GOLDEN JUBILEE

1909

1959

RADIO CLUB OF AMERICA

FIFTIETH ANNIVERSARY GOLDEN YEARBOOK

1909

1959

RADIO CLUB OF AMERICA INC.
11 WEST 42ND ST., NEW YORK 36, N. Y.

See 1012

Dedicated to:

"The Spirit of Good Fellowship

and the Free Interchange of

Ideas Among All Radio Enthusiasts"

FIFTIETH ANNIVERSARY COMMITTEE

GEORGE E. BURGHARD, *Chairman*
ERNEST V. AMY
PIERRE BOUCHERON
RALPH N. BATCHER
GEORGE J. ELTZ JR.
FRANK A. GUNTHER
HARRY W. HOUCK
FRANK KING
WALTER A. KNOOP
CARMAN R. RUNYON JR.
HARRY SADENWATER
FRANCIS H. SHEPARD
WILLIAM E. D. STOKES JR.
GEORGE WASHINGTON JR.

FIFTIETH ANNIVERSARY GOLDEN YEAR BOOK COMMITTEE

GEORGE WASHINGTON, JR., *Chairman*
GEORGE E. BURGHARD
PIERRE BOUCHERON
CRAIG WALSH
HARRY SADENWATER
PERCE B. COLLISON
PERRY H. OSBORN

PREFACE

The Officers and Directors of the Radio Club for some time previous to the printing of this book were keenly aware of their responsibility in preparing the Golden Jubilee history.

Accordingly the Golden Year Book Committee was set up some time ago and assigned the burden of gathering from all parts of the world the personal background story and recent achievements of each member. This was a formidable task to span a 25 year period in such a rapidly expanding diversified field, since the publication of the Silver Anniversary Year Book.

The Committee contacted each member or attempted to do so in two tries. The answers were most gratifying—more than 85% replied. Of necessity the stories must be brief. To do full justice to the achievements of each member would require a large volume in itself.

Our membership is contributing more than its share to the perfection of the ever expanding Radio Art in all of its diversified branches, now encompassed by the Electronic Industry. We cannot in this book describe each and all of the inventions contributed by members to the commercial as well as the military science. The records are available in the Proceeding. The index of all papers published throughout the fifty years of Club activity is contained herein.

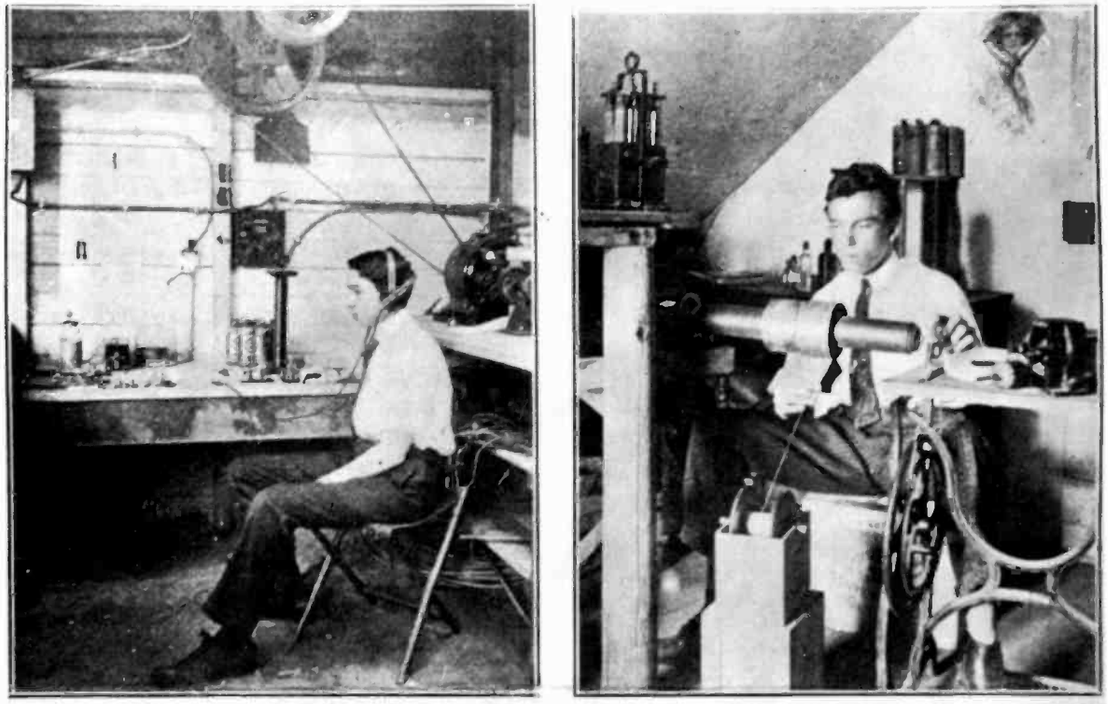
There is no other radio association quite like the Radio Club, no other group so free of the commercial taint, old or young. The free discussion of pertinent subjects is still on the same informal level. We have long since proved the wisdom of free Club "expression." With the span of another quarter century and the passing of some members, the total membership is the largest in the history of the Club.

We of the Committee look to our younger members to carry on this real spirit of the Radio Club. We cannot help you write the Centennial volume. We cannot even visualize the changes that will take place as a result of your contribution. Who knows? Radio as we knew it, Electronics as we see it, the future as we view it may provide that elixir of life that will allow us to enjoy *YOUR* Centennial year book.

GEORGE WASHINGTON JR.

INSPIRED BY THE SPIRIT OF SCIENCE

Enterprising Boys Who Make and Operate Their Own Wireless



FRANK KING, AGE SEVENTEEN, OF NEW YORK, HAS MASTERED THE MORSE CODE AND IS STUDYING THE CONTINENTAL.

FAITOUTE MUNN, OF EAST ORANGE, N. J., AGE SEVENTEEN, IS HERE SEEN USING AN OLD SEWING MACHINE TO WIND HIS COIL.

These pictures appeared in The Saturday Evening Mail of July 24, 1909. Both Frank King and Faitoute Munn were founders of The Junior Wireless Club, Ltd.

CONTENTS

A MESSAGE FROM THE FIRST PRESIDENT OF THE JUNIOR WIRELESS CLUB LTD.

Any history of the Radio Club of America would read like a Jules Verne story. When a handful of boys in 1907 tried to devise a remote control system for their model aeroplanes so they would not be smashed against the walls of the National Guard Armory the groundwork for Guided Missiles was laid and everything we now know as radio was started. Those early contraptions for transmitting signals and voice with low power begot our modern walky-talky sets and those prodigious efforts to eliminate static led to our present day smooth FM reception.

The important thing to remember is that our boys of the Radio Club were in the forefront in all this; they were the leaders in this new field and they had the imagination. Their early technical triumphs, too numerous to mention, were, amongst many others, the Regenerative Circuit, the Hudson Coated Filament, Armstrong's Feedback Circuit and Eltz's Square Law Condensor. Some of the earliest trans-Atlantic messages were received by club members who in some instances established stations of their own in Europe and elsewhere to exchange signals. The official Radio Club Station and stations established by members chalked up numerous world records in Trans-Atlantic tests with low power short wave sets. Only one pipe dream remains, the transmission of power itself without wires, but give the boys a little more time and we will have that disclosure in the "Proceedings" too.

The atmosphere of the young club was always calculated to produce Good Fellowship and the Free Interchange of Ideas among all radio enthusiasts. A milestone was reached when on 28th April 1910 a committee of boys appeared before the sixteen U. S. Senators of the Commerce Committee in Washington to oppose the Depew Bill S. 7243—"To Regulate Radio Communication," because they believed that, while some regulations might be needed, the bill was unreasonable and unfair to amateurs and students of wireless. Let's hope that we never lose the fruits of that victory. Our delegate to advise Secretary Hoover's Congressional Committee did much to frame present regulations and a notable program of the Club was to popularize pure continuous wave transmission as an aid to the elimination of interference; this was the father of the modern Broadcast Program.

Much remains to be done. The small body of amateurs has gradually changed to a large scientific organization of recognized standing, before which the leading lights of the radio world are glad to deliver papers. The enthusiastic urge of the members for the original precepts of the founders remains undampened.

W. E. D. Stokes Jr.

W. E. D. Stokes Jr. (right), first president of The Junior Wireless Club Ltd. and Walter Knoop Jr., present president of The Radio Club of America.

A MESSAGE FROM THE PRESENT PRESIDENT OF THE RADIO CLUB OF AMERICA INC.

While the Club has its rich heritage of illustrious members over the past fifty years your Board of Directors is continually striving to maintain the organization as an active, vibrant group interested in today and tomorrow with due respect for the past.

First and foremost, the Radio Club is a "club," and encourages fellowship among its members. Since the membership is not specialized, nor is it particularly research oriented, an attempt is made by the Papers and Meetings Committee to secure speakers on recent advances in areas of general interest such as long range radar, telemetering, amplifier stability, stereophonic systems, component and subassembly packaging techniques, and radio astronomy to name a few. In general, the Club stresses physical concepts in its meetings and discussions as compared with rigorous mathematical treatment. This year the publication schedule of the "Proceedings" has been resumed and is on a satisfactory basis.

Dinner-meeting attendance has been good, especially considering that most of the members reside and work in the suburbs of New York City. Your President occupies his position in the Club's 50th Year with a great deal of humility and wishes to express his sincere thanks to the Board of Directors, the Fiftieth Anniversary Committee, and the several operating committee chairmen for their enthusiastic approach to the work involved in carrying on its tradition and responsibility.

WALTER A. KNOOP JR.

