

PROCEEDINGS
of the
RADIO CLUB of AMERICA



Vol. 2 No. 9

July, 1923

R. C. A. SPECIAL NOTICES

To the Membership:

Beginning with this issue, the "Proceedings of the Radio Club of America" will be printed by RADIO BROADCAST magazine. The direct relation of our papers to the experimental side of radio broadcast reception should afford new opportunities for service through this new channel. We hope that the wide interest in the columns of RADIO BROADCAST will assist the Club in maintaining a direct contact with progressive Radio experimenters in all sections of the country.



During the Summer recess of the Club, from June to September, we are anxious to receive papers from the membership for publication in these "Proceedings." We feel sure there are many members who have not had an opportunity to tell of their developments at a regular meeting. Why not write a short paper for the "Proceedings" this Summer?



For the benefit of those who were not present at the last meeting, we are pleased to announce the complete list of the Officers and Directors of the Club for 1923.

OFFICERS

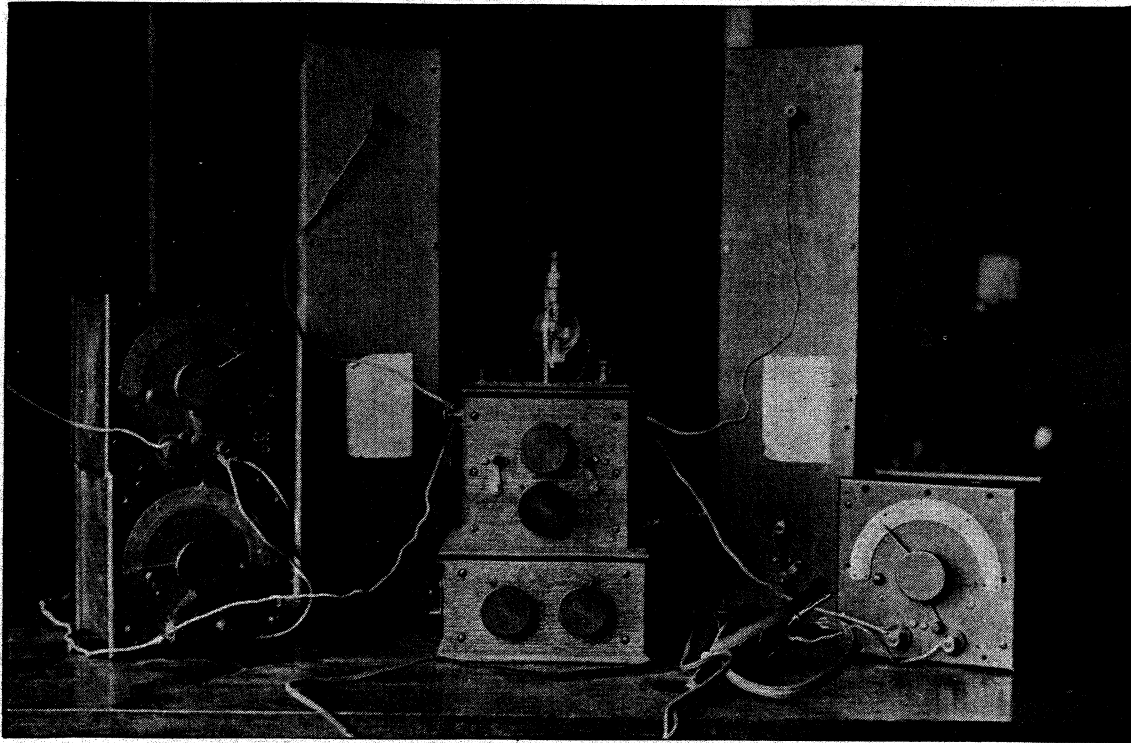
President.....	George C. Burghard
Vice President.....	Paul F. Godley
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Corr. Sec.....	Renville H. McMann
Rec. Sec.....	Pierre Boucheron

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E. H. Armstrong	W. S. Lemmon
G. Eltz	L. M. Clement
H. Sadenwater	E. V. Amy
L. G. Pacent	F. King
J. F. Grinan	L. C. F. Horle



W. S. Lemmon, *Editor of Proceedings*, 342 Madison Ave., New York
P. Boucheron
E. V. Amy



JUNK WORTH A MILLION!

With this very equipment, Edwin H. Armstrong discovered regeneration—the receiving system that revolutionized radio reception and made the inventor famous



Eighteen Years of Amateur Radio



The Days When Hams Could Send on Any Wave. The “Junior Wireless Club Limited,” Which, in 1911, Became the “Radio Club of America.” Pioneer Experiments and Inventions. Early Measures to Reduce Interference. Recent Activities Sponsored by the Radio Club

By GEORGE E. BURGHARD

President of the Radio Club of America

It is with pleasure that we present this paper on amateur radio, prepared by one of the foremost American amateurs. This paper has just been read before the Radio Club of America at the close of a successful season of lectures.

