherlands, Sweden, the Union of Socialist Soviet Republics;

Desirous of promoting safety of life at sea by establishing in common agreement uniform principles and rules directed thereto;

Having decided to participate in an international conference which, upon the invitation of the Government of the United Kingdom of Great Britain and Northern Ireland, was held in London;

Appointed the following delegations:

[Here follow the names of the delegates.]

In the course of a series of meetings between the 16th April, 1929, and the 31st May, 1929, a convention, dated the 31st May, 1929, for the safety of life at sea was drawn up.

[Sections I and II do not relate to communications.]

† Insert here references to articles and regulations, specifying particular paragraphs.

ANNEX III

The Conference also adopts the following recommendations:

AS REGARDS CONSTRUCTION

[Subsections 1, 2, 3, 4, and 5 do not relate to communications.]

AS REGARDS RADIOTELEGRAPHY

6. Alarm Signal

The International Conference on Safety of Life at Sea, having approved of the use of the automatic alarm receiver for watchkeeping purposes, and anticipating that a large number of these receivers will be installed in passenger and cargo ships in the near future, recommends that the next International Radiotelegraph Conference prescribe that "the alarm signal shall, as a general rule, precede the distress signal."

7. Cyclone Warnings

The International Conference on Safety of Life at Sea, considering that it is of more importance to prevent disaster than to render assistance after a disaster has occurred, and being of the opinion that in certain cases use may be made of the auto-alarm to this end, strongly recommends that the next International Radiotelegraph Conference authorise Governments to permit coast stations under their jurisdiction to precede the broadcasting of emergency cyclone warnings by the alarm signal.

8. Wave Lengths

The International Conference on Safety of Life at Sea draws the attention of the Governments concerned to the advisability of ensuring that signals of distress utilising waves of Type A2 shall be effective over a sufficiently wide band of frequencies.

The Conference also desires to draw attention to the provisions of Article 5, § 11, of the Regulations annexed to the International Radiotelegraph Convention, Washington, 1927, and to point out that radiotelephonic transmissions on frequencies in the neighbourhood of the distress wave will render inoperative automatic alarm receivers working on the alarm signal defined in Article 19, § 21, (*e*), of the above-mentioned Regulations. The Conference desires, therefore, to emphasise the importance, in the interests of safety of life at sea, of avoiding the use of radiotelephonic emissions in the neighbourhood of the distress wave, except in case of emergency.

AS REGARDS SAFETY OF NAVIGATION

9. Radio Aids to Navigation

The International Conference on Safety of Life at Sea recommends that the Contracting Governments should establish and maintain an adequate system of radio aids to navigation, and should take all necessary measures to ensure the efficiency and reliability of such services.

10. Synchronised Radio and Under-water Signals

The International Conference on Safety of Life at Sea favours the extension of the installation of distance-finding apparatus capable of emitting synchronised radio and under-water signals, as necessary to meet navigational needs in distance finding and position finding by vessels.

11. Depth-sounding Apparatus

The International Conference on Safety of Life at Sea recommends that the Contracting Governments should encourage the development and use of echo depth-sounding apparatus.

12. Life-saving Signals

The International Conference on Safety of Life at Sea considers that the signals for life-saving stations communicating with vessels in distress and signals for vessels in distress communicating with life-saving stations should be international.

[Subsections 13 and 14 do not relate to communications.]

AS REGARDS CERTIFICATES

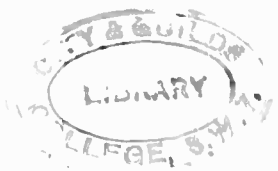
15. Recognition of Convention Standards

Recognising the importance of bringing the Convention standards into operation at the earliest possible date, it is recommended that all such steps as may be practicable should be taken by the Contracting Governments to secure the recognition in international trade as from the date of the signing of this Convention of such ships as in fact conform to such standards.

In faith whereof the undersigned have affixed their signatures to the present Act.

Done in London this thirty-first day of May, 1929, in a single copy which shall be deposited in the archives of the Government of the United Kingdom of Great Britain and Northern Ireland, which shall transmit certified true copies thereof to all signatory Governments.

[Here follow the signatures.]



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