THE HERITAGE OF THE RADIO CLUB OF AMERICA

By Lloyd Jacquet

Perhaps we were misunderstood by our friends and contemporaries of a half century ago. The term "egghead" was not yet invented; or at least its full connotation had not taken on the meaning that represented our position in those early days. We were young, and with a certain lightness of heart peppered with a purpose, with a straight unalloyed sincerity in our dedication to all things that had to do with "electricity," "wireless," and "science" generally.

None of our pals or classmates thought us book-wormish or abnormal. On the contrary, we were the "bright boys" of the usually misunderstood physics teachers, who would somehow look to us kindly as we pushed the lab class along with our own inhibited enthusiasm, raising the over-all marks of the students at exam times. Maybe there was a certain amount of satisfaction in being able to explain authoritatively to the spell-bound classroom what a Voltaic pile was; and to quickly draw on the blackboard an electric bell dry-cell circuit diagram; or gleefully hook up a telegraph key and sounder in a demonstration of fast code work that the girls marvelled at.

We reserved our more profound and esoteric knowledge of "wireless" however for our fellow-conspirators. And if perchance there were enough self-raised, self-started neophytes in a particular area or borough, we might draw the circle closer by forming a "Wireless Club" with constitution, by-laws, and the inevitable "sergeant-at-arms." For there was an attractive force as with the poles of a permanent magnet that drew together only those of a same mind, of a same interest, and to a large degree, of a same feeling of fellowship.

In our own private excursions into the mysteries of what was to evolve in a half century as one of the most important branches of science, we spent many lone hours at our hand-made instruments, in the quiet of our attic room, or cellar corner, and so developed a certain way of thinking. Even the most insignificant result of our experimental blundering was eagerly reported to our fellow-conspirators for verification and sharing. This eagerness and frankness in distributing the results of our findings undoubtedly molded the form of fellowship which is such a striking quality of the Radio Club's membership.

We were undoubtedly romantic about ourselves, possessors of strange new secrets that enabled us to send and receive messages without wires. We were in love with "wireless," and so dedicated our every spare moment to this goddess. The man-hours of loving efforts thus lavishly spent alone and together have of course left their mark on any and all under the influence of this magic. The habit once formed was impossible to lose, come war, or further schooling, marriage, family, and many other enticing hobbies.

Exalted and inspired as we were in belonging to a relatively small and unique group initiated into the very few mysteries of the art, we were free and open with our ideas. Our knowledge and secrets were shared with all neophytes that besought the scant information. They were brought into our homes and shown our highly individualistic "labs" and "research projects," as well as working equipment. Advice and help was freely given. And soon the beginner would want to join "the gang"—belong to the Club.

Politics? We had no time or patience with them, and our Radio Club was run by the

best men we thought as we voted them into office. And with this confidence, they performed unselfishly and bravely. This developed leadership, and still retained the individual stamp of democracy. And it has continued thus for a half century.

Vigilant and jealous of our position, and not quite sure of our legal "rights," we kept an eager watch over our own actions as they might hurt others; but also quickly stopped others who would curtail our sincere efforts. And thus it was that we went to bat with the full support of the Radio Club's membership when unfavorable legislation, or rules and regulations that would adversely affect all amateurs had to be faced and fought out. Yet we never would attempt to dictate to others our own ideas or concepts of laws to rule all. How much of this upright, sincere, and selfless spirit eventually permeated the Radio Laws that were written into our national bills we may never know. But certainly the influence of Radio Club men here and there, quietly and rightly, trickled through to the law-makers, and the matter was kept in the proper perspective, that all radio men, as individuals, might enjoy their full rights.

Many have been the guests at Radio Club meetings who have commented upon one of the most obvious characteristics of the members: their strong friendship among each other, their sincere fellowship, their open goodwill. These are qualities that have grown with the founding members, and is one of the prized appeals that the Radio Club retains for those affiliated with it through these many years.

For this is a Radio Club with a distinctive personality. It is and has stayed the *individual's* Radio Club: the pioneer, the lone researcher, the staunch amateur, the independent inventor. It is the place—in a conformist-ridden industry overshadowed by "big business" aspects—for the independent amateur, the theoretical physicist, the practical engineer, the famed inventor, the beginning experimenter, the business man and marketer, the independent scientist, to mingle and to fraternize on the one, common level of good fellowship.

There seems to be a shrinking of places where the essential pioneer spirit can survive: the spirit of independent investigation and scientific research so essential to the progress of the whole electronic art. The value of the *individual* person, his character and his achievements, can best flourish in the proper environment. There are few oases as inviting today as the forum and fellowship of the Radio Club.

Though a half century old, it is a strange thing that it is so young in spirit. The continued policy of recognizing primarily the value of the individual and his personal worth; the giving of full recognition to individual achievement in fields of pioneer investigation; the encouragement to individuals to expand the opportunities for individual achievement in the fields of electronics...these are all powerful factors at work at the Radio Club, all lineal descendants of the pioneer qualities built into it by those who went before, the unique heritage that insures continuity of existence, into the second half of the century mark, and beyond...

At this Fiftieth Year milestone, we may well stop and make a quick moral assessment of our being. Did we, to use a modern phrase, leave *any messes behind?* Were we a luxury, and was our hobby a worthy one? Looking at the pile of old electrical, wireless and science magazines in our old rooms, the tangle of useless wires, the dented coils, broken VT tubes, battered earphones, useless home-made tuning and detecting devices, our parents had to straighten out when we left the roost to go out into the world and prove our worth in the new field of communications, we might have misgivings.

But as for our ideals, and our thinking, and our philosophies—those, we like to believe, were lofty, and noble, worthy of permanence...and without confusion.

All through these five decades, we could, and did, look at ourselves face to face, and be not ashamed. Even though our scientific iconoclasm caused some to raise eyebrows among the uninitiated, the secret something that drew us together originally and kept us together ever since has proved to be real and substantial. As ethereal as this substance is, it was the base upon which we erected this clan of kindred minds that we call the Radio Club of America.

Proudly do we proclaim to the world that we belong together in a tight fellowship defending the last one of us if challenged; or to back fully the single individual bold enough to challenge the world building up all about the Universe with new concepts and ideas.

Our fellows loved radio—they had to. They knew its fill of mystery, its compelling challenge. They knew too that the future was filled with an awe and a wonder which they were determined to investigate, and pass on to all the members of the Radio Club, and to the outer world in a modest reverent way, carrying the inspiration of 1909 ever forward, ever bright. That is the wonderful heritage of the Radio Club of America. We all partake of it, as we continue to contribute to it—and the next half century is bright with promise.

THE RADIO CLUB OF AMERICA, INC.

1959

OFFICERS

WALTER A. KNOOP	*President*
R. H. MCMANN, JR.	*Vice President*
JAMES MORELOCK	*Corresponding Secretary*
C. R. RUNYON, III	*Recording Secretary*
JOSEPH STANTLEY	*Treasurer*

DIRECTORS

HARRY W. HOUCK
ERNEST V. AMY
JERRY B. MINTER
GEORGE E. BURGHARD
HARRY SADENWATER
FRED A. KLINGENSCHMITT
RALPH R. BATCHER
FRANK H. SHEPARD
FRANK A. GUNTHER
JOHN H. BOSE
ALFRED W. BABER
ROBERT FINLAY
PERRY H. OSBORN

COMMITTEE CHAIRMEN

GEORGE E. BURGHARD	*50th Anniversary*
GEORGE E. BURGHARD	*Armstrong Memorial*
JOSEPH J. STANTLEY	*Budget*
ERNEST V. AMY	*Banquet & Entertainment*
ALBERT F. TOTH	*Facilities*
GEORGE E. BURGHARD	*Legal Counsellor*
GEORGE WASHINGTON, JR.	*Manuscript*
HARRY W. HOUCK	*Medals & Honors*
FRED A. KLINGENSCHMITT	*Membership*
R. H. MCMANN	*Papers & Meetings*
J. H. RUITER	*Publications & Advertising*
RALPH B. BATCHER	*Publicity*
GEORGE WASHINGTON, JR.	*Yearbook & Archives*
JOHN H. BOSE	*Objectives & Requirements*

JUNIOR WIRELESS CLUB, LTD.

EACH MEMBER MUST HAVE MADE HIS OWN STATION.

W. E. D. Stokes, Jr., Its President—Headquarters at the Ansonia Contains Much Apparatus—Club to Go to Washington to Oppose Pending Bill.

It is somewhat dangerous to attempt to enter the clubroom and experimental station of the Junior Wireless Club, Ltd. without a guide, for the officer in charge dispenses with the necessity of lock and key by having the knob charged with electricity to give the unexpected—and unexpecting—visitor what he terms a "nice little shock."

But when proper guidance is secured from the club's young president, who maintains headquarters at his home, the Ansonia, many marvels and intricacies may be observed with some degree of security. W. E. D. Stokes, Jr., president, aged 14 years, points out the pitfalls.

"Look out. Don't step on that zinc plate!" says he. "It's charged!" And you look out and don't step.

The clubroom and receiving station is imposing, almost formidable despite its somewhat small extent. In addition to the wireless telephone instruments at one side of the windows, the sending station across the way and the aerials connecting with three conduits above many other things more or less electric add to the effect. A big electric turning lathe occupies one side of the room; numerous vari-colored models of aeroplanes—which the manufacturer asserts really go when wound up—hang from wire complexities overhead; zinc plates, worse than they look, are not to be ignored.

In fact it is not safe to put a hand to the most innocent looking object unless first reassured. A big box beneath the battery and motor table filled with perfectly staid appearing earth and plants which thrive on the rays of a makeshift sun specially arranged out of a 100 candle power electric bulb is not what it would seem. Those plants—roots, branch, leaf or blossom—are electrified and emit sparks when invited. On the side walls high and low, on the ceiling and suspended therefrom, bulbs of every conceivable variety, shape and power transform the little room into an Aladdin cave of brilliancy.