We feel sure that the readers of RADIO BROADCAST will be glad to learn that the Radio Club of America has chosen our magazine for the exclusive publication of its papers, and we wish to express our appreciation of the compliment paid us.

Such solons as Professor M. I. Pupin, Professor L. A. Hazeltine, Professor J. H. Morecroft, E. H. Armstrong, W. C. White and many others, present to this Club papers of importance, in which we feel sure that you will find great interest.

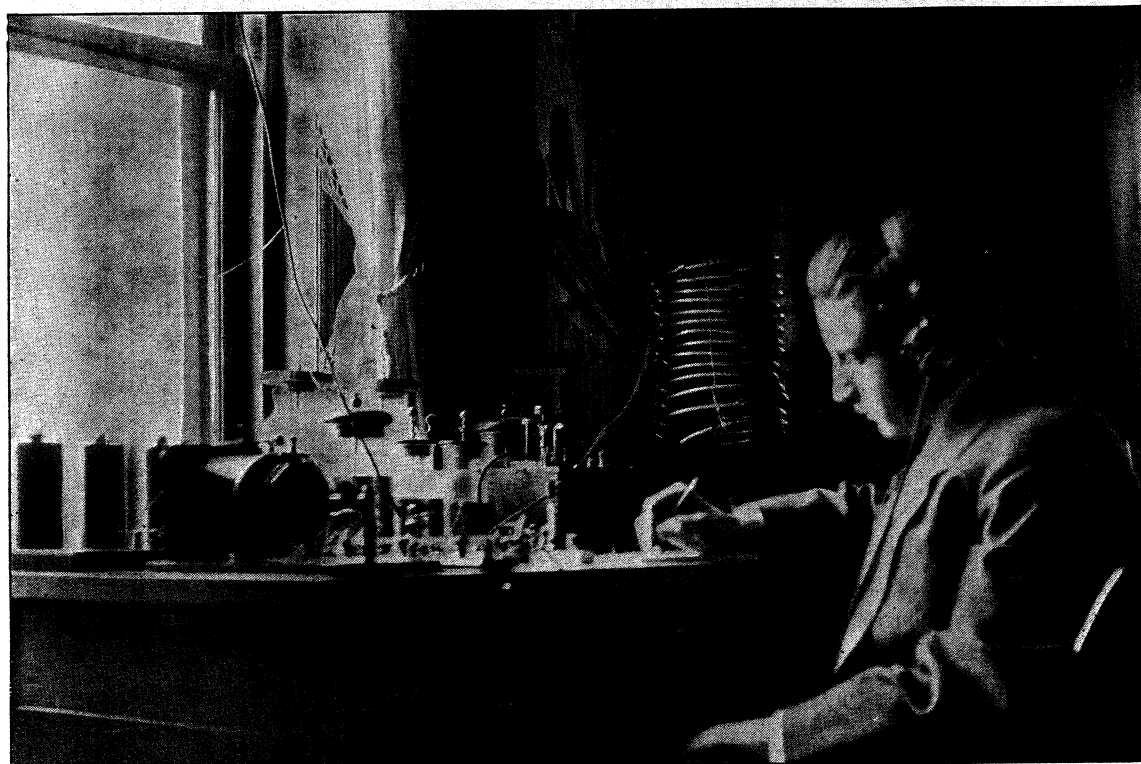
The second of these papers, which will appear in our September issue, deals with the latest of all the vacuum tubes—those employing thoriated filaments—and is the work of Mr. W. C. White, of the General Electric Company, who helped develop the tubes.—THE EDITOR.

IN AN attempt to create a precedent which it is earnestly hoped will be followed as long as the Radio Club of America exists, this paper is presented as the first of a series of papers by the Chief Executive, describing the activities of the organization and its members during the last twelve months. As this is the first of the series, however, it may be well to review the achievements of the Club from the time of its inception, and even the work of its members before the idea of organization had materialized. In this way it is possible to gain a good idea of the beginnings of amateur radio as well as the early strivings of the art in general, since the Club numbers among its members many of the radio pioneers.

