

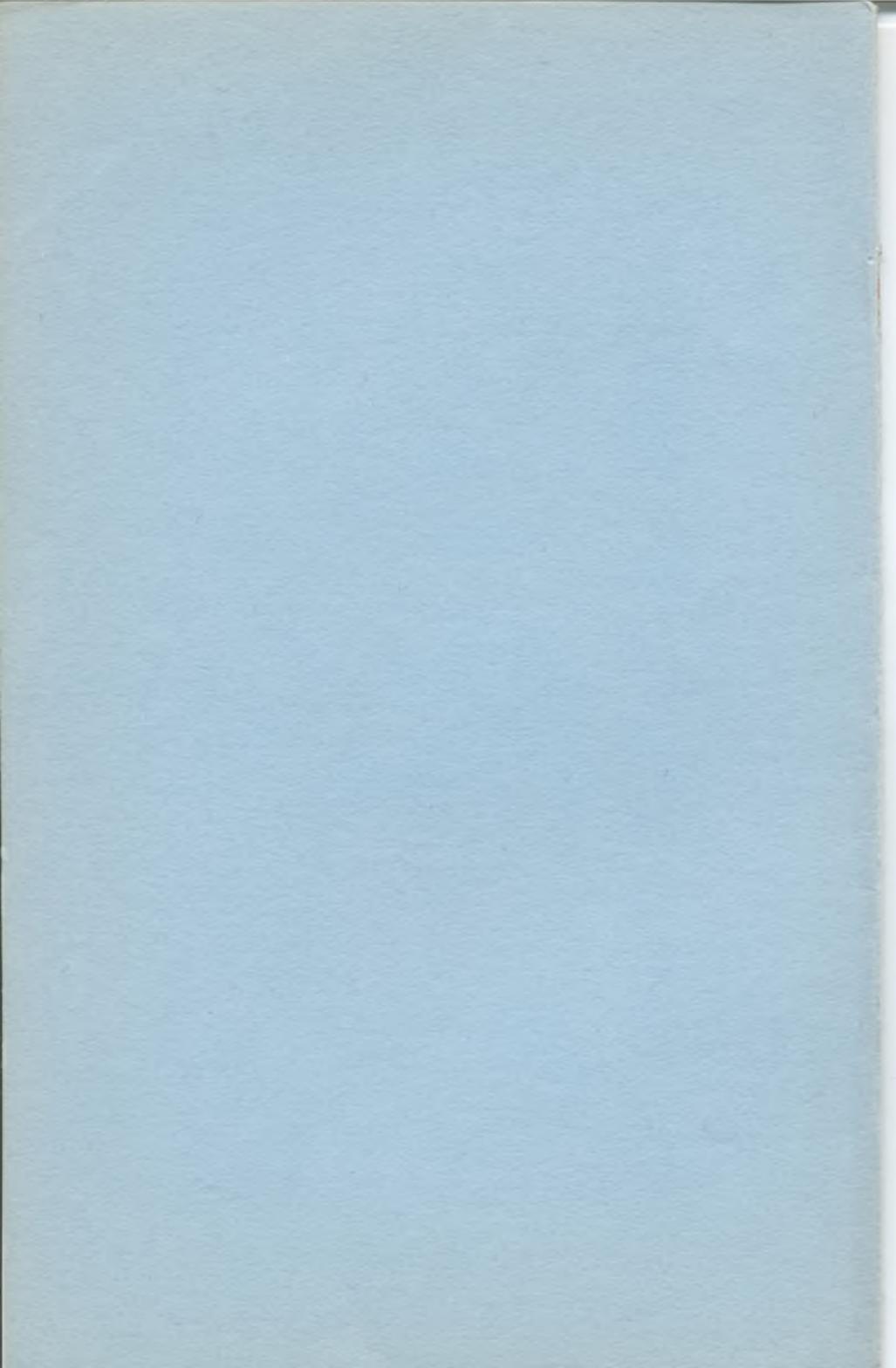
Annual Report of the Directors
of
Radio Corporation
of America

to the

Stockholders for the year ended
December 31, 1922



New York, 1923



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**Report of the Directors
of
Radio Corporation of America**

New York, March 30, 1923

TO THE STOCKHOLDERS :

The Directors of the Radio Corporation of America, submit the following review of operations for the year ended December 31st, 1922 :

The scope of the business of your Corporation covers radio telegraphy both for domestic and overseas business, and radio telephony, both overseas and ship business, and radio telegraphy and radio telephony for amateur, broadcast receiving and certain private uses.

Your Corporation, as you will recall, was formed as the result of an appeal by representatives of the Navy Department of the United States Government, to the ends of (1) establishing an American owned, operated and controlled radio communications company, powerful enough to meet the competition of the radio interests of other nations; (2) establishing such an international communications system that the United States would not be dependent upon the foreign owned cables; and (3) providing for the construction and operation of radio stations at home and abroad under such terms and conditions as would best serve the needs of the American people and their Government.

Your Corporation, during the past year, for the first time has been able to develop free from previously existing patent restrictions, receiving and sending apparatus, essential for carrying out the purposes for which the Corporation was formed. Additional facilities for high powered wireless telegraphy have been provided at home, and today, the United States is foremost in the development of international radio stations, having more long distance circuits in operation than any other country in the world.

Radio telephone broadcasting has also reached a more advanced stage of development in the United States than in any other country in the world.

Since the issuance of the last Annual Report the American Telephone & Telegraph Company has disposed of its holding of stock in your Corporation, and the following is an extract from the recently issued Annual Report of the American Telephone & Telegraph Company :

“The exchange of patent licenses between this and certain other companies, described in the report for 1920, has proved valuable. The cooperation in research and use of facilities which it provided has greatly facilitated our experiments in trans-oceanic wireless telephony. Ownership of stock in the Radio Corporation of America has not, however, proved to be necessary for cooperation. Therefore, in line with our general policy to hold permanently only the stocks and securities directly related to a national telephone service, we have disposed of all stock in the Radio Corporation, a small amount which appears among the assets on December 31st, having since been sold.”

Your Corporation continues to enjoy the benefits of the highly developed engineering and research organizations of the General Electric Company, the Westinghouse Electric and Manufacturing Company, the United Fruit Company (through its associated Company the Wireless Specialty Apparatus Company), the American Telephone & Telegraph Company and the Western Electric Company.

CONTRACT WITH THE GOVERNMENT OF SWEDEN

During the year, your Corporation entered into an agreement with the Royal Telegraph Administration of the Kingdom of Sweden for a super-power station to be erected at Varberg, Sweden, for communication with the rest of the world and primarily with the United States.

On August 14th, 1922, the final contract was executed, and your Corporation has forwarded to Sweden plans and drawings on which the construction work will be based.