"I'm always looking around at bulbs," says the president, "and when I see a new kind I try it."

So there they are, long and slim, short, fat and round, but all shining and bringing out dazzlingly the blueprints of scientific aspect which adorn one side of the wall, posters of the Postal Telegraph and Cable Company variety, illuminated letter placards bearing such legends as "No Smoking," "S. W. Co."—Stokes Wireless Company—and last but not least printed lists of wireless signal stations and steamers with wireless equipment.

These steamers and signal stations are all intimately acquainted with the experimental station of the Junior Club—too much so at times, it seems, when the Manhattan Beach station has to ask it to stop receiving for a time; for the Manhattan Beach station is less powerful and is retarded in receiving.

The young president puts the receiving headgear on your head.

"Listen," he says. "They're talking to Manhattan Beach."

"How can you read it?" you ask.

"Listen," he says. "The spaces—da-da-da-da—can't you hear it?" And he becomes a trifle impatient at your stupidity. He discusses condensors, detectors, sensitive points and other appropriate topics for your enlightenment, but you are a poor subject.

Then the president tells how the Junior Wireless Club came to be, how it operates and what it intends.

About two years ago the Junior Aero Club, under the direction of Miss E. L. Todd, participated in the toy exhibition held at Madison Square Garden. Three of these youthful members, Frank King, Faltoute Munn and Frederick Seymour, specialized on wireless telegraphy and frequented Miss Todd's studio on West Twenty-third street to experiment. Each of them made his own wireless apparatus, and through the newspapers they invited any other boy to come and show a mechanical set he had made himself.

W. E. D. Stokes, Jr., then aged 12, had rigged up a wireless outfit which he brought forth to display and which Frank King helped him set up. Such books as the "A B C of Wireless Telegraphy" and "Electricity of Everyday Life" and possibly the random assistance of a random electrician were the principal sources of information.

The father of W. E. D., Jr., met the boys and invited them to his home to form a club. There the Junior Wireless Club, Ltd., came into being with headquarters at the Ansonia, there being just enough offices to go around among the charter members. W. E. D. Stokes, Jr., was made president; George Eltz, 441 West Forty-seventh street, vice-president; Faltoute Munn, East Orange, N. J., recording secretary; Frank King, 326 West 107th street, corresponding secretary; Frederick Seymour, East Orange, N. J., treasurer. Miss E. L. Todd was made honorary president, Prof. R. A. Fessenden of Brant Rock, Mass., was chosen as consulting engineer, and Seymour, Seymour & McGrath, 71 Broadway, as general solicitors and patent attorneys. Thus from the start the club's letterheads presented a complete and dignified appearance and are as yet unchanged, although the club has extended its membership to thirteen.

At 10 A. M. the first Saturday of each month from October to May the club holds meetings at the Ansonia, goes through the regular preliminary business, acts on the business letters received and the applications for membership, talks over schemes and, most of all, works with the wireless. The necessary qualification for membership is that the applicant has himself made his own wireless apparatus; later he may have assistance and more elaborate mechanical contrivances, but the first rule is inviolable.

They first memorize the Morse code until they are able to think in dots and

W. E. D. STOKES, JR., AND HIS WIRELESS TELEGRAPH.

This article appeared in the New York newspapers early in 1910. The illustration shows "Weddy" Stokes, first President, at the official Junior Wireless Club station in the Hotel Ansonia.

A HISTORY OF THE RADIO CLUB OF AMERICA, Inc.

By GEORGE E. BURGHARD

Part I

The story of the Radio Club of America begins over a quarter of a century ago, during the really dark ages of the radio art, about 1907.

Here we find a group of small boys, who according to the true American spirit, were so interested in flying that they formed the Junior Aero Club of U. S. under the leadership of Miss Lillian E. Todd. The names of the boys, who were in their early teens, were: Frank King, W. E. D. Stokes, Jr., George Eltz and Frederick Seymour. The members of the club made model planes and attempted to fly them at the regular meetings which were held in a convenient armory. Of course the science of flying was in its infancy at that time, and although their tests were not particularly successful, they were none the less commendable.

In conjunction with their experiments in aviation, these youngsters had, for some time, also been interested in what was then known as WIRELESS. In fact, the new idea of sending messages without wires had proved itself so fascinating, that they found themselves actually devoting most of their spare time to tinkering with wireless apparatus. There were at this time a small number of so-called amateur wireless experimenters in and about New York City, so the boys decided to form a new club with wireless as an object.

Accordingly, Mr. W. E. D. Stokes, Sr., called a special meeting of the Aero Club, for the purpose of forming a new club, with wireless telegraphy and telephony as its main interest. This meeting was held at the Hotel Ansonia in New York City on January 2nd, 1909. There were present Messrs. W. E. D. Stokes, Sr., W. E. D. Stokes, Jr., George Eltz, Frederick Seymour, Frank King, Faitoute Munn, and Miss Todd, the organizer of the Junior Aero Club.

It was unanimously decided to form a new organization to be devoted entirely to Wireless. Thus, the Junior Wireless Club Limited was founded, and the following officers were elected:

Director General—W. E. D. STOKES, SR.
Honorary President—MISS E. L. TODD
Consulting Engineer—PROF. R. A. FESSENDEN
President—W. E. D. STOKES, JR.
Counsel—MR. SEYMOUR
Vice-President—GEORGE ELTZ
Recording Secretary—W. FAITOUTE MUNN
Corresponding Secretary—FRANK KING
Treasurer—FREDERICK SEYMOUR

It was also unanimously decided that these members should be known as the Charter Members.

Of course, the early days of Radio were indeed days of pioneering and darkness,—Days when traffic had to be handled with a coherer and a straight gap spark transmitter. There were no books or magazines to guide these boys, but they held regular monthly meetings at the Ansonia, where "Weddy" Stokes lived, on Saturday afternoons, and by swopping information gained the necessary knowledge to build their own receivers and transmitters. The fascination of sending messages through space without wires, readily took hold of the younger generation, and small boys began to enveigle their parents into giving them money with which to buy wire and other material to build sets in imitation of

A meeting was called by Mr W.C.D. Stokes. Sr. at the Ansonia, New York City, on January 2nd 1909, for the purpose of discussing the organization of a club whose objects should be devoted to the interests of wireless telegraphy and telephony.

There were present: Messrs. W.C.D. Stokes, Sr. W.C.D. Stokes Jr., George Clty. Frederick Seymour, Frank King, Fantorth Munn, and Miss C. Lillian Todd, Organizer of the Junior Aero Club of the United States.

The meeting was called together by Mr. W.C.D. Stokes, Sr. as Chairman, who stated the object of the proposed organization and made a brief address on the history of the Cable and the subject of the future of wireless telegraphy and telephony. At the close of his remarks Mr. Stokes presented a motion that those in favor of the formation of such a club, signify their Approval.

The motion was duly seconded, and unanimously carried.

Mr Stokes requested Miss Todd to state whether it was her idea that the new club be organized as a division of the Junior Aero Club of the United States, or as a separate association. Miss Todd stated that it did not seem desirable to hamper in any way the new club by any connection with the original organization, and that she would transfer the members present who were now members of the wireless division of the Junior Aero Club to the new club.

Mr Stokes then suggested that Miss Todd name the new club; she proposed the name already suggested by Mr. Stokes which was thereupon submitted to those present for consideration, and upon motion, duly made, seconded and carried, the name

Junior Wireless Club, Limited

was unanimously adopted.

The election of officers being next in order, upon motion duly made, seconded and carried, the following officers were unanimously elected; —

		(Proposed by)
Director General	Mr W.C.D. Stokes	Miss Todd
Honorary President	Miss C.L. Todd	Mr Stokes, Sr.
Consulting Engineer	Prof. R.A. Fessenden	" " "
President	W.C.D. Stokes Jr.	" F. Munn.
Counsel	Mr Seymour	W. C.D. Stokes, Sr.
Recording Secretary	W. Fantorth Munn	Miss Todd
Corresponding Sec'y.	Frank King	Mr. Clty.
Vice President	George Clty	W.C.D Stokes, Jr.
Treasurer	Frederick Seymour	F. Munn

Upon motion, duly seconded and carried, it was unanimously decided that the members present should be known as the Charter Members.

Mr Stokes, Sr, made a speech congratulating the members upon their new organization and gave them the privilege to hold meetings at the Ansonia. Mr Stokes then presented the club a sum with which to create a treasurer's fund. To this was added by Miss Todd, the membership fees that had been paid into the treasury of the Junior Aero Club, the members of that organization present doing thereby transferred to the Junior Wireless Club, Limited.

Upon motion, duly made, seconded, and carried, it was decided that regular meetings be held on the first Saturday of each month at 3 o'clock P.M.