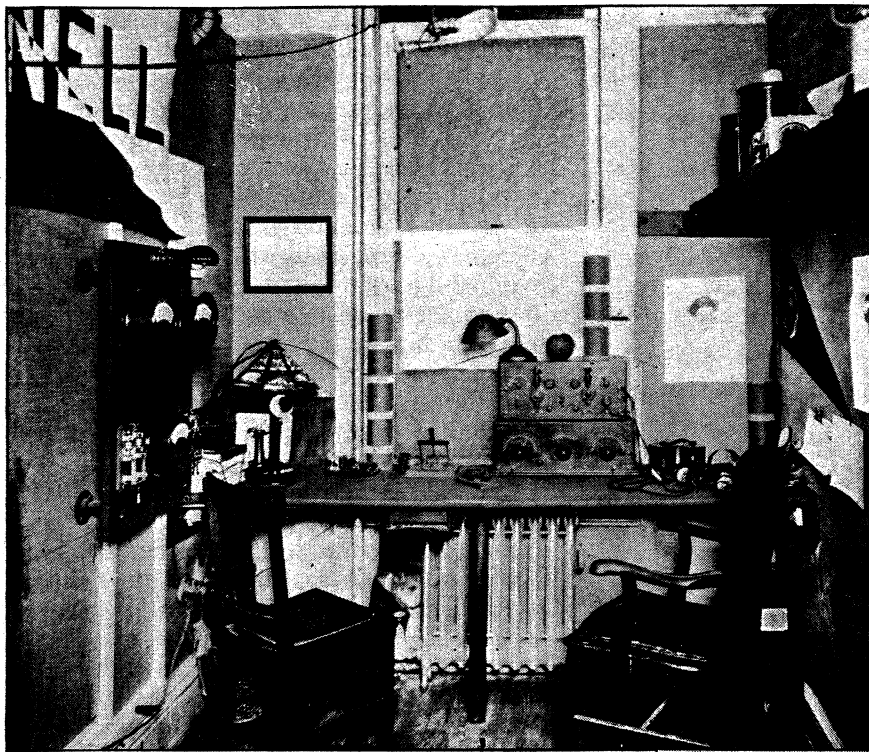
It is the earnest hope of the writer that the aforementioned precedent will be followed closely and that each succeeding President of the Club will prepare and read a paper covering its accomplishments during his period of office. Thus, an accurate record of Radio Progress can be maintained and should prove of considerable interest and value both to the present and future radio generations.

The early days of radio were indeed days of darkness and pioneering—days when traffic had to be handled with a coherer and a straight gap spark transmitter. This meant that the personnel was really the most important factor, and operators were developed who could copy coherent messages under conditions when the average mortal could distinguish nothing but crashes and noises. These men, who learned their lessons in a very hard school, learned them well and are in many cases the prime factors in radio to-day.

At the same time that the commercial companies were making their initial stand, the fascination of sending messages through space without wires began to take hold of the younger generation, and we have the beginning of amateur radio, about 1905. Of course, there had been private experimenters prior to this, but the real radio amateur had his beginning in the end of 1904 to 1905. Small boys began to inveigle their parents into giving them money with which to buy wire and other material to build their own sets in imitation of those used by the commercial companies. Their efforts were gallant indeed, for there were no books



BACK IN 1910, WHEN THE WRITER WAS AN ARDENT FAN
George Burghard operating one of his first transmitters, located at 1 East 93rd Street, New York City

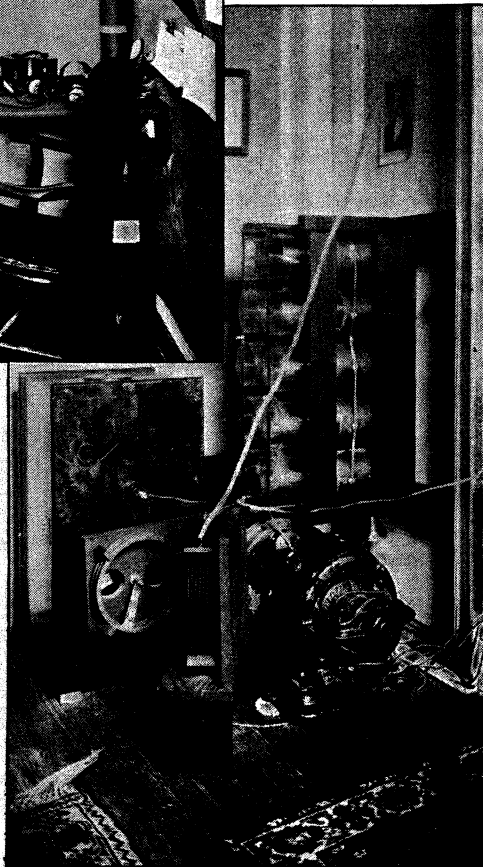


**THE RECEIVER
AT 2 PM**

Not the time of day but the call letters of the station owned by John Grinan and Adolph Faraon. Amplifiers were almost unknown when this station, in New York, heard the "Coast," and the two tubes were both used as detectors, with individual controls

to guide them. But the results proved successful in some cases, where the frequency of the transmitter happened by chance to be within the range of the receiver, or someone had gained expert knowledge from the operators at Manhattan Beach or the Waldorf Astoria where the main commercial land stations were located. With the crude apparatus and the embryo knowledge available, it was really remarkable that those boys could communicate at all, but almost any night one could hear messages being exchanged between stations in New York City covering distances of approximately a mile or two.