When the transmitting station is complete, it will have two Alexanderson alternators and an antenna supported by six four hundred-foot self-supporting towers. The receiving station, Kungsbacka, will be provided with a long directional receiving antenna and two complete sets of receiving apparatus of the latest type capable of receiving simultaneously from two sending stations. The actual telegraph manipulation of both transmitting and receiving stations will be performed at a central office in Gothenburg which will be connected with the transmitting and receiving stations by ordinary land wires in accord with the established American practice.

At the time the contract for furnishing the station was closed, your Corporation also entered into a mutually satisfactory traffic agreement with the Swedish Government, which provides favorable terms for the exchange of wireless telegraph traffic between the two countries.

CONTRACT WITH THE GOVERNMENT OF POLAND

In the Annual Report for the year 1920 and 1921, mention was made of the contract which your Corporation has with the Polish Government for the establishment of a super-power station at Warsaw, Poland, for communication with the rest of the world, but primarily with the United States.

All of the radio equipment for the transmitting and receiving stations has been forwarded to Poland and your Corporation has had a corps of engineers in Poland supervising the erection of this station for the Polish Government. Five of the ten four hundred feet towers which will support the antenna have been erected, and substantial progress has been made upon the construction of the power house and the transmitting and receiving buildings. The work of installing transmitting and receiving equipment is well under way, and for the past five months, service messages from the United States concerning the construction of the station have been received directly and without difficulty at the station site.

It is confidently expected that this station will be ready to start operating not later than August 1st, 1923, when the station will undertake to handle commercial traffic in accordance with the mutually satisfactory traffic agreement with the Polish Government which was executed simultaneously with the construction contract.

JAPAN

During the past year, your Corporation presented to the Department of Communications of the Imperial Japanese Government a complete receiving set and plans and specifications for a long directional antenna system similar to that in use at the stations of your Corporation. The installation of this apparatus by the engineers of your Corporation was completed in November and resulted in a material increase in the traffic capacity of the Hawaiian-Japanese circuit and allowed your Corporation to take full advantage of the installation of the long directional receiving antenna it had made at its station in Hawaii.

SOUTH AND CENTRAL AMERICA

In the Annual Report for the year 1921, mention was made that the Marconi's Wireless Telegraph Company, Ltd., the Compagnie Generale de Telegraphie Sans Fils, and the Gesellschaft fur Drahtlose Telegraphie, m.b.H., and your Corporation had granted all of their external communication rights in the South American Republics to Trustees to be held for the four parties in equal shares. This was done because the erection of individual stations by different nationals would have meant duplication of capital in countries where the prospective business is too meagre to warrant such duplication, particularly as the construction of stations is very expensive; and the wave lengths suitable for long distance international radio communications are so few that they should be used only at their full capacity; moreover, the national feeling with reference to communications runs too high to permit the successful execution of competitive programs. To have proceeded with individual competitive stations would have been highly wasteful and uneconomic.

The nine Trustees, two appointed by your Corporation, two by the British, two by the French, two by the Germans and the additional one, Mr. Thomas Nelson Perkins, a prominent American, designated as Chairman by your Corporation, have held important meetings during the past year.

The parties to the Trusteeship enlarged the field of its activities to include certain Central American countries and have increased the scope of the Trusteeship to include all rights except sales to Governments and the merchant marine.

It is hoped by this arrangement to provide, with the cooperation of the South and Central American Nationals, adequate and economic wireless communication services between the Republics in the Western Hemisphere and between them and the rest of the world.

Acting under this program, substantial progress has been made in the erection of a high power station at Monte Grande, near Buenos Aires, in the Argentine. The station, when completed, will consist of eight steel lattice work towers, each six hundred and ninety feet high, supporting the antenna, and two alternators of four hundred kilowatts capacity. The receiving stations will be four in number, receiving from United States, England, France and Germany, respectively.

It is expected that the station will be ready for operation in July, 1923, at which time it will represent a total investment of approximately \$6,000,000.00.

In Brazil, where a concession had already been obtained, and

financial commitments made, the Trustees conducted during the year very extensive engineering tests, and recommendations have been made for the location of the stations. Engineering plans and specifications have been worked out looking to the erection of one super-power station and two high power stations.

The Trustees have also taken over the medium powered station which the British company erected at Bogota in Colombia, and this station will be used during the present year to communicate with the United States.

In accord with this program, a sales and a broadcasting company were formed in the Argentine, and plans are under way for the developing of internal communications and the merchandising of amateur, experimental and commercial radio apparatus.

CHINA

In 1921, the Federal Telegraph Company, a California Corporation, entered into a contract with the Republic of China for building certain radio stations, and operating them over a period of years in partnership with the Chinese Government. The officers of your Company were asked by representatives of the Federal Company to cooperate in the carrying out of this contract, rather than to participate with foreign interests in developing Chinese-American communications.

Responding to the spirit of this invitation, your Corporation has entered into an agreement with the Federal Telegraph Company of California, whereby both companies have formed a new company, called the Federal Telegraph Company of Delaware, which company is willing to take over the contract concessions which the Federal Telegraph Company of California has with the Republic of China, and subject to obtaining certain modifications in these contracts, immediately undertake the building of one high powered station in China at Shanghai and four smaller stations at Pekin, Harbin, Canton and Shanghai.

Representatives of the Federal Company are now in China, and assuming that the consent of the Chinese Government, with whom the relationship is friendly, is obtained, the construction of a high powered station will be started promptly thereafter.

Your Corporation's business is classified as follows:

TRAFFIC DEPARTMENT: Handles the international radiogram as well as ship to shore radiogram traffic.

SALES DEPARTMENT: Merchandises radio apparatus to foreign and domestic customers, which include Governments, commercial companies, amateurs and experimenters.

MARINE DEPARTMENT: Sells, leases and rents radio apparatus to steamship owners and companies.

ENGINEERING DEPARTMENT: Maintains the existing high power and marine stations of the company; furthers technical developments and their practical application to commercial, amateur and experimental apparatus.

A brief summary of the activities of these departments is as follows:

TRAFFIC DEPARTMENT

Your Corporation has in operation the following international radio communication circuits:

1. Great Britain.
2. Norway.
3. Germany.
4. France.
- 5 and 6. Distinct circuits that are used to any of the above countries depending upon the density of the traffic at any particular time.
7. United States to Hawaii.
8. Hawaii to Japan.
9. Hawaii to United States.

These nine circuits, the oldest one of which came into service only three years ago, are rendering a steadily increasing public radio telegraph service in keen competition with seventeen cable circuits to Europe and one to the Far East. It is confidently estimated that your Corporation is today handling between twenty and thirty percent of the international message business that flows across the Atlantic and between forty and fifty percent of the international message business that flows across the Pacific.

For years the most important cable services of the world have "centered" in Great Britain, but the bringing together in your Corporation of the scientific and engineering resources of the greatest electrical concerns in America has resulted not only in giving the United States leadership in the development of the radio art, but also has made it the center of a world-wide wireless system.