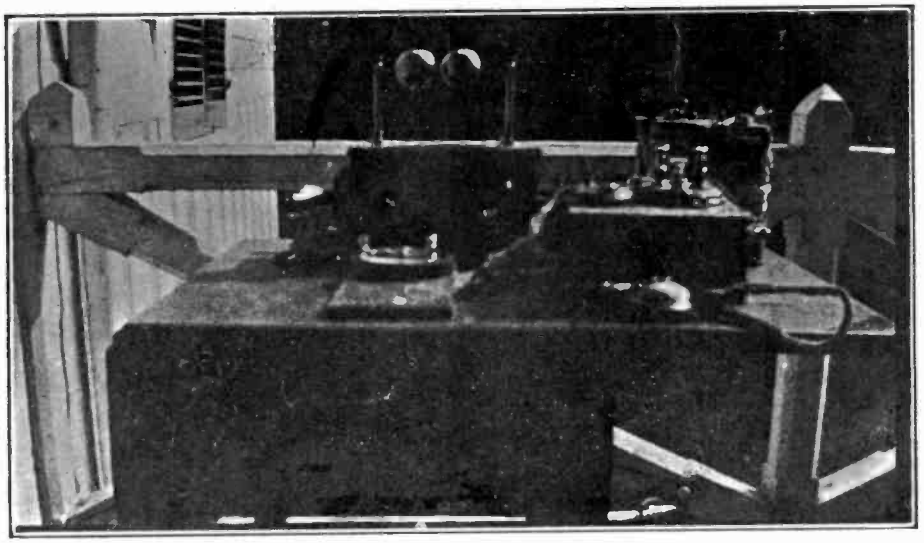
There being no more business to transact, the meeting adjourned.

Mr Stokes then invited the members of the Junior Winders to luncheon.

Fantorth Munn

Facsimile of original minutes of the Junior Wireless Club, Lmtd., 1909.
This was the special meeting of the Junior Aero Club of the United States, held in the Ansonia Hotel, Jan. 2nd, 1909, at which the Junior Wireless Club Limited was formed and the first officers were elected.

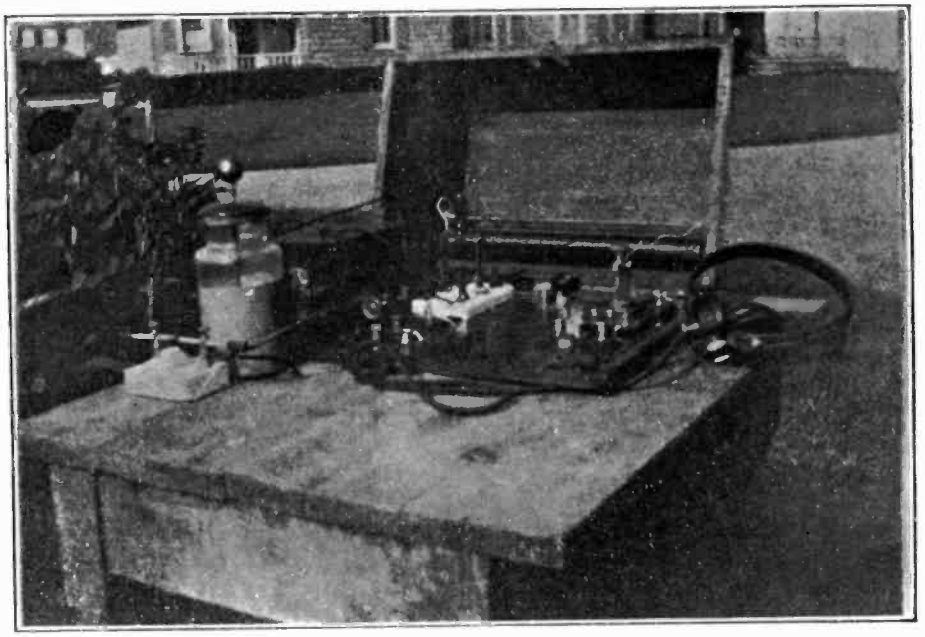
those used by the commercial companies. Their efforts were gallant indeed, and the results were successful in some cases, where the frequency of the transmitter happened by chance to be somewhere near that of the receiver, or someone had gained expert knowledge from the operators at Manhattan Beach or the Waldorf Astoria, where the main commercial land stations were located. With



Ernest Amy's station, "EA", at Rumson, N. J., 1907.
A typical station of the old Coherer days, with one inch spark coil and round ball spark gap.

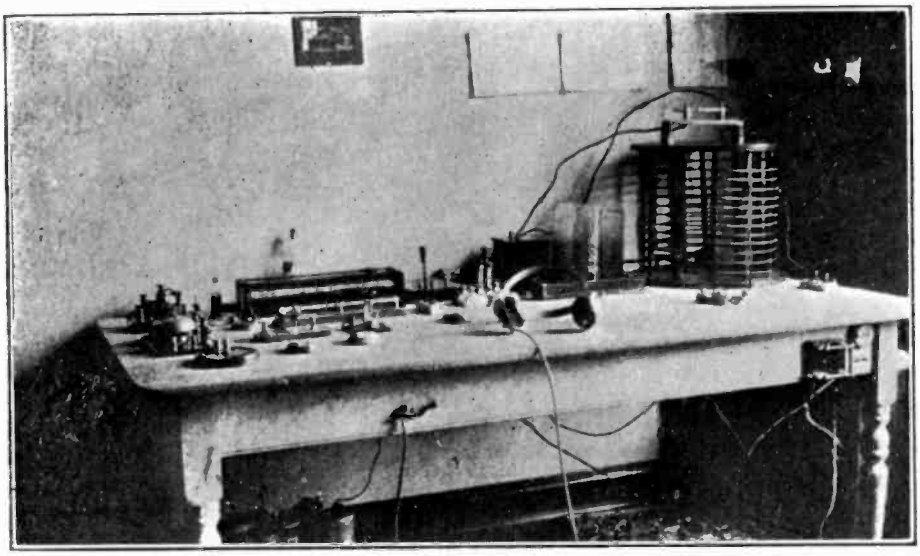
the crude apparatus and the embryo knowledge available, it was really remarkable that these boys could communicate at all, but almost any night one could hear messages being exchanged between stations in New York City, covering distances of at least a mile or two.

The amateur in these days, of necessity, had to build his own set, since there were no manufacturers other than the Commercial companies. Occasional articles on commercial stations, as they then existed, appeared from time to time,



Frank King's portable "FK" at Long Branch, N. J., 1907.

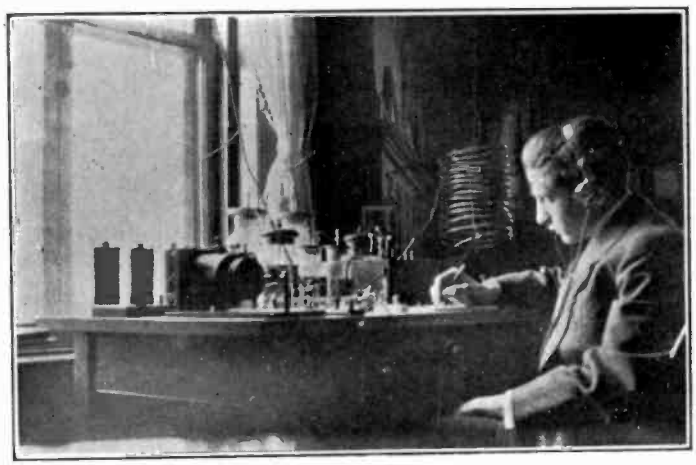
and each new idea presented, was added to the experimenter's stock of knowledge. The success of each experiment was passed by word of mouth to the other amateurs and eagerly followed. The Coherer, and in a few cases the Marconi Magnetic Detector, were the detectors in use at that time. All tuning was accomplished by means of sliders on coils of wire wound on the handiest form obtainable, very often being nothing more nor less than a broomstick, rolling



Station "EA", E. V. Amy, 48 West 70th St., N. Y. C., 1909.
Dry batteries, with a mechanical interrupter, were used as a power supply. Note the slide-wire tuner, potentiometer, and the glass plate transmitting condensers.

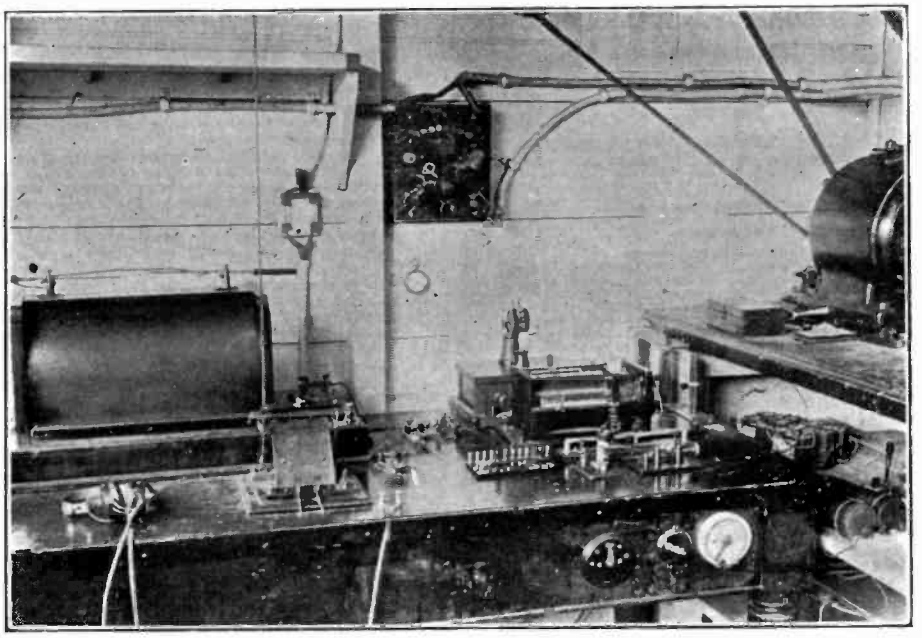
pin, or convenient carpet pole. Variometers and variable condensers were then unknown to the amateur.

The transmitters consisted of spark coils, mostly home made, and operated with a mechanical interrupter which was subsequently replaced by the electrolytic type. Most of these interrupters were home made, and lucky was the boy who could boast of the possession of a platinum point neatly sealed in a glass tube.