At that time there were perhaps a handful of these amateurs in New York City, but they grew rapidly in numbers and by 1909 they had already organized into the "Junior Wireless Club Limited." This organization, which was really the first of its kind, held regular monthly meetings at the Hotel Ansonia where the President, W. E. D. Stokes, Jr., was living at that time. The original membership consisted of eleven men who, it may be said, were the founders and charter members of the Radio Club of America: W. E. D. Stokes, Jr., George Eltz, Jr., Faitoute Munn, Ernest Amy, Frank King, Graham Lowe, Frank Whitehouse, Lyman Butler, and George E. Burghard. These young boys were the leaders of amateur radio at that time and soon drew all the live operators into their organization.



2 PM'S TRANSMITTER

This was the first amateur station to transmit across the continent

In 1910, under the auspices of the Radio Club, the father of all radio call-books was born. It consisted of a single mimeographed sheet with some thirty-odd names. Later this was increased to two sheets, then four blue printed sheets, and so on until the task became too ponderous and had to be undertaken by real publishers.

The following list is copied from the original typewritten sheet. (The question marks indicate names or addresses that could not be made out):

BB Max Bamberger, 16 W. 70th St.
 GX Harlow Hardinge, 331 W. 101st St.
 9 ? Melly, 328 W. 96th St.
 HB Doctor Besser, SE Cor. Bdwy & 144th St.
 DR Dr. W. G. Hudson, 312 W. 109th St.
 VD Randolph Runyon, Yonkers, N. Y.
 C George Cannon, Mount Vernon
 SK G. Skinner, Mount Vernon
 GE George Eitz, ? W. 47th St.
 WR W. Russell, 242 W. 104th St.
 VN Irving Vermilya, Mount Vernon
 BB Louis Schulman, ? W. 106th St.
 K9 Francis C. Knochel, ? W. 159th St.
 YN G. Popper, 763 Beck St., Bronx
 PC Percy Corwing, 5 West 107th St.
 DG Harry Johnson, Patterson, N. J.
 IY Fred Tracy, 4 W. 129th St.
 BF Brace Fidler, ? W. 129th St.
 RG Alfred Roebling, Far Rockaway
 UH Ernest Hubner, 1657 First Ave.
 WL Walter Lemon, 94th St. & Bdwy.
 GW G. Bartlett, 8 W. 108th St.
 EA Ernest Amy, 48 W. 70th St.
 DX Elmer Ayers, 235 W. 103rd St.
 SG Vincent Lamarche, 70 W. 46th St.
 CH John Myers, 315 W. 40th St.
 GH Doctor Goldhorn, Mount Vernon
 KH K. Harries (2)
 QW C. D. Winslow, 1985 Amsterdam Ave.
 PX P. H. Boucheron, 303 E. 48th St.
 JB Louis Bahr, 1929 Amsterdam Ave.
 JF John Farrington, 467 W. 159th St.
 TR George Post, 292 Riverside Drive
 CP Clarence Pfeiffer, Ridgewood, N. J.
 AH Arthur Herbert, 138 W. 123rd St.
 CS Charles Schaffer, 459 E. 147th St.
 YP Fred Parsons, 764 Beck St., Bronx
 BO Massey Wireless Co., 170th St. & Jerome Ave.
 FK Frank King, 326 West 107th St.

In 1911 the membership had increased considerably, and the name was changed to The Radio Club of America, which is the name it bears to-day. By this time books and other literature on various radio topics began to appear, so that the knowledge of the Club members was greatly increased and papers were delivered at their monthly meetings, which were held at the home of Frank King, who was elected first President of the new organization. The first papers consisted of short talks describing the various stations operated by the members, and various they were indeed. It is almost useless to attempt descriptions, but perhaps the accompanying photographs will serve to give an idea of the types of apparatus used and the great handicap under which communication was maintained in those days when it was considered a great event to work Yonkers from New York City direct. But still, even this was a great advance over the old coherer days. Now there were

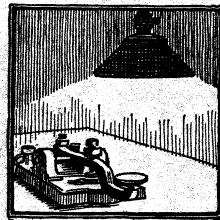
crystal detectors, microphone detectors, and even electrolytic detectors. Boys were busily engaged in breaking up chunks of rock in an attempt to find a good piece of carborundum, copper pyrites, or zincite, or groveling on hands and knees diligently searching the floor for the missing piece of Wollaston wire which was always diminutive and hard to find. These new detectors together with the advance in knowledge enabled the amateur operator to establish quite reliable communication within the city limits and occasionally a superhuman feat such as working Yonkers, a distance of about fifteen miles was accomplished, but for some unknown reason it was impossible to get any signal across to Brooklyn.