Although the United States has more high powered radio stations than any other country in the world, your Corporation was unable during the year to open additional direct international communication services owing to the lack of corresponding high powered sending stations abroad. However, a traffic agreement was executed with the Netherland Government, providing for the exchange over a test period of traffic between the United States and Holland, but this service has not been inaugurated because the erection of the high powered station in Holland has not been completed. The year 1922 was, therefore, devoted to providing additional facilities for handling the existing volume of traffic and to increasing the capacity and efficiency of stations already in operation.

In 1921, your Corporation had in operation across the Atlantic, five radio circuits with four connecting foreign companies and telegraph administrations in Europe furnishing a comprehensive communication service to and from the City of New York, but your Corporation was unable to extend this service to points in the interior of the United States because of its inability to work out with the land line telegraph companies a reasonable arrangement for the distribution and collection of such messages. In September, 1922, with six transatlantic circuits in operation, your Corporation entered into an agreement with the Postal Telegraph-Cable Company which extended the advantages of "RCA" international radiogram service to all parts of the country. It provides for the delivery through the Postal Telegraph offices of radiograms originating in Europe, Western Asia or Africa destined to points in the interior of the United States. It further provides that which is more important,—for the acceptance at all Postal Telegraph offices throughout the United States of radiograms intended for transmission "via RCA" over the transatlantic circuits of your Corporation to Europe, Western Asia or Africa. By this arrangement, the extensive and highly organized land line telegraph system of the Postal Company became linked with your transatlantic radio system, thereby offering to every city and hamlet the opportunity to use at radio rates this most modern and rapid means of communication. Since the execution of this agreement the volume of traffic handled by the "RCA-Postal Service" has steadily grown. With the same benefits for the public as those outlined above, radiograms destined to or received from Hawaii, Japan or the Far East, are collected and distributed in the entire United States through the offices of the Western Union Telegraph Company.

The year 1922 was one of constant progress in improving the

quality of the international communication services, and although only one new circuit was put in operation, the quantity of traffic handled was increased by twenty-nine percent over that of 1921. This is largely attributed to the efforts of your operating staff seeking continuously greater efficiency, and to the prompt application by your engineers of the most recent developments in the radio art. There has been improvement at the corresponding foreign stations, both in the matter of equipment and operation, which has also materially contributed to the betterment of the service.

On August 6th, 1922, the operation of the European end of your French circuit was transferred by the French Government Administration of Posts and Telegraphs to the private company Compagnie Radio-France, and direct reception and transmission between 64 Broad Street, New York, and 166 Rue Montmartre, Paris, became immediately effective. The French Company, following the American practice, employed for this purpose centralized operation of its great new transmitting station at Saint Assise and its most modern of receiving stations at Ville Cresnes, both a short distance from Paris. The transmission time for urgent rate messages on this circuit, as on your other circuits is frequently only a matter of one or two minutes.

During the past year, a number of banking and other business houses in New York have installed private telegraph and telephone wires to your Central Radio Office, obviating the need for messenger service, and reducing delays to an absolute minimum.

The great value of your Corporation's radio communication system will never be more strikingly emphasized than it has been during the past year on three occasions. In August, 1922, more than fifty percent of the transatlantic cables were put out of service by the action of irregular forces in Ireland. During this cable breakdown, which was complete for over two weeks, your transatlantic circuits received and forwarded an enormously increased traffic so expeditiously that they were equal to all the demands. Had it not been for the service rendered by your Corporation, serious congestion of traffic and extraordinary delay in transacting foreign trade would inevitably have resulted.

On Election Day, a tremendous snow storm passed over the Rocky Mountain States which interrupted all wire communication between the Eastern and Western States. Your Corporation, on an appeal from the Press Associations, used its high powered international stations on the Atlantic and Pacific coasts for exchanging between New York and San Francisco election

returns. The successful continual operation 3,000 miles over land of these stations was not only a historical event in wireless development, but demonstrated the practical value of the wireless in an emergency.

The importance of radio to the commercial interests of the United States was again demonstrated in December, when during the entire month the one cable across the Pacific from the United States to Japan was out of service. During this interruption your circuits to Hawaii and Japan carried a double load without excessive delays. Had it not been for this, American traffic would have been routed via Europe to the Far East at increased rates, with possibility of delay and all the other difficulties and menaces which such circuitous routings would entail.

RADIOLETTER

A new and important feature of your transatlantic service was the introduction in November of the Radioletter for week-end transmission at the rate of six cents per word. This service, which met with very general public appreciation, for the present is between New York, London and Germany, and permits the sending of a four-word plain message for 24c. Provision is made for the mailing of radioletters to and from points beyond New York and London.

CENTRALIZATION OF CONTROL BY RCA SYSTEM

In the last Annual Report, the method perfected by your Engineers, of centralizing the control and operation of distant transmitting and receiving stations was set forth at some length.

During the year, the new scheme of operation was installed in the high powered stations of your Corporation in California and in the Hawaiian Islands, and has greatly improved the quality of the service, increased the speed of operation and reduced operating costs.

It is also interesting to note in this connection that the type of centralized control of operations which was developed by your Corporation and which has resulted in materially reducing operating costs has been adopted by the Germans and by the French and is now being adopted by the British.

The increased use of wireless for international communications during last year, and the success of the centralized handling of your Corporation's transatlantic traffic demonstrated that it was both desirable and necessary that the facilities for handling this traffic should be permanently located. Your Di-

rectors realizing this necessity authorized the purchase, at a cost of \$950,000, of the White Oil Building at 64-68 Broad Street, New York City, where the traffic department has been located since the formation of your Company. In this connection a subsidiary company, the Radio Real Estate Corporation of America, was organized to acquire and operate the building. Your Corporation owns all of the issued capital stock of the Radio Real Estate Corporation, and has through it paid \$216,200 on account of the purchase and maintenance of the property.

The building is ten stories high and contains approximately 43,000 sq. ft. It is ideally located for the purposes of the communication business of your company, being within two blocks of the principal cable and telegraph forwarding offices, and in the center of the financial and commercial district of New York, where the larger percentage of the radiogram traffic originates. It is the intention to eventually move all departments of the Corporation to the new building.

MARINE TRAFFIC

Your Corporation continues to own and operate marine radio stations at the following points:

Chatham, Mass.
Siasconset, Mass.
New London, Conn.
New York, N. Y.
Cape May, N. J.
San Francisco, Calif.