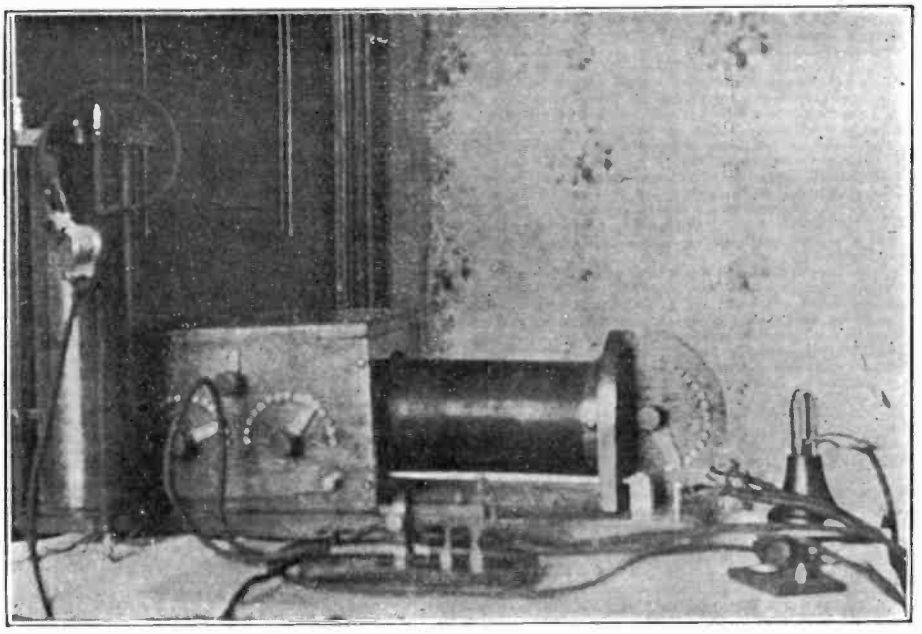
George Burghard at station "EB", 1 East 93rd St., N. Y. C., 1910.
The apparatus was mostly home-made, the "Helix" in particular, which was suspended from the ceiling by a string to insure good insulation.

Many were the amusing incidents which occurred. One boy desiring to erect the best possible antenna, ran across an article describing the aerial used by the Marconi Co. at its station on Cape Cod. It was in the shape of a huge



Station "FK", Frank King, 326 West 107th St., N. Y. C., 1911.
The birth place of the Radio Club of America, Inc. The station was located in the shack in Frank's back-yard where the special meeting of the Junior Wireless Club was held on Oct. 21st, 1911, at which the name was changed to Radio Club of America, Inc.

square funnel, the upper ends or rim of which were insulated. Accordingly, he very carefully built a miniature copy only four feet on one side, and six feet high, not realizing the difference in electrical constants between the Cape Cod



Harry Houck's station, New York, 1910.
Note the home-made loose coupler, which was a prized possession at that time.

TO REGULATE RADIO COMMUNICATION

HEARINGS

APRIL 28, 1910

ON THE BILL (S. 7243) TO REGULATE RADIO COMMUNICATION

BEFORE THE

COMMITTEE ON COMMERCE OF THE SENATE OF THE UNITED STATES

SIXTY-FIRST CONGRESS, SECOND SESSION

CONSISTING OF

WILLIAM P. FRYE, of Maine, *Chairman*.

STEPHEN B. ELKINS, of West Virginia.	JONATHAN BOURNE, JR., of Oregon.
KNUTE NELSON, of Minnesota.	THEODORE E. BURTON, of Ohio.
JACOB H. GALLINGER, of New Hampshire.	THOMAS S. MARTIN, of Virginia.
BOIES PENROSE, of Pennsylvania.	WILLIAM J. STONE, of Missouri.
CHAUNCEY M. DEPEW, of New York	F. M. SIMMONS, of North Carolina.
GEORGE C. PERKINS, of California.	JAMES P. CLARKE, of Arkansas.
SAMUEL H. PILES, of Washington.	FRANCIS G. NEWLANDS, of Nevada.
WILLIAM ALDEN SMITH, of Michigan.	JOHN H. BANKHEAD, of Alabama.

WOODBURY PULSIFER, *Clerk*.
FREDERICK B. SARGE, *Assistant Clerk*.

WASHINGTON
GOVERNMENT PRINTING OFFICE
1910

communication. Why to-day most all the ocean-steamer messages are transferred or relayed from ship to ship within a radius of 500 miles at most.

I think, gentlemen, I have shown that there are strong reasons why this bill should be contrary to the best interests of the United States as a world power. All this interference complained of by the navy operators was due to the commercial companies, not to amateurs.

Sixth. We feel that the greatest objection against this bill is that if it is passed it will stifle the ambition and great inventive genius of American boys. We boys of to-day are the citizens of to-morrow. We have, many of us, already chosen wireless as our line of work. There are vast possibilities, great discoveries, and marvelous inventions yet to be revealed in the study of radio communication. We boys want a try at the great rewards that are sure to come to the successful experimenter and inventor in these lines. Wireless is not mere play for us boys, as some seem to think. We love the work, hence the name amateur, but it is always the amateur or lover of a line of work who produces results.

A few years ago only a very few boys were studying wireless. To-day there are between 25,000 and 40,000 in the United States alone. As I said, it is not mere play for them. It makes them thoughtful, observant, and trains them in the laws of cause and effect, and is, in short, an education and discipline for them.

Believe me, they are all keenly interested in the attitude of our Government toward wireless, and they expect fair play

Gentlemen, this Government is on record as a protective Government. You protect our cotton factories, our steel-rail mills, and our tobacco growers. Why not at the same time protect our amateur inventors? The returns to the Government from such protection will surely equal or exceed those from the protection given to the wool-growers of the land.

Article I, Section VIII, clause 8, of the Constitution of the United States says that Congress shall have power "to promote the progress of science and useful arts," etc With this power, gentlemen, goes the responsibility for promoting the progress of science and useful arts, and wireless is bound to be one of the greatest.

The people who are to-day using and paying to the great "communication trust" unreasonable toll for the use of wires will then have only to buy a wireless instrument for a few dollars and then will be able to talk to their friends with little cost. Most every State in the Union has done away with "tollgates" on land. Does our Government now propose to pass an act to establish tollgates in the air? Soon the paths to heaven will be beset by tollgates.

The men and women of the United States will be able to typewrite a message and have a duplicate made of it at the same time in the Morse code on chemically prepared paper, which can be placed in a clock mechanism and be sent out and received by the desired person on his own special wave lengths. He or she also will be able to communicate within a radius of 400 miles by wireless telephony. We boys ask only for a chance to work these things out. Do not hamper us. I have wireless applications in our Patent Office for small patents which have been granted. I hope some day to discover something that will be a great use to the world and to my own personal benefit.

I have a telephone plant which will operate within a radius of 50

41275—S. S. C—10——2

STATEMENT OF MR. W. E. D. STOKES, JR., REPRESENTING THE JUNIOR WIRELESS TELEGRAPH CLUB OF AMERICA.

Mr STOKES. Mr. Chairman and honorable members of the Committee on Commerce of the Senate, we appear before you as delegated representatives of the Junior Wireless Club of America (Limited), an organization of boys who have devoted much earnest study to radio-communication and who have already contributed to the development of this science with the firm belief that they still have more to contribute and who want the help and protection of your honorable body.

As president of this club, I wish to register with you our opinion of the bill now in your committee, known as No. 7243, introduced by Senator Depew, of New York, for the purpose of regulating wireless communication.

We agree as to the importance of licensing all professional, as well as amateur, wireless operators, but only upon the basis of a merely nominal fee of 50 cents or $1. We also believe that such a license should be revoked forthwith for malpractice at any time, such as in case of war or intentional interference in important messages, and the sending out of false calls for aid, or refusal to answer calls for aid, or to send along such messages.

We would even go further than does this bill in regard to the qualifications necessary for securing a license. For instance, we believe that every person who takes out a license should be either a born citizen of the United States, or should declare himself to be a citizen, and he must understand the Morse code—for many, especially the ocean-going steamer operators, understand only the continental code, and must agree to obey all government regulations.

Every licensed amateur operator must promise to forward government messages when requested so to do, and to state every year what kind of apparatus he has in use, the wave length he uses, and any other information deemed necessary, and the Government should issue with the license its regulations and instructions, how and what the operator is to do in case he receives a call for aid on matters important to the Government.

However, we feel there is more in this bill which arouses our protest than there is which meets with our approval.

We protest against the bill for these reasons:

First. We believe that in actual practice the provisions of this bill would discriminate heavily against the amateur and in favor of the commercial wireless companies, which are for the most part only stock-jobbing corporations and members of a great trust.

Second. It is impossible and impracticable in some of its features.

Third. It is ambiguous and capable of interpretation unfair to amateurs and students of wireless.

Fourth. It is unjust to a large body of manufacturers.

Fifth. It is contrary to the best interests of the United States as a nation.

Sixth. If passed, it will stifle the ambition and really great inventive genius of American boys.

Seventh. Should proposed Senate bill No. 7243 or House bill No. 23495 become a law, it would require, to enforce it, a force of at least 1,000 to 5,000 expert wireless engineers, whose salaries would not be less than $200 a month each, with a system of double stations in each locality to get triangulation, scattered all over the United

just as easy to conceal the aerial as it is to conceal the operator. With the new methods of radio transmission, the location of the operator could be absolutely concealed. There would be no noise, no spark to indicate his location. He might have a dozen aerials, a mile apart, which would only cost from $2 to $5 each, connected to some one locality, or a dozen localities, where the operator could be concealed, and while the engineers were trying to locate one apparatus by triangulation the offender could be operating another one a mile away, or 2 miles away. And it would require the cooperation of several skilled radio engineers to locate each apparatus.