And yet the strivings of this handful of boys led to great things and great things were discussed at the meetings. No one thought of the far-reaching possibilities of the Hudson coated filament at the time when Dr. Hudson delivered his paper describing this very useful invention over the pool table at Frank King's house in 1913, nor were the stupendous results of the regenerative circuit in any way apparent at the time E. H. Armstrong told us all about it at one of the meetings in 1915. Who could have dreamed of the extent to which radio telephony would grow when, in 1911, George Eitz and Frank King constructed and operated an arc telephone transmitter at 107th Street and actually played music for the benefit of the fleet in the Hudson River when the alcohol didn't explode in the arc chamber and cause a violent break-down without any time for an apologetic "one moment, please." This may be said to constitute the first real broadcasting station ever operated with any degree of success.

By this time the three-electrode vacuum tube had appeared on the scene. Audions they were called, and cost \$5.00 a piece, but every amateur had to have one. So down to the Metropolitan Tower he would go, up to the DeForest Radio Company's laboratory, leave his five and go home with his most precious possession. Of course the number of identical new circuits and inventions developed by these boys was great, but nevertheless communication was greatly benefited and messages could be sent and received over distances of approximately 50 miles, quite regularly. This marked a great advance in amateur radio.

During these early days, the activities of these amateur experimenters aroused con-

siderable interest, and it was not long before the Government began wondering what it could do to control these newcomers. The idea of restricting the free air had never occurred to any one before. The result was a bill introduced by Senator Depew in 1910, prohibiting amateur radio communication. The then members of the Junior Wireless Club quickly rallied, and a committee was sent to Washington to plead the cause of the amateur before Congress. The plan was successful and the bill was lost. In 1912 the Alexander Wireless Bill was introduced, which purported to do all that the Depew Bill had failed to accomplish and even more. The Club also took action on this bill, killed it in Committee, and later, through the concerted action of its members in the service after the Armistice, definitely settled the matter.



In 1912, one of the most illustrious members of the Radio Club, E. H. Armstrong, developed the feed-back circuit which has made possible the broadcasting of to-day. This, of course, did wonders for the amateur. All kinds of tuning coils and couplers were put into use, and sets were operated to the Nth degree of regeneration until finally real communication with the Western amateur stations was established and amateur radio came into its own.

This also opened another field to the amateur, namely transatlantic reception. Perhaps the first attempts at hearing the stations of Europe were made by Paul Godley, Harry Sadenwater, and Louis Pacent, who in 1914 strung an antenna from the Palisades on the Hudson River and with a specially constructed receiver listened patiently for what they had never heard before. Little did Godley think at that time that some years later he would be listening just as attentively, under different conditions, in a tent in Scotland, for the signals of his brother amateurs in America.

In those days, of course, there were no licenses and no regulations for amateurs. Everyone used whatever wavelength he happened to hit upon, and the great difficulty of getting a wave meter left that unknown in most cases. The only way to find out whether the set was in tune was by inserting a carbon filament lamp in series with the antenna and adjusting the helix [antenna tuning inductance] for maximum brilliancy. Some stations had aerials of as many as eight or ten wires, one to two

hundred feet long, and sparks gaps directly coupled. This, of course, could not continue, so the Radio Club welcomed the new license regulations and did a great deal toward assisting Radio Inspector Marriott and later Harry Sadenwater in clearing up the mess. In fact, the relationship of the Club with the Department of Commerce has always been most friendly. On one occasion the two organizations combined to track down an amateur station in Brooklyn with a loop mounted on an automobile. The boy had for no apparent reason been sending out distress calls, and after a whole night's searching the station was finally located and the culprit called to account.

This was going a long way toward the right system of cooperation, especially in those days when the notion of free air still prevailed and

it was actually necessary for the operators of one commercial station to invite certain amateurs to go swimming at Coney Island so that the relief operators could handle their traffic without interference!

The Club soon outgrew its quarters at Frank King's home in 107th Street and it was not long before the attendance at meetings grew so large that it became necessary to use the large lecture halls of Columbia University for the monthly gatherings. As the art grew and radio knowledge was more readily obtainable, the character of the papers also changed. The small body of amateur operators gradually changed to a large scientific organization of recognized standing, before which the leading lights in the radio world were glad to deliver papers on their newest discoveries. But in spite of these changes the club idea and spirit of comradeship was never lost, and even to-day the Radio Club of America is as proud of its congenial club spirit as it is of its scientific standing.

In 1915 the Club installed and operated a transmitting and receiving station in the Hotel Ansonia where Admiral Fletcher had made his headquarters. The station operated by the Club members handled all of the Admiral's traffic with the fleet in the Hudson River. Several hundred messages were handled, and President Wilson himself sent a message from the *Mayflower* commending the good work. The Navy League also presented the Club with a banner in recognition of its services.