The volume of marine traffic, that is, communications between ships at sea and between ships and shore stations increased in the last year 105 percent in volume. The bulk of this traffic has been handled through your Corporation's Marine Radio Central at Chatham, Mass. Due to the gradual centralization of marine reception and transmission at one station, the cost of operation has been reduced. At Marine Central there are three transmitters and one long directional antenna constructed and operated on the same principle as those used for the international message services. One of the transmitters is used on 600 meters while the other two are used on 2,200 meters and transmission and reception are carried on simultaneously on these short wave lengths and messages are exchanged with ships at sea up to 2,500 to 3,000 miles distant. While last year this was occasionally possible, due to improvement of ship radio installations,

communications at these distances are now more regularly and satisfactorily established.

Radiograms destined for and sent from ships at sea are received at and distributed from the offices of both the Postal and Western Union Telegraph Companies in places where your Corporation does not maintain its own offices.

Supplementing the regular ship wireless telegraph service, your Corporation continues to render an increasingly valuable service in the following fields:

Free medical advice by radio for mariners made possible through the cooperation of the U. S. Public Health Service and the Seamen's Church Institute of New York.

An important daily news service furnished to the principal passenger ships crossing the Atlantic.

Ship's position reports are received at your Corporation's stations and turned over to newspapers for publication. These reports are of considerable interest to relatives or friends of those at sea and of great value to the shipping industry.

The Marine Radio Information Bureaus at New York and San Francisco which were established in 1921 for the purpose of furnishing the general public and steamship companies correct information as to how vessels in any part of the world may be reached by radio have proved a source of increasing traffic and have become important factors in rendering an efficient, prompt and reliable marine communication service.

MARINE DEPARTMENT

The depression in shipping business has continued, but the number of ships operated under your rental and service contracts has showed a very slight increase. In this department the gross income from leases, sales and rentals of radio apparatus was \$401,711.

As pointed out below, improvements effected in the receiving apparatus now installed on vessels by your Corporation has greatly enhanced the range of communication between shore and all ship stations so equipped, and has resulted in an increased volume of traffic.

During the year, your Corporation started the rebuilding of the existing apparatus on ships operated under rental contracts so that these ships would be fitted with the latest type of vacuum tube transmitters and continuous wave receivers. The installation of the continuous wave transmitters and receivers aboard ship is in accord with the latest and best practice in the radio art. The use of this new apparatus reduces interference

and enables communications to be carried on more satisfactorily and reliably than with spark transmitters. However, the spark equipment is kept available on board ship for use in case of emergency.

This improvement in your Corporation's apparatus and service has been appreciated by ship owners and the position of your Corporation in this field has been greatly strengthened.

S. S. "HONOLULU"

Your Directors feel that it is proper to call to your attention a specific and outstanding incident in which operators in the employ of your Corporation rendered meritorious service in the protection of life and property at sea. The S.S. "Honolulu" was burned and abandoned, seven hundred miles off the California coast on Thursday, October 12th. All of the 263 people on board the steamer were saved and landed at Los Angeles on the morning of October 16th. The description of the service rendered cannot be more vividly set forth than in the simple and direct language of the condensed official report to the Radio Corporation of America, which was made by Chief Operator Bell and which is as follows:

"On September 23rd, we sailed on outward voyage to Honolulu. Everything ran fine, and we left Honolulu for our return trip on October 7th. On October 12th at 6:00 A.M. I was called by Third Operator N. C. Kumler, who was then on watch. A general alarm had just been sounded and Kumler was sent to the bridge for instructions, I taking charge in his place.

"In a minute, I was instructed to request all ships to stand by for notification of our position. We then heard KPH, the Radio Corporation Station at San Francisco, with whom we had been working immediately before the general alarm, instruct all ships to keep quiet, and to stand by. Five minutes later, our broadcasted position was acknowledged by station KPH, U. S. Navy Transport 'Thomas,' S.S. 'Enterprise,' and S.S. 'City of Los Angeles.'

"In the meantime, Third Operator Kumler called H. B. Hancock, Second Operator, who reported immediately in the radio room. We then got the positions of all of the above-named ships. At 8:30 A.M., we were ordered to send an SOS. This was acknowledged by station KPH and S.S. 'Enterprise'—'Enterprise coming full speed ahead.'

"Second Operator Hancock and Third Operator Kumler were instructed to go and help the passengers into life boats.

The fire was gaining rapidly and the ship listing badly. We feared the ship was about to turn over. At this time everybody was getting into the life boats, although the work was hampered by a bad list. At nine o'clock I broadcasted: 'All off the boat except the Captain, Chief Engineer, First Officer, Fourth Officer and myself (Bell), and we expect to leave the boat any minute now.' About 9:40 we heard stations KFS, the Federal Telegraph Company's station at San Francisco. I got a message from them which I took to the Captain. The Captain asked me if I thought that I could get back to the radio cabin to send an answer. This I did and sent the Captain's message to Station KPH, telling them we were leaving the ship. Six hours later we were picked up by the S.S. 'West Faralon' and transferred to the transport 'Thomas' the next morning. No lives were lost and all of the records were saved. Commend coolness of Second Operator Hancock and Third Operator Kumler."

Your Directors felt that your Corporation should recognize in some manner such exceptional services, and authorized a Radio Corporation of America Medal to be awarded to wireless operators who, when in the service of the Company, perform meritorious service.

MARINE ENGINEERING

During the last year, your engineers installed a seven hundred and fifty watt duplex telephone set on board the S.S. "America," which was being operated by the U. S. Shipping Board in regular transatlantic service. In cooperation with the engineering department of the American Telephone and Telegraph Company operating through their Deal Beach station, this equipment was tested under practical conditions with a view to ascertaining whether equipment of this type would provide a satisfactory basis for the development of commercial marine wireless telephony. On a number of voyages successful two-way telephone conversations were carried on between the S.S. "America's" officers and prominent officials of the American Telephone and Telegraph Company, the Radio Corporation of America and the officials of various steamship lines, who were using their ordinary telephones at their homes or in their offices. The tests were successful and demonstrated the practicability of extending the land telephone service to ships at sea.

During the course of these tests, your engineers also demonstrated simultaneous wireless telephone and telegraph communication by means of the continuous wave transmitters installed for this purpose.

Considerable progress has also been made by your engineers during the year on radio aids to navigation which enables a ship to get its bearings by wireless in foggy, thick or stormy weather.

TRANSOCEANIC ENGINEERING

At the beginning of the year 1922 your Corporation had in operation five transatlantic transmitters. During the year, the sixth transmitter was put in operation at Radio Central, Rocky Point, Long Island. This was made possible by utilizing the second alternator equipment which was included in the installation originally provided for at Radio Central and by improvements in the antenna design whereby the twelve towers which were originally erected for use with a single transmitter can now be used more advantageously as two separate antennæ of six towers, each of which radiates a signal more powerful than any previously used at your stations. This improvement has resulted in a material saving in capital investment.