To substantiate this statement, any of us would guarantee to prove that it will take at least a month for the government aerial engineer detectives to discover our locality, for the engineering calculations would be so intricate it would take days to locate the exact position of the offender.

Is our Government prepared to establish a detective bureau of wireless police, which will be fully as expensive, if not more expensive, to carry on as the United States customs-house?

We desire to file with your honorable committee copies of this our argument against this bill; also a copy of circular issued by P. S. Kullman & Co., stock jobbers in wireless stocks; also an analysis of the financial condition of the United Wireless Company made by the Financial Review.

We thank you for permitting us to appear before you

The CHAIRMAN. Whom do you represent?

Mr. STOKES. The Junior Wireless Telegraph Club of America.

The CHAIRMAN. Where is it located—in New York?

Mr STOKES. Yes, sir. I will present Mr. Eltz.

STATEMENT OF MR. GEORGE ELTZ.

The CHAIRMAN. Whom do you represent, sir?

Mr. ELTZ. I represent the Junior Wireless Clubs and Engineers of America.

Gentlemen, I may add a word to this interference with which we are charged. There is a lot of interference caused by the amateurs in New York City. It is not intentional, however, in any way We all have instruments, and whenever a commercial station or the navy or any big station in the city requests us to keep off, we do so, but there is a lot of interference because the naval stations and the other stations can receive greater distances than the amateurs, and an amateur coming on at night goes up to his instrument and listens and hears nobody working. It may be the navy-yard has told everybody to be quiet; so he starts to operate; he breaks up the navy-yard and the navy-yard says he interferes. It is entirely unintentional, and if the apparatus of the navy was up to date, as some of the Fessenden apparatus is, there would be no such interference. I think the bill is entirely unnecessary.

The CHAIRMAN. How many more desire to be heard against the bill?

Mr BOTTOMLY I would like to say a few words.

Senator PENROSE. Shall we sit for an hour longer, or meet again? I am only asking for information. I am going to the Senate to report a bill

Reproductions from the Congressional Record of 1910, showing parts of the statements made by Weddy Stokes and George Eltz at the hearing before the Committee of Commerce on the Depew Bill in Washington, April 28th, 1910.

aerial and his miniature model. Needless to say, the small imitation of the real thing didn't work very well, and it was only by chance, that the amateur discovered that, a stretch of bell wire was far more efficient.

Several experiments were also made with kite aerials. A kite was flown from the roof of a city house. When the kite had reached a height of several hundred feet, a severe static shock was received by the young man holding the wire, much to his chagrin and the amusement of the party. One member proudly announced that he wouldn't get a shock from the wire because he had on rubber heels, and walked about the tin roof with his toes in the air. The manipulator of the kite rather doubted the insulating qualities of rubber heels as against static charges, and at a favorable moment brought the wire in contact with the boastful young man's ear. The result was a neat little spark and a resounding yelp from the wise young fellow, despite his O'Sullivans. Irrespective of shocks and static, however, the kite antenna proved a great success for reception.

Naturally the activities of these amateur experimenters aroused considerable interest, and it was not long before the Government began wondering what could be done to control these newcomers. The idea of restricting the free air had never occurred to anyone before, but the result was a bill introduced by Senator Depew in 1910, practically prohibiting amateur experimenting. This bill, naturally the first of its kind, would surely have spelled the death of all amateur Radio had it not been for the quick action of the Junior Wireless Club. The club opened hostilities by the following letter to Senator Depew in reply to his letter of March 17th, 1910:

New York, March 19, 1910.

Hon. Chauncey M. Depew.
U. S. Senate,
Washington, D. C.

My Dear Sir:

Yours of March 17th to our President is before us. We think you must have been misinformed that malicious orders were sent to the Fleet by Amateur Wireless Operators.

In the 1st place,—All messages and orders to the Navy should be in cypher.

2nd. Any skilled government operator knows the touch and tone of every other government operator, just as you know the voice of your wife from the voice of your son, or a Bank Cashier recognizes the signature of Smith from the signature of Brown.

3rd. If our Government used only certain wave lengths, they should be able to tune out all other interferences, except their own wave length provided they were supplied with an up-to-date plant.

At the Narraganset Bay there were certain Naval tests made about two years ago, and the various so-called Wireless Companies wanted to get the first news to the newspapers of these tests, so as to boom their companies' stocks, and to say the news was received first through their Company, and when some of them found they were unable to cut out interference between themselves, in order to prevent other Wireless Companies from getting the news first they sent a lot of fake messages of confused dashes.

Only a few of the so-called Wireless Companies have efficient methods of cutting out interferences, and these are the Companies that are now crying the most for protection.

You probably have heard of the tests made last year between Glace Bay, N. S., and Clifton, Ireland, when the National Signaling Co. picked up the messages, which Marconi, on the test, was unable to deliver between their own stations, from both Glace Bay and Clifton, Ireland, in spite of the fact that the Marconi Company kept up a constant interference of dash, dash, dash from their Cape Cod station for 48 hours without interruption, but the National Signaling Co. paid no attention to such interference and picked up all the messages, which Marconi was unable to exchange between their own stations, and all these messages were handed over to Lord Northcutt at the Hotel St. Regis.

What the Navy needs is an up-to-date plant and system that will operate at all seasons of the year, at all times of the day or night, and under all atmospheric conditions of the weather, and will send not less than 1000 miles and receive not less than 200 miles.

Our Government should have a well paid intelligent staff of operators, and a secret cypher system of communication like that of the British Admiralty,—then there would be no talk of amateur interference.

Since the day that boy at Portsmouth, Me., received the first news from the Connecticut of the return of the Fleet from its trip around the world, these so-called stock-jobbing Wireless Companies have been unable to sell their stock, and have done nothing but pound us boys.

We, the undersigned, a Committee of The Junior Wireless Club Ltd. of America, would like to be heard on this proposed bill, and we will come to Washington, if we are allowed to do so, and if it can be arranged so that we can come on a holiday.

Yours respectfully,
THE JUNIOR WIRELESS CLUB, Ltd.,
GEORGE ELTZ, Jr.,
W. FAITOUTE MUNN,
FRANK KING,
FREDERICK SEYMOUR,
HARLOWE HARDINGE,
Committee.

Subsequently, a committee was appointed to go to Washington and plead the cause of the amateur before Congress. This committee consisting of Messrs. W. E. D. Stokes, Jr., chairman, Frank King, George Eltz, and Ernest Amy, appeared before the Committee of Commerce of the Senate in Washington on April 28th, 1910, as is evidenced by the accompanying reproduction from the Congressional Record, and through their efforts succeeded in killing the bill. The importance of their work cannot be stressed too greatly, because without this timely intervention by a handful of mere boys, who are to be most highly commended for their indominatable spirit, the amateur would certainly have ceased to exist right then and there.

Globe
Herald Advertiser. EST'D 1797.
ORK'S OLDEST NEWSPAPER.

RK. THURSDAY, APRIL 28, 1910

BOY WARS ON THE AIR TRUST

"Buster" Stokes, 14 Years Old, Talks to Senate Committee.

WIRELESS CHAMPION

Bill to Curb Amateurs Is Earnestly Denounced by Him.

(From a Staff Correspondent.)

WASHINGTON, April 28.—W. E. D. Stokes, Jr., fourteen years old, of New York City, and known to his friends as "Buster," appeared before the Senate committee on commerce to-day and made a plea for the amateur wireless telegraphers of the country.

The committee was considering the bill providing for regulations of wireless communication when the youthful advocate spoke. He said that he was president of the Junior Wireless Club of America, and represented 60,000 American boys. After young Stokes's plea, Frank King and Ernest Amy, two other boys representing the same club, addressed the committee.

There was much amusement when Senator Frye presented young Stokes. He stands about four feet five, wears short trousers, and does not assume to be more than the boy he is. He rushed into his argument in great seriousness, and told the committee in the language of a practiced attorney that the provisions of the bill were "not feasible but will discriminate heavily against the amateur and in favor of the commercial wireless companies, which are for the most part stock-jobbing corporations and members of a great trust.

"The bill," he went on, "is ambiguous and capable of interpretation unfair to amateurs and students of wireless. It is unjust to a large body of manufacturers; it is contrary to the best interests of the United States as a nation, and it will stifle ambition of the really great inventive genius of American boys."

Young Stokes declared the bill would compel the public to pay toll to the Western Union trust for all wireless messages, whereas, if we amateurs are left undisturbed and allowed to experiment we are sure that within ten years at little or no cost every one in the land will be able to communicate with any person he desires to reach within a limited radius. For instance, within ten years, a man in his automobile meeting with an accident twenty-five miles from home will be able to signal on a specific wave length, call up his own home by ring a bell there, bring his butler to the telephone and tell him the cau his delay, and that he will not be home for dinner."