PROFESSOR PUPIN AND THE DELEGATION THAT VISITED IBCG AT GREENWICH, CONN.
The trip was made with a view to using this station for transatlantic work on short waves. Professor Pupin is seated in the centre of the group, with George Burghard at his right, and E. H. Armstrong at Burghard's right

A year later, amateur station 2PM which has gone down in history as one of the most famous of all amateur stations, owned and operated by John Grinan and Adolph Faraon, succeeded in breaking all records by sending the first transcontinental relay message from New York to California. This affair was not prearranged but was accomplished during the ordinary transmission periods and the answer was received back in New York in one hour and forty minutes from the time of transmission. Several weeks later the same station and the same operators succeeded in getting signals to California, a distance of some 2,500 miles overland, a feat which had heretofore been deemed impossible with an input of one kilowatt on amateur wavelengths.

Activities had to be suspended for the next few years, due to the fact that all the members of age enlisted in one branch of the service or another. The war records, which have been chronicled elsewhere, make too lengthy a

proposition for this paper. It suffices to say that practically all were officers in radio capacities and in charge of important operations, such as radio aircraft, radio schools, laboratories, field service, etc. Notably, E. H. Armstrong, with the armies in France, invented the super-heterodyne receiver which aided greatly in establishing successful radio communication at the front.

After the Armistice was signed and things began to assume a normal appearance, Club activities were resumed and the first event was a get-together dinner, held at the Hotel Ansonia, in honor of E. H. Armstrong upon his return from France. Many prominent men were among those present and due homage was paid him for his great work with the Expeditionary Forces.

In 1919, a successful flight was made by the Navy Department from Halifax to the Azores, in which radio played an important part. Three planes were used and

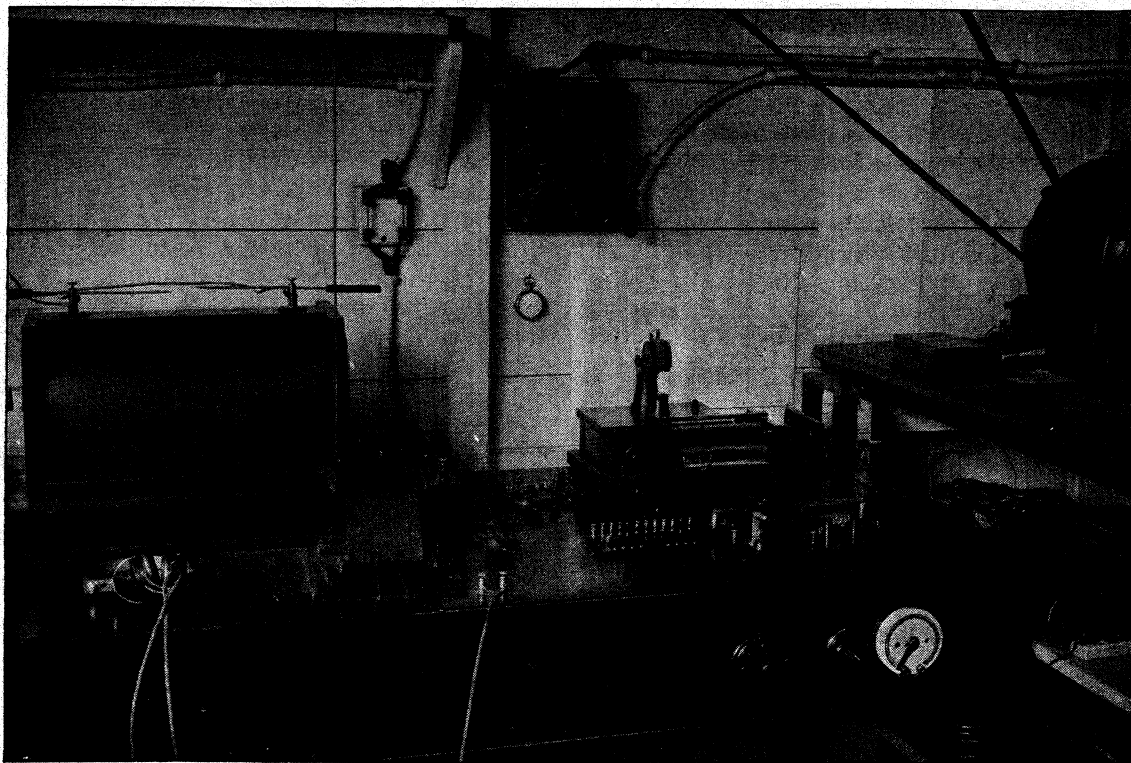
of course radio was a very important part of the equipment and the operators had to be of sterling worth. Lieutenant Harry Sadenwater, a Radio Club member, was chosen to operate the set on the NC 1. Unfortunately, this ship was forced to the water within twenty miles of the Azores and it was due to the valiant efforts of Lieutenant Sadenwater that the storm-tossed crew were finally rescued by a destroyer which responded to his calls after some fifteen hours of gruelling work.