During the past year, your engineers cooperating with engineers of the General Electric Company demonstrated a high powered long distance tube transmitting set controlled telegraphically. The set was installed at Radio Central, and on October 15th, during a test period of sixteen hours, for the first time in the history of wireless telegraphy, a high powered tube transmitting set successfully handled commercial transatlantic wireless traffic between New York, Great Britain and Germany. This apparatus was the result of development work which had been carried on for over ten years, and in these ten years the energy obtained from vacuum tubes has increased more than a million times. The demonstration showed that the development of tube transmitters had reached a point where sets of high power can be successfully built for use in long distance commercial wireless telegraph communication. No installation, operation or maintenance cost data was obtained which would justify your engineers in concluding that the Alexanderson alternators which are now in use for high powered working should be immediately replaced. However, your engineers have spent a considerable amount of time developing this particular type of tube transmitter and specifications are now being drawn up for tube equipment for commercial stations requiring medium power installations.

EXPERIMENTS

During the past year, arrangements were made for the cooperation of the engineers of your Corporation and those of the

American Telephone and Telegraph Company for the purpose of demonstrating a high power long distance tube transmitting set, controlled telephonically. The preliminary work for this demonstration was completed during the year 1922, but the actual long distance telephone tests were not carried out until the first weeks of 1923.

By means of this set, the land line telephone service was extended internationally by wireless and continuous telephone speech was heard over a considerable period with commercial audibility in England.

The radio apparatus and system used in this test was the result of research and experimental work, which was done in the laboratories of the Radio Corporation of America and its associated companies and in the laboratories of the American Telephone and Telegraph Company. The actual tube transmitter was installed in the Rocky Point station of your Corporation. Through the arrangement which your Corporation has with the American Telephone and Telegraph Company, wireless telephony for over-seas service when commercially practicable, is to be carried on through the stations of your Corporation in connection with the land line telephone service of the American Telephone and Telegraph Company.

The volume of traffic handled by your stations in 1922 showed a very marked increase over that of 1921 and reflected a greater operating efficiency for each station, especially since only one new transmitter was added to previously existing facilities. The technical problems connected with the handling of this increased volume of traffic are multiplied on account of the increased number of stations operating in the other parts of the world and on account of the measures which must be taken to avoid interference between these stations. Your engineers have been giving special attention to these technical problems in order to provide increased traffic handling capacity by improved apparatus and methods of operation rather than by increased investment in new property.

In the domestic, as distinguished from the international field, the tremendous appeal of broadcast reception has introduced for your engineers many interesting and complicated engineering problems which have necessitated the special study of all types of radio telephone receiving and transmitting apparatus. The proper reproduction of musical sounds and the study of electro-acoustics in connection with the broadcast service is receiving careful attention.

OPERATION AND MAINTENANCE

The rehabilitation of your high powered and marine stations which was undertaken after they were returned by our Government at the beginning of 1920, was completed in 1922, and at the close of the year your Corporation's property was in an excellent operating condition. In 1921 the operation of your marine stations was in the hands of the traffic department, but during the last year the operating division of the Engineering Department has been given sole charge of the marine stations as well as of the high powered stations. This has resulted in keeping your engineers in much closer contact with the problem of traffic handling and it is confidently expected it will produce economies in operation.

All the stations have operated at an increased efficiency and the facilities at all times have been adequate to handle the maximum load of traffic required to serve both the public at home and our foreign correspondents.

During the past year radio engineers from the principal Governments and wireless companies of the world have visited your Corporation's stations for the purpose of studying the equipment in use and with the object of improving their own communication services in accord with the latest American scientific and engineering practices. Among your Corporation's guests your Officers were pleased and honored to welcome Senatore Guglielmo Marconi. His great contribution to the wireless art, his sympathy for and appreciation of the work of the American engineers, his great modesty and restraint, but confident enthusiasm, was an inspiration to the radio engineers of America, and particularly to the officers and employees of your Corporation.

BROADCASTING

At the time your Corporation was formed in 1919, for the purpose of building up a world-wide international wireless communication system, wireless telephony had not passed out of the experimental stage, and it was not at that time foreseen that the broadcasting art would ever reach the high point of popularity that it has in the last year. The engineers and scientists had anticipated the development of wireless telephony for communication purposes, but no one had visualized the phenomenal expansion of wireless telephony as used today for broadcasting.

In the last year the number of broadcasting stations has grown from less than twenty to almost six hundred. The art itself is advancing very fast, and the ultimate effect of broad-

casting upon the economic, social, religious, political, educational life of the country and the world, is comparable only with that of the discovery of printing 500 years ago. Today, broadcasting stations are sending out news, music, lectures, concerts, crop reports, weather reports, time signals, religious services, as well as fire and police warnings. Systematic broadcasting of educational matter is also being experimented with in many places.

Broadcasting has appealed to the imagination as no other scientific development of the time. Thousands of letters have been and are received at the broadcasting stations, most of them expressing profound appreciation for the services rendered, some of them commenting upon the quality of the service and the programs rendered. These letters show that the successful station manager in order to satisfy the public, must in some measure be an interpreter of public tastes and opinion, a musical critic, a spiritual adviser, a statesman, and an expert upon education.

The value of broadcasting to any individual or community is in proportion to the difficulty of getting this same thing by any other means, and radio's greatest service next to the saving of life at sea will be through broadcasting to those people who are confined to their homes or live in remote communities.

This, however, will not limit its entertainment value for those who live in the more densely populated sections of the country, as the service should be constantly expanded to meet the wishes and desires of our whole population. It is the opinion of the officers of your Corporation, that radio broadcasting is here to stay, and has become a permanent part of the everyday life of the people of the United States, the home of its development, and that it will ultimately extend throughout the whole civilized world.

Successful broadcast wireless telephony is only a little more than a year old, and it is one of the problems of your Corporation to participate in and carry on the technical improvement of the art for the purpose of helping to make broadcasting of the greatest service to all of the people of the country. Today, broadcasting is being done by electrical manufacturing companies, automobile schools, newspapers, Chambers of Commerce, state universities, department stores, Government Departments, etc. Depending upon the size of the station and the class of service rendered, the cost of operating these stations ranges from \$25,000 to \$100,000 a year.

It is popularly believed that radio communications can be carried on through the air to an unlimited extent. That, unfor-

tunately, is not true. The spaces in what scientists call "the ether," through which communications may be carried on, are very limited. They are like a limited number of parallel paths or a city street upon which only so many men can march shoulder to shoulder.

In many places in the past year, because of the limited number of wave lengths available for broadcasting and the large number of stations trying to operate on these wave lengths, there has been a great deal of interference. Generally one of two things has happened; either good programs have suffered from this interference, or stations capable of serving many thousands of listeners have been asked to give up time on specific wave lengths to stations less well equipped, which can at best serve only small communities and a limited number of listeners with local programs.