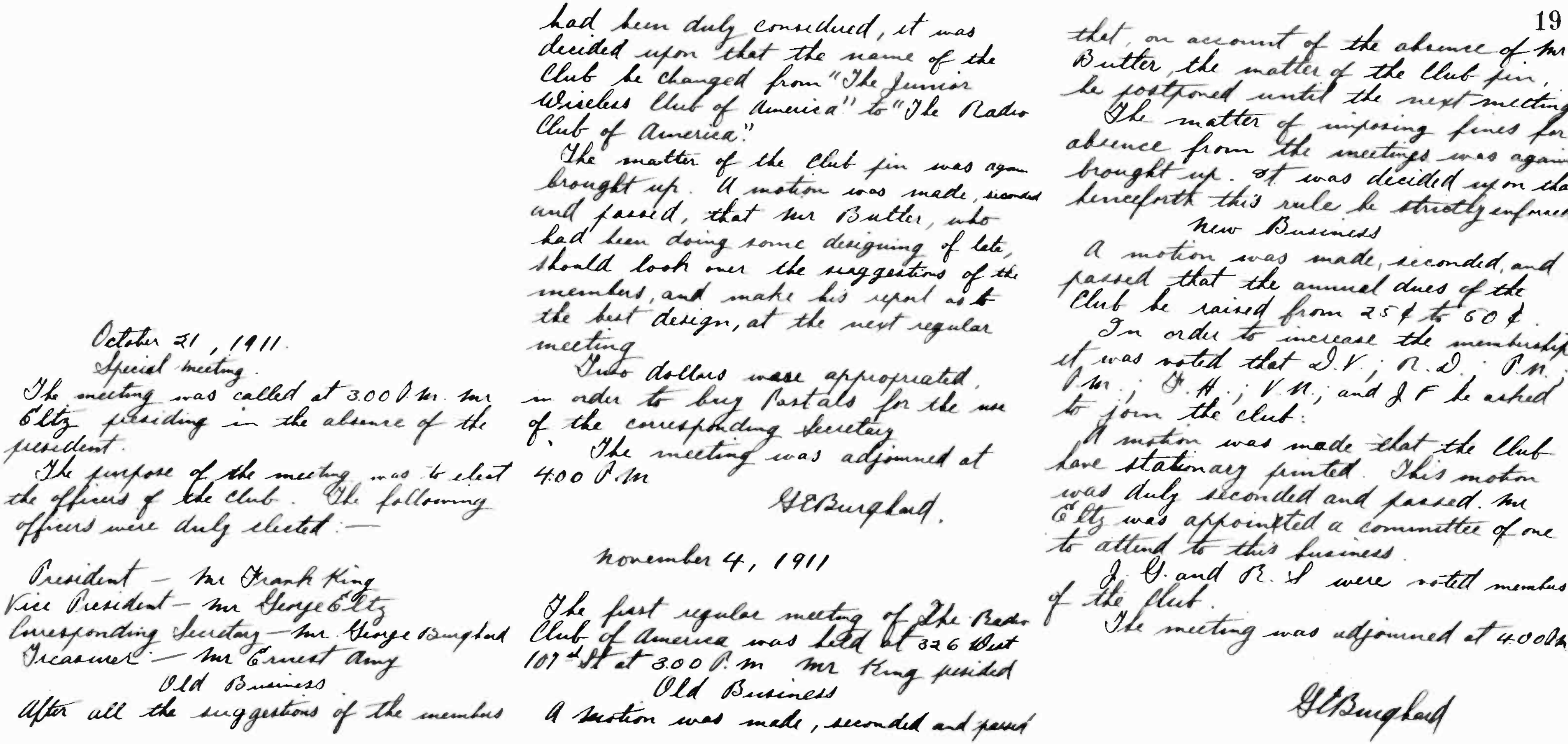
The other youths who appeared declared that the Western Union Telegraph Company was absorbing all the other companies. "Soon some vast trust will be organized to corner the very air we breathe," spoke one of the associates of President Stokes.

Other advocates and opponents of the bill appeared before the committee. Commissioner of Navigation E. T. Chamberlain urged the committee to report the measure favorably, saying that the army, the navy, the treasury, and the agricultural departments should be protected by regulating the use of the air.

Joseph H. Hayden and F. W. H. Clay of Pittsburg, representing the National Electric Signal Company, took exception to the provisions of the bill, which give the army and navy priority in the use of the air. They contended that new and improved instruments would effect the very thing the bill proposed to regulate, and that the legislation was wholly unnecessary. Representatives of the Marconi and United Wireless companies were also present, and urged practically the same objections offered by the signal concern.

What the papers had to say about the trip to Washington.

By 1911 the interest in amateur radio was beginning to grow by leaps and bounds and while the original membership of the club consisted of some five active members, by this time it had more than doubled. These young boys were the leaders of amateur Radio in and around New York City at that time, and soon drew all the live operators into the organization. Due to this increase in membership it was decided on April 22nd, 1911, to hold all subsequent meetings at 326 West 107th Street, N. Y. C., the home of Frank King. It was there at a special meeting on October 21st, 1911, that it was unanimously decided to



October 21, 1911.
Special meeting.
The meeting was called at 3.00 P.M. Mr Eltz presiding in the absence of the president.
The purpose of the meeting was to elect the officers of the club. The following officers were duly elected:—

President — Mr Frank King
Vice President — Mr George Eltz
Corresponding Secretary — Mr George Burghard
Treasurer — Mr Ernest Amy

Old Business
After all the suggestions of the members had been duly considered, it was decided upon that the name of the Club be changed from "The Junior Wireless Club of America" to "The Radio Club of America."
The matter of the Club pin was again brought up. A motion was made, seconded and passed, that Mr Butler, who had been doing some designing of late, should look over the suggestions of the members, and make his report as to the best design, at the next regular meeting.
Two dollars were appropriated in order to buy postals for the use of the corresponding secretary.
The meeting was adjourned at 4.00 P.M.

G E Burghard.

November 4, 1911

The first regular meeting of The Radio Club of America was held at 326 West 107th St at 3.00 P.M. Mr King presided.
Old Business
A motion was made, seconded and passed that, on account of the absence of Mr Butler, the matter of the Club pin be postponed until the next meeting.
The matter of imposing fines for absence from the meetings was again brought up. It was decided upon that henceforth this rule be strictly enforced.
New Business
A motion was made, seconded, and passed that the annual dues of the Club be raised from 25¢ to 50¢.
In order to increase the membership it was voted that D.V.; R.D.; P.M.; F.H.; V.N.; and J.F. be asked to join the club.
A motion was made that the Club have stationary printed. This motion was duly seconded and passed. Mr Eltz was appointed a committee of one to attend to this business.
J. G. and R. S. were voted members of the Club.
The meeting was adjourned at 4.00 P.M.

G E Burghard

Facsimile of the original minutes of the Radio Club of America, Inc., 1911.
This was the special meeting of the Junior Wireless Club held at Frank King's house on Oct. 21st, 1911, at which the name was changed to Radio Club of America, and is followed by the first regular meeting of the Club held at the same place on November 4th, 1911.

change the name from JUNIOR WIRELESS CLUB LIMITED to THE RADIO CLUB OF AMERICA. This was in fact the birth of The Radio Club of America and a list of the members at that time, who are the original Charter members, follows:

W. E. D. STOKES, JR.
GEORGE ELTZ, JR.,
W. FAITOUTE MUNN,
FRANK KING,
FREDERICK SEYMOUR,
HARLOWE HARDINGE,
E. V. AMY,
GRAHAM LOWE,
MAX BAMBERGER,
EDWIN N. RHODES,
FRANK WHITEHOUSE,
L. S. SHAW,
GEORGE E. BURGHARD.

The following officers, who are the first officers of The Radio Club of America, were also elected at this meeting.

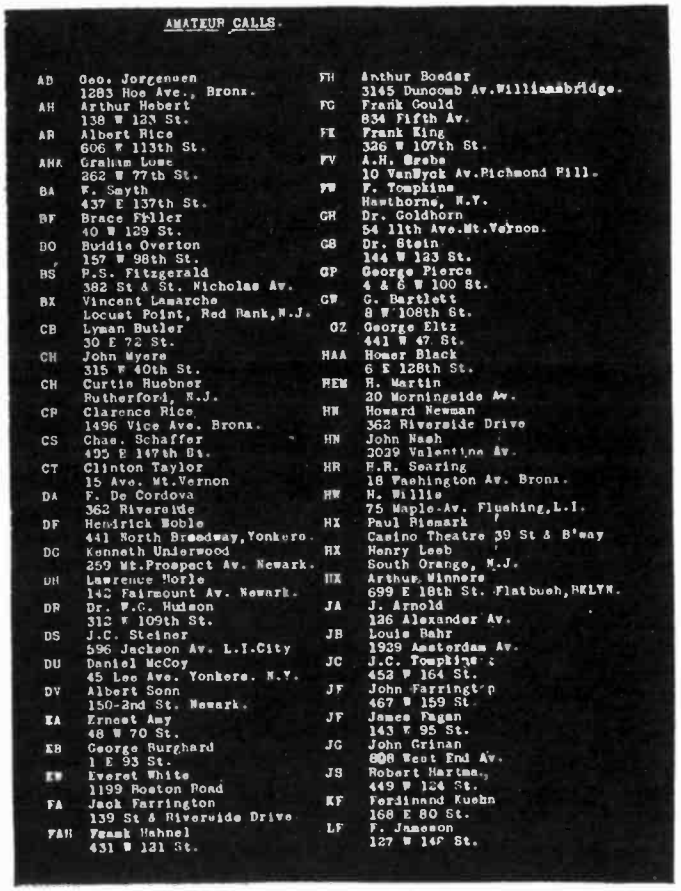
President—FRANK KING.
Vice-President—GEORGE ELTZ, JR.
Corrs. Secretary—GEORGE BURGHARD.
Treasurer—ERNEST AMY.

These are the events which led up to the beginning of the present RADIO CLUB OF AMERICA, and its first regular meeting was held at Frank King's House 326 West 107th St., N. Y. C., on November 4th, 1911.