When, in 1921, the American Radio Relay League instituted its amateur transatlantic tests, the Radio Club of America built a special continuous-wave transmitting station at Greenwich, Conn. and succeeded in winning the prize offered by Mr. Burnham, of England, for the best station in the test. This station not only succeeded in transmitting audible signals to Paul Godley, also a member of this club, in Scotland, but was heard in Germany, Italy, and France. It also broke all records by sending a complete 12-word message to Scotland and later sent three complete messages direct to Avalon, Catalina Islands, off the coast of

California. These feats aroused such interest in view of the low power and short wavelength used (i. e., 1 K. W., 215 meters), that such prominent men as Professor M. I. Pupin of Columbia University and David Sarnoff, General Manager of the Radio Corporation, went to Greenwich to visit the station.

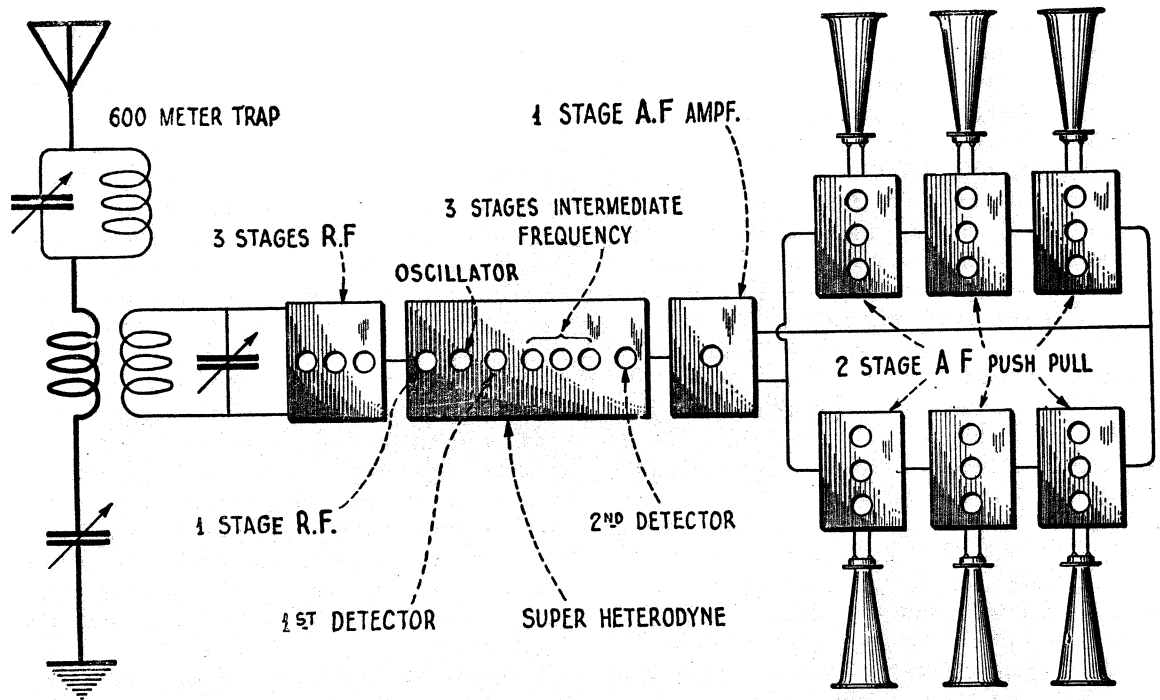
By this time the number of amateur stations had increased to a tremendous extent, and with broadcasting just about beginning, communication was becoming almost impossible. The Radio Club investigated the situation and found that most of the interference was caused by spark and interrupted continuous wave transmitters. It therefore undertook a vigorous campaign of advice and suggestion, through papers presented before the membership, to educate the amateur in the whys and wherefores of pure continuous-wave transmission and its many advantages over the older forms. The campaign proved successful and is still in progress.

It was at one of these meetings in 1922 that E. H. Armstrong startled the radio fraternity by producing a sufficient volume of music



THIS IS FRANK KING'S STATION, FK, NOW NOTHING BUT A MEMORY OF PAST GLORY

Old-timers will recognize several antiques, including a variable condenser, loose coupler, crystal and electrolytic detectors, and that king of QRM—the 10-inch spark coil



SCHEMATIC DIAGRAM OF THE LOUD SPEAKER SYSTEM USED AT GRAND CENTRAL PALACE

to fill the large lecture hall, using his newly invented super-regenerative circuit, a loop aerial and only one Western Electric J Tube. This performance, of course, had never been equalled, and when it is considered that the signals were coming from station WJZ, at Newark, N. J., and that the receiving set was located in a steel building with a copper roof at Columbia University, it was certainly an epoch-making event.