Although radio broadcasting in spite of this interference has progressed to a point where it is of great value, if the country is to realize the greater possibilities of wireless telephony without going through years of inefficient service and financial loss, broadcasting must ultimately be organized along national lines. The questions of who eventually is to do broadcasting, or of how it is to be paid for and of how to utilize the available wave lengths so that the greatest good will come to the greatest number must be answered before broadcasting can be put upon an enduring and satisfactory basis.

The officers of your Corporation are giving study to these questions with the hope that through the cooperation of those interested in the development of broadcasting a constructive program will be worked out insuring a universal service of quality and permanence.

During the past year, your Corporation in cooperation with the Westinghouse Electric & Manufacturing Company has been operating a broadcasting station, WJZ, at Newark, N. J. Your Directors also early in the year authorized the erection of broadcasting stations in New York and Washington. Your engineers designed plans and drew specifications for these stations and the construction work is now nearing completion.

The stations will embrace all of the latest and most advanced types of transmitting apparatus and will be capable of transmitting on two wave lengths simultaneously. It is hoped that they will be in operation in the very near future.

The station in New York will be erected on Aeolian Hall Building at 42nd Street near Fifth Avenue, in the heart of the

city, and the station in Washington will be located on the Riggs National Bank Building, at 14th Street and Park Road, N. W.

SALES DEPARTMENT

In the last two months of 1921, as a result of the erection of a number of radio broadcasting telephone stations in various parts of the United States, there was a demand for wireless telephone receiving sets. In the early part of last year the number of stations was increased until every section of the United States was supplied with a broadcasting service and a most extraordinary demand sprung up over night for wireless telephone receiving apparatus. Prior to 1922, no wireless receiving apparatus had been developed which lent itself to quantity production, and the impatient demand for such sets reached its climax in the early part of 1922, when due to the energies of your scientists and engineers, radio receiving apparatus embodying the latest improvements and of a character suited for general use was developed and manufactured in large quantities. The improvements in apparatus continued through the year and your Corporation was able to fill the extraordinary demands that were placed upon it.

While in previous years your Corporation had enjoyed in the domestic field a substantial business in the sale of radio apparatus to ship owners, commercial companies, amateurs, experimentors and to Governments, it had never been faced with the problem of setting up an organization for merchandising apparatus which would eventually go into every American home. In order to meet this unprecedented demand, your Sales organization grew from a personnel of fourteen to approximately two hundred and district offices were opened in Chicago and San Francisco. The products of your Corporation are being distributed today through one hundred and forty-six wholesale distributors throughout the United States who operate one hundred and ninety-six warehouses and the list of dealers who are handling "RCA" products now numbers approximately 15,000.

In addition to the domestic sale of broadcasting, experimental and commercial radio apparatus, a number of sales have been effected in foreign countries and to foreign Governments, the most important of which were: the sale of a high powered wireless telegraph station to the Government of Sweden which was mentioned earlier in this report and the sale to the Tropical Radio Telegraph Company, a subsidiary of the United Fruit Company, of seven medium powered vacuum tube telegraph

transmitters, two of which will be used in the United States and one each in the following countries :

Guatemala.
Honduras.
Nicaragua.
Costa Rica.
Panama.

The gross sales booked by the Sales Department of your Corporation for the year amounted to \$14,409,557.

PATENTS

The popularity of broadcasting not only aroused tremendous interest on the part of the public throughout the country during the past year, but the attention of scientists, engineers and inventors was directed to the development of this new phase of the wireless art. Consequently the patent department of your Corporation has investigated in detail an unusual number of inventions covering not only broadcast receiving apparatus but also apparatus intended for use in or for the distant control of medium and high powered sending and receiving stations. The sudden and pyramided demand for apparatus brought many inexperienced and unreliable organizations into the radio business which resulted in the infringement of your Corporation's patent rights. Suits have been brought to maintain the proper protection for the large investment which your Corporation has in existing patents and the unlawful use of such property rights is being kept at a minimum.

GENERAL

While the Preliminary International Communications Conference held at Washington in 1920 has not yet produced definite or final results, progress has been made during the past year towards a revision of the existing International Radiotelegraphic Convention. By such revision it is hoped that there will be allocated among the various nations all of the available bands of wave lengths and that regulations for the control of international radio communication will be generally readjusted to conform to existing conditions and the present development of the radio art.

The presence in this country during the early part of last year of representatives of the wireless interests of leading coun-

tries of Europe and the Far East in attendance upon the Limitation of Armament Conference, afforded an opportunity for helpful consideration of many of the problems involved in international radio communication.

Representatives of your Corporation are hopefully cooperating towards the convening of a constructive, up-to-date international radiotelegraph convention (as distinguished from a combined cable and radiotelegraph convention) designed to provide not only an equitable allocation among the nations of all available bands of wave lengths, but also a maximum utilization thereof.

Your Corporation has enjoyed the good fortune during the past year of being comparatively free from litigation, except for the filing of certain patent suits as above mentioned. While a few suits have been started against your Corporation which naturally require careful attention, none of them are regarded as a menace or of serious import to your interests.

FINANCIAL

Balance Sheet

Your Corporation's capital stock consists of 3,955,974 shares of 7 percent preferred stock of \$5.00 par value and 5,734,000 shares of common stock of no par value, against which latter there is shown on the balance sheet an equity of \$13,660,163, which is approximately \$2.38 per share. No dividend was paid during the year 1922 on either the preferred or the common stock.

The 7 percent preferred stock becomes cumulative January 1, 1924.

The Corporation's financial position has been further strengthened during 1922. Current assets have increased \$3,775,984, and exceed the current liabilities by \$5,997,966.

The current liabilities amounting to \$2,688,941 represent indebtedness for merchandise, materials, and Federal Income Tax. The Corporation has no bonded debt.

The total of Plant and Equipment, \$12,711,348, remains substantially the same as last year, while the Reserve for Depreciation and Obsolescence of Plant has been increased by \$529,376 and now amounts to \$1,347,705. The Amortization of Patents Reserve, after charging patents expired, now stands at \$2,045,376, and represents the depreciation to December 31, 1922, indicated by the schedule founded on the life of such patents.

OPERATIONS

After providing for Depreciation of Plant and Inventory, the operations for the year resulted in a net profit of \$2,974,579, which has been allocated, in the main, to Reserves for Patents and Federal Income Tax, the balance having been applied against Organization Expense.

The profits were not sufficient up to December 31, 1921, to meet Patent Amortization called for by the schedule and it was necessary to charge \$1,666,284 against Common Stock Equity. The total of \$2,480,576 transferred from 1922 earnings provides for 1922 Patent Amortization and the restoration of the above amount to Common Stock Equity.

The gross revenue from transoceanic service showed an increase of 36 percent and marine service of 14 percent over the relative totals for the previous year.

PERSONNEL

The foreign relations of your Corporation in the interests of the development of World-Wide Wireless have in the past two years grown to be of such great importance that it became necessary to appoint a responsible officer of wide experience who could give his entire time to activities in the foreign field. To meet this situation your Directors, in November of last year, created a new office of Managing Director of International Relations, and Mr. Edward J. Nally, who had been President of your Corporation since its formation, was elected to that office.

At the same time that the office of Managing Director of International Relations was created, Major General James G. Harbord, Deputy-Chief-of-Staff of the United States Army, was elected President of your Corporation, to succeed Mr. Nally. These changes went into effect on January 1st, 1923.

General Harbord was educated in the common schools of Illinois and Kansas and upon graduation from the Kansas State Agricultural College, entered the United States Army as a private. After spending thirty-four years in the service of our Government, he asked to be retired to become the President of your Corporation.

During the first year of our participation in the World War, General Harbord was Chief of Staff of the American Expeditionary Forces in France. He was later assigned to command the Marine Brigade of the Second Division, which stopped the advance of the enemy during the fighting near Chateau Thierry,

in June, 1918, and also commanded the Division during the Soissons offensive of July of that year. Later he was placed in command of the Service of Supplies of the American Expeditionary Forces in France, which was the largest single business enterprise ever undertaken by our Government in time of war.

The election of General Harbord to the Presidency of your Corporation will, your Directors feel sure, insure its continued success.

During the year 1922, Mr. David Sarnoff was elected Vice-President and General Manager, and Mr. William Brown was elected Vice-President and General Attorney of your Corporation.

This report would be incomplete without some mention of the *esprit de Corps* existing throughout the personnel of your Corporation. During the year 1921, there was no precedent to follow in the development of the new art of commercial radio communications. New men had to be trained and new methods and new apparatus developed to meet the requirements of a world-wide public service. The popular advent in 1922 of broadcasting presented the problem of completely reorganizing the merchandising department of your Corporation. It was often very difficult to obtain the personnel who had had experience in the radio field, and throughout the whole year many members of your staff were called upon for increased effort and personal sacrifice. It is a great pleasure to record that the demand for such service always met with conscientious and immediate response.

All of the employees of your Corporation have endeavored to faithfully carry on their work with a sincere feeling of responsibility not only to the Corporation but to the public, and it is the courteous and loyal cooperation of the entire personnel which has made possible the accomplishments of the year just passed.

For the Directors :

OWEN D. YOUNG, *Chairman of the Board.*

JAMES G. HARBORD, *President*

Printed by order of the Board.
JOHN W. ELWOOD,
Secretary.

RADIO CORPORATION OF AMERICA

BALANCE SHEET—DECEMBER 31, 1922

ASSETS

PLANT AND EQUIPMENT:

Comprising High Power Stations in Operation with the necessary equipment, together with Ship Stations and Sundry Machinery, Tools and Furniture..... \$12,711,348.15

PATENTS, PATENT RIGHTS, CONTRACTS, AND GOODWILL 16,735,232.60

STOCKS OF SUBSIDIARY AND ASSOCIATED COMPANIES 1,173,507.72

DEFERRED CHARGES..... 1,028,906.14

INSTALLATION WORK FOR FOREIGN CUSTOMERS..... 639,705.95

CURRENT ASSETS:

Cash at Banks and on Hand..... \$946,888.82

Accounts and Notes Receivable..... 2,445,925.85

INVENTORIES: Merchandise.. \$3,909,401.09

Ship, Shore and

High Power

Apparatus... 1,131,811.85 5,041,212.94

Investments at Cost (market value Dec.

31, 1922, \$242,924)..... 252,880.00

TOTAL CURRENT ASSETS..... 8,686,907.61

\$40,975,608.17

LIABILITIES AND CAPITAL

CAPITAL STOCK:

3,955,974 Shares 7% Preferred \$5 par value \$19,779,870.00

5,734,000 Shares Common (no par value).. 13,660,163.56

TOTAL CAPITAL STOCK..... \$33,440,033.56

CURRENT LIABILITIES..... 2,688,941.53

ADVANCE COLLECTIONS FROM FOREIGN CUSTOMERS..... 895,600.49

DEFERRED LIABILITY (Balance Payment Tuckerton Station)..... 390,000.00

RESERVES:

For Amortization of Patents after writing off the Patents expired..... \$2,045,375.84

For Depreciation and Obsolescence of Plant..... 1,347,705.27

Other Reserves..... 167,951.48 3,561,032.59

\$40,975,608.17

CONTINGENT LIABILITY - \$37,800.00

RADIO CORPORATION OF AMERICA
SUMMARY OF OPERATIONS
YEAR ENDED DECEMBER 31, 1922
WITH COMPARATIVE FIGURES FOR 1921

| | Year Ended | |
|---|------------------------|-----------------------|
| | Dec. 31, 1922 | Dec. 31, 1921 |
| GROSS INCOME FROM OPERATIONS: | | |
| Gross Sales..... | \$11,286,489.41 | \$1,468,919.95 |
| From Transoceanic Communication..... | 2,914,283.11 | 2,138,625.86 |
| From Marine Service..... | 630,084.24 | 553,298.71 |
| | <u>\$14,830,856.76</u> | <u>\$4,160,844.52</u> |
| DEDUCT: | | |
| General Operating and Administration Expenses, Depreciation, and Cost of Sales..... | 12,126,464.71 | 3,762,231.48 |
| | <u>\$2,704,392.05</u> | <u>\$398,613.04</u> |
| OTHER INCOME | 270,187.72 | 28,186.55 |
| NET INCOME FOR YEAR | <u>\$2,974,579.77</u> | <u>\$426,799.59</u> |
| APPLIED AS FOLLOWS: | | |
| Reserve for Amortization of Patents..... | \$2,480,576.25 | \$426,799.59 |
| Reserve for Federal Income Tax..... | 270,000.00 | |
| Proportion of Organization Expense Written Off..... | 224,003.52 | |
| | <u>\$2,974,579.77</u> | <u>\$426,799.59</u> |

CERTIFICATE OF AUDITORS

We have examined the books and accounts of the RADIO CORPORATION OF AMERICA for the year 1922, and we certify that, in our opinion, the foregoing Balance Sheet and Summary of Operations correctly set forth, in brief, the financial position of the Corporation at December 31, 1922, and the operations for the year, which are further explained in the report of the Chairman of the Board prefixed hereto.

ARTHUR YOUNG & COMPANY,
Members American Institute of Accountants.

New York,
March 7, 1923.