In December 1922, The Radio Exposition Company held a large Radio Show at the Grand Central Palace, New York. As everyone knows, if all the exhibitors at a Radio Show are permitted to receive broadcast programs at the same time, chaos would result due to heterodyning between the receivers themselves. In order to avoid this difficulty, the exposition directors decided to permit only one concern to do all the receiving. This, of course, was an unhappy thought since there was no way of deciding which company this should be, without causing vigorous protest from the other exhibitors. Finally it was decided to choose a non-commercial organization. The lot fell to the Radio Club of America. A special committee was appointed and the work begun. Tests were made a week prior to the opening of the

show with various types of antennas and finally it was found that even a loop would pick up too much of the noises resulting from commutator sparking, circuit breakers, and electric locomotive shoes, from the power houses in the vicinity and the New York Central tracks directly beneath, so that a single wire about fifteen feet in length had to be used. The problem proved to be twofold and a great deal more ponderous than was at first anticipated. First there was the matter of doing away with extraneous noises so as to deliver pure radio signals to the power amplifiers and secondly a physical problem of placing the loud-speaking horns so that there would be no re-echoes or dead spots. The first was solved after much experimentation by the small antenna, a 600-meter frequency trap, and a super-heterodyne receiver. The acoustic problem, however, offered stubborn resistance. Six loud speaker units with four-foot straight horns were obtained, and the question was how to place them so that the sound would fill the entire Grand Central Palace exhibition hall. At first, they were hung radially in a cluster from the ceiling in the centre of the floor space. This proved unsuccessful since many re-echoes were produced from the side walls and dead spots resulted from large columns. Finally,

after trying several other positions, it was decided to place the horns on the balcony directly in front of the specially constructed booth which housed the receiving and amplifying apparatus. It is interesting to note that all the horns had to be placed together because any separation by placing horns at various points about the hall produced out of phase relationship and distortion. As it was, only five horns could be used, since the sixth faced a wall and produced a decided re-echo which interfered with the speech to a marked degree.

The receiving and amplifying apparatus used, consisted of the small antenna described before, a frequency trap consisting of a coil and variable condenser, a tuned circuit, three stages of radio-frequency amplification, a super-heterodyne receiver with one initial stage of radio-frequency amplification, and three stages of intermediate-frequency amplification, and the usual oscillator and two detector tubes; one stage of audio-frequency amplification and then six two-stage audio-frequency amplifiers of the push-pull type, connected in series parallel, each amplifier feeding one horn, the sixth horn being in the booth and acting as a pilot for the operators. Some twenty-nine tubes were used in all and each horn may be said to have had fourteen tubes connected to it. Of course, the drain on the batteries was great, but four 250-ampere-hour 6-volt storage batteries supplied the filaments without much trouble, while 95 dry cells connected in series successfully handled the plate supply. The diagram on page 297 gives an idea of the general layout and circuits.

This system proved very successful and in spite of many sceptical opinions at the outset, sufficient volume was produced to fill the hall amply, and on the last night, the signals from WEAF were reproduced with such intensity that several of the audience on the main floor were seen to hold their hats in humorous indication of their approval.

In 1922, when Secretary Hoover found it necessary to call a meeting of the radio interests before a special committee of his choosing, the Radio Club was represented on the Committee by E. H. Armstrong. Thus the Club again as of old took an active part in the regulation of radio by Congress. This special committee reported direct to Congress

on its findings, and did much to help frame the present regulations.

This brings the tale of the activities of the Radio Club up to the present day. It is hoped that they may continue along the same lines for many years to come and that those policies which have been followed in the past and the ideals for which the Club stands will never be forgotten. The Radio Club of America was organized to propagate the art of radio telegraphy and telephony in all its branches, and

true to this ideal it has always lent its aid to the best of its ability to all phases of the art. It originated as an amateur organization with a scientific purpose. It fought for the continued existence of the amateur and helped to educate him. It lent a helping hand to commercial radio, by

research and coöperation wherever it could. It gave all it had to the Government when it was in dire need of radio personnel, and, finally, when that new element in radio cropped up—the broadcast listener—it gave him much needed assistance. This organization belongs to no one branch of the radio art but to all branches and therefore its duty at present must necessarily be one of education. Through the medium of its papers and discussions as well as the individual efforts of its members, it must endeavor to terminate the disastrous conflict which has sprung up between the original radio amateur or traffic amateur and the broadcast listener. Both classes must be trained and assisted to become mutually beneficial to one another. The traffic man must be shown how to construct his transmitter so as to create minimum interference, and the broadcast listener how to operate his receiver at the point of maximum selectivity. Neither one nor the other can or should be permitted to die out, for each has his own particular value. The broadcast listener class is composed of the general public whose pleasure and comfort must not be interfered with at any cost, while the splendid services of the traffic amateurs in the World War will never be forgotten and surely entitle them to an everlasting right of existence. But, unless these two warring factions, can be educated to coöperate and aid one another, one of the two is doomed; and this task of education for the good of the radio art must now be the important work of the Radio Club of America as well as all other radio clubs throughout the United States.