RADIO CORPORATION OF AMERICA

233 BROADWAY

WOOLWORTH BUILDING

NEW YORK

TREASURER'S DEPARTMENT

G. S. DE SOUSA, *Treasurer*

M. H. Payne, *Assistant Treasurer*

C. G. Terwilliger, *Credits and Collections (Sales)*

A. B. Tuttle, *Credit and Collections (Trans-oceanic and Marine)*

J. V. Henry, *Cashier*

COMPTROLLER'S DEPARTMENT

C. J. ROSS, *Comptroller*

H. A. Sullivan, *General Auditor*

A. Nicol, *Auditor of Receipts*

G. A. Bellis, *Auditor of Sales*

E. H. Keeler, *Auditor of Disbursements*

L. G. Hills, *Auditor of Trans-oceanic*

W. B. Sanders, *Auditor Pacific Division*

SALES DEPARTMENT

E. E. BUCHER, *Manager*

H. T. MELHUISE, *Assistant Manager*

New York District Office

QUINTON ADAMS, *District Sales Manager*

M. Brunet

M. Berger

G. H. Clark

A. E. Crocker

R. C. Edwards

H. C. Gawler

A. R. Genet

S. W. Goulden

J. R. Harrison

H. Y. Higgs

C. H. Nance

G. D. Nelson

E. S. Pearl

V. N. Phillip

Donald Pierl

CHICAGO DISTRICT OFFICE

(10 S. LaSalle St.)

J. M. SAWYER, *District Sales Manager*

C. C. Chapelle

J. P. Francis

A. R. Beyer

L. Bennett

E. Lange

P. G. Parker

SAN FRANCISCO DISTRICT OFFICE

(Insurance Exchange Bldg.)

L. A. MALARIN, *District Sales Manager*

M. L. Bergin

T. L. Love

TRAFFIC DEPARTMENT

W. A. WINTERBOTTOM, *Traffic Manager*

A. A. ISBELL, *General Superintendent, San Francisco*

John B. Rostron, *Asst. Traffic Mgr. (Trans-oceanic)*

T. M. Stevens, *Asst. Traffic Mgr. (Marine)*

C. J. Weaver, *Acting Supt.*

W. H. Barsby, *Assistant Supt.*

Walter E. Wood, *Assistant Supt.*

L. A. Briggs, *Chief Office Electrician*

A. H. Morton, *Superintendent, Washington, D. C.*

F. D. Heiser, *Superintendent, Chatham, Mass.*

G. E. Baxter, *Superintendent, San Francisco*

F. M. Roy, *Asst. Superintendent, San Francisco*

W. P. S. Hawk, *Superintendent, Honolulu*

H. A. Oxenham, *Asst. Superintendent, Honolulu*

TRAFFIC PRODUCTION DEPARTMENT, 64 BROAD ST., N. Y.

LEE LEMON, *Director*

DONALD McNICOL, *Assistant Director*

H. Chadwick

F. A. Haviland

M. J. Lyons

G. E. McEwen

W. H. Niemann

R. S. Mighill

W. A. Scrivens

J. N. Weisiger

H. M. Harding,

San Francisco

G. F. Schecklen,

San Francisco

Wm. P. Van Wyck, *Purchasing Agent*

Edward B. Pillsbury, *General Superintendent in Charge of Real Estate, 64 Broad St., New York*

RADIO CORPORATION OF AMERICA

233 BROADWAY

WOOLWORTH BUILDING

NEW YORK

ENGINEERING DEPARTMENT

E. F. W. ALEXANDERSON, *Chief Engineer*

R. A. WEAGANT, *Consulting Engineer*

DR. A. N. GOLDSMITH, *Director of Research*

DESIGN DIVISION

C. H. TAYLOR, *Assistant Chief Engineer*

J. L. Finch, *Transmitter Design*

F. H. Kroger, *Low Power Design*

H. H. Beverage, *Receiver Design*

R. H. Ranger, *Receiver Design*

CONSTRUCTION AND OPERATING DIVISION

A. E. REOCH, *Assistant Chief Engineer*

W. A. GRAHAM, *Operating Engineer*

R. T. Rossi, *Construction Supt.*

F. A. Blanding, *Assistant,*

L. C. Everett, *Estimating Engineer*

Tuckerton, N. J.

E. W. Brousseau, *Construction Engineer*

J. S. Philbrick, *Engineer-in-Charge,*

E. D. Sabine, *Construction Engineer*

Bolinas, Cal.

R. N. Cumming, *Engineer-in-Charge*

W. H. Beltz, *Acting Engineer-in-Charge*

P. S. Carter, *Assistant,*

Kahuku, T. H.

New Brunswick, N. J.

I. C. Reid, *Engineer-in-Charge,*

B. S. Y. Clifton, *Engineer-in-Charge*

Marshall, Cal.

G. I. Usselman, *Assistant,*

G. A. Burns, *Engineer-in-Charge,*

Marion, Mass.

Koko Head, T. H.

A. W. Aird, *Engineer-in-Charge*

A. B. Tyrrell, *Engineer-in-Charge,*

M. R. Strausburger, *Assistant,*

Radio Central, N. Y.

H. D. Kent, *Engineer-in-Charge,*

G. J. Eshleman, *Engineer-in-Charge*

Aeolian Hall, N. Y.

PATENT DEPARTMENT

IRA J. ADAMS, *Patent Attorney*

H. G. GROVER, *Assistant Patent Attorney*

J. G. NORTON, *Assistant Patent Attorney*

C. A. NORTON, *Assistant Patent Attorney*

MARINE DEPARTMENT, 64 Broad St., N. Y.

G. HAROLD PORTER, *General Superintendent*

John B. Duffy, *Superintendent,*

Eastern Division, 326 Broadway, N. Y.

F. H. Mlingworth, *District Manager,*

W. S. Fitzpatrick, *Asst. Superintendent*

35 S. 3rd St., Philadelphia

W. F. McAuliffe, *Marine Superintendent,*

L. H. Gilpin, *District Manager,*

433 California St., San Francisco

220 Brewer St., Norfolk

George W. Nicholls, *District Superintendent,*

Alfred Thomas, Jr., *District Manager,*

136 Federal St., Boston

10 S. La Salle St., Chicago

Lee L. Manley, *Supt. M. R. & I.,*

A. W. Dorchester, *District Manager,*

326 Broadway, N. Y.

109 Steuart St., San Francisco

Edwin M. Hartley, *Assistant Superintendent*

George S. Hubbard, *District Manager,*

Julius A. Pohl, *Supt. Gulf Division,*

Maritime Building, Seattle

709 Carondelet Bldg., New Orleans

H. L. Bleakney, *District Manager,*

Edwin A. Nicholas, *Supt. Great Lakes Div.,*

Southern Pacific Bldg., San Pedro

1599 St. Clair Ave., Cleveland

O. B. Minter, *District Manager,*

Frank G. Siegel, *Assistant Superintendent*

30 Realty Bldg., Port Arthur

W. P. Kelland, *District Manager,*

J. E. Broussard, *Representative,*

Gay and Pratt Sts., Baltimore

P. & O. S. S. Co., Key West

ADVERTISING AND PUBLICITY DEPARTMENT

P. BOUCHERON, *Manager*

L. R. Galvin

C. N. Schaefer