By the end of 1911 the membership had increased considerably and the first typewritten membership list was issued, on which appeared the following names:

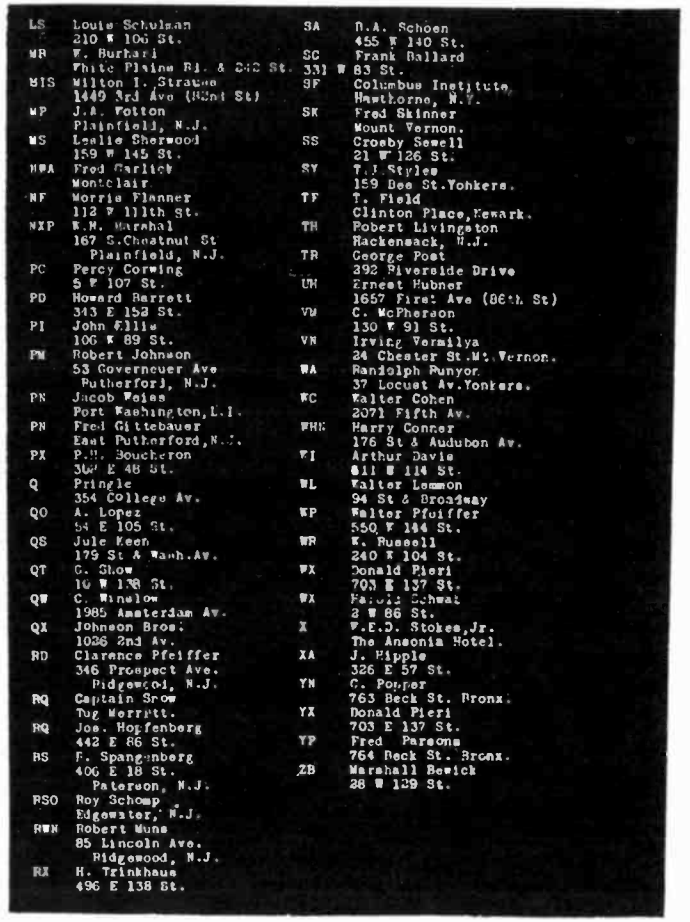
MEMBERS OF THE RADIO CLUB OF AMERICA

EA	Ernest Amy, 48 W. 70th St.
EB	George Burghard, 1 E. 93rd St.
GZ	George Eltz, 441 W. 47th St.
GX	Harlowe Hardinge, 410 Riverside Drive
FK	Frank King, 326 W. 107th St.
CB	L. C. Butler, 30 E. 72nd St.
	Faitoute Munn, 518 Main St., East Orange, N. J.
	Frederick Seymour, 55 Prospect St., East Orange, N. J.
X	W. E. D. Stokes, Jr., The Ansonia, N. Y.
	Edwin N. Rhodes, West Point, N. Y.
SA	Graham Lowe, 262 W. 77th St.
RS	L. Spangenberg, 406 E. 18th St., Paterson, N. J.
DR	Dr. Hudson, 312 W. 109th St.
JG	John Grinan, 808 West End Ave.
JF	James Fagan, 143 W. 95th St.
ABC	Louis Gerard Pacent, 218 Young St., Blissville, L. I.
SF	W. F. Ruth, 125 Newton Ave., Astoria, L. I.
WA	Randolph Runyon, 37 Locust Ave., Yonkers, N. Y.
BG	Daniel McCoy, 45 Lee Ave., Yonkers, N. Y.
VN	Irving Vermilya, 24 Chester St., Mount Vernon, N. Y.
MP	B. Doland, Midland Park, N. J.
FY	Fred Young, 416 Grand Ave., L. I. C.
	J. A. Fried, 525 Lockewood St., Astoria, L. I.
AM	William R. Helme, 454 Lockwood St., L. I. C.
	Frank Whitehouse, 227 W. 71st St.



AMATEUR CALLS.

AD Geo. Jorgensen
1283 Hoe Ave., Bronx.
AH Arthur Hebert
138 W 123 St.
AR Albert Rice
606 W 113th St.
AHK Graham Lowe
262 W 77th St.
BA W. Smyth
437 E 137th St.
BF Brace Fuller
40 W 129 St.
BO Buddie Overton
157 W 98th St.
BS P.S. Fitzgerald
382 St & St. Nicholas Av.
BX Vincent Lamarche
Locust Point, Red Bank, N.J.
CB Lyman Butler
30 E 72 St.
CH John Myers
315 W 40th St.
CH Curtis Huebner
Rutherford, N.J.
CP Clarence Rice
1496 Vice Ave. Bronx.
CS Chas. Schaffer
495 E 147th St.
CT Clinton Taylor
15 Ave. Mt.Vernon
DA F. De Cordova
362 Riverside
DF Hendrick Wobble
441 North Broadway, Yonkers.
DC Kenneth Underwood
259 Mt.Prospect Av. Newark.
DH Lawrence Norle
142 Fairmount Av. Newark.
DR Dr. W.C. Hudson
312 W 109th St.
DS J.C. Steiner
596 Jackson Av. L.I.City
DU Daniel McCoy
45 Lee Ave. Yonkers. N.Y.
DV Albert Sonn
150-2nd St. Newark.
EA Ernest Amy
48 W 70 St.
EB George Burghard
1 E 93 St.
EW Everet White
1199 Boston Road
FA Jack Farrington
139 St & Riverside Drive
FAH Frank Hahnel
431 W 121 St.
FH Arthur Boeder
3145 Duncomb Av. Williamsbridge.
FG Frank Gould
834 Fifth Av.
FK Frank King
326 W 107th St.
FV A.H. Grebe
10 VanDyck Av. Richmond Hill.
FW F. Tompkins
Hawthorne, N.Y.
GH Dr. Goldhorn
54 11th Ave. Mt. Vernon.
GS Dr. Stein
144 W 133 St.
GP George Pierce
4 & 6 W 100 St.
GW G. Bartlett
8 W 108th St.
GZ George Eltz
441 W 47 St.
HAA Homer Black
6 E 128th St.
HEM H. Martin
20 Morningside Av.
HN Howard Newman
362 Riverside Drive
HN John Nash
2039 Valentine Av.
HR F.R. Searing
18 Washington Av. Bronx.
HW N. Willis
75 Maple Av. Flushing, L.I.
HX Paul Biemark
Casino Theatre 39 St & B'way
HX Henry Leeb
South Orange, N.J.
HX Arthur Winners
699 E 18th St. Flatbush, BKLYN.
JA J. Arnold
126 Alexander Av.
JB Louis Bahr
1929 Amsterdam Av.
JC J.C. Tompkins
452 W 164 St.
JF John Farrington
467 W 159 St.
JF James Fagan
143 W 95 St.
JG John Grinan
808 West End Av.
JS Robert Hartman
449 W 124 St.
KF Ferdinand Kuehn
168 E 80 St.
LF F. Jameson
127 W 140 St.



LS Louis Schulman
210 W 106 St.
MR W. Burhard
White Plains Rd. & 242 St.
MIS Milton I. Strauss
1449 3rd Ave (82nd St)
MP J.A. Potton
Plainfield, N.J.
MS Leslie Sherwood
159 W 145 St.
MWA Fred Garlick
Montclair
NF Morris Flanner
112 W 111th St.
NXP W.N. Marshal
167 S.Chestnut St
Plainfield, N.J.
PC Percy Corwing
5 W 107 St.
PD Howard Barrett
343 E 152 St.
PI John Ellis
106 W 89 St.
PM Robert Johnson
53 Governeuer Ave
Rutherford, N.J.
PN Jacob Weiss
Port Washington, L.I.
PN Fred Gittebauer
East Rutherford, N.J.
PX P.H. Boucheron
300 E 48 St.
Q Pringle
354 College Av.
QO A. Lopez
54 E 105 St.
QS Jule Keen
179 St & Wash.Av.
QT G. Shaw
10 W 138 St.
QW C. Winslow
1985 Amsterdam Av.
QX Johnson Bros.
1036 2nd Av.
RD Clarence Pfeiffer
346 Prospect Ave.
Ridgewood, N.J.
RQ Captain Srow
Tug Merritt.
RQ Joe. Hopfenberg
442 E 86 St.
RS F. Spangenberg
406 E 18 St.
Paterson, N.J.
RSO Roy Schomp
Edgewater, N.J.
RWN Robert Muns
85 Lincoln Ave.
Ridgewood, N.J.
RX H. Trinkhaus
496 E 138 St.
SA O.A. Schoen
455 W 140 St.
SC Frank Ballard
331 W 83 St.
SF Columbus Institute
Hawthorne, N.Y.
SK Fred Skinner
Mount Vernon.
SS Crosby Sewell
21 W 126 St.
SY T.J. Styles
159 Dee St. Yonkers.
TF T. Field
Clinton Place, Newark.
TH Robert Livingston
Hackensack, N.J.
TR George Post
392 Riverside Drive
UH Ernest Hubner
1657 First Ave (86th St)
VW C. McPherson
130 W 91 St.
VN Irving Vermilya
24 Chester St. Mt. Vernon.
WA Randolph Runyon
37 Locust Av. Yonkers.
WC Walter Cohen
2071 Fifth Av.
WHK Harry Conner
176 St & Audubon Av.
WI Arthur Davis
611 W 114 St.
WL Walter Lemmon
94 St & Broadway
WP Walter Pfeiffer
550 W 144 St.
WR K. Russell
240 W 104 St.
WX Donald Pieri
703 E 137 St.
WX Fabian Schwai
3 W 86 St.
X W.E.D. Stokes, Jr.
The Ansonia Hotel.
XA J. Hipple
326 E 57 St.
YN C. Pooper
763 Beck St. Bronx.
YX Donald Pieri
703 E 137 St.
YP Fred Parsons
764 Beck St. Bronx.
ZB Marshall Bewick
28 W 129 St.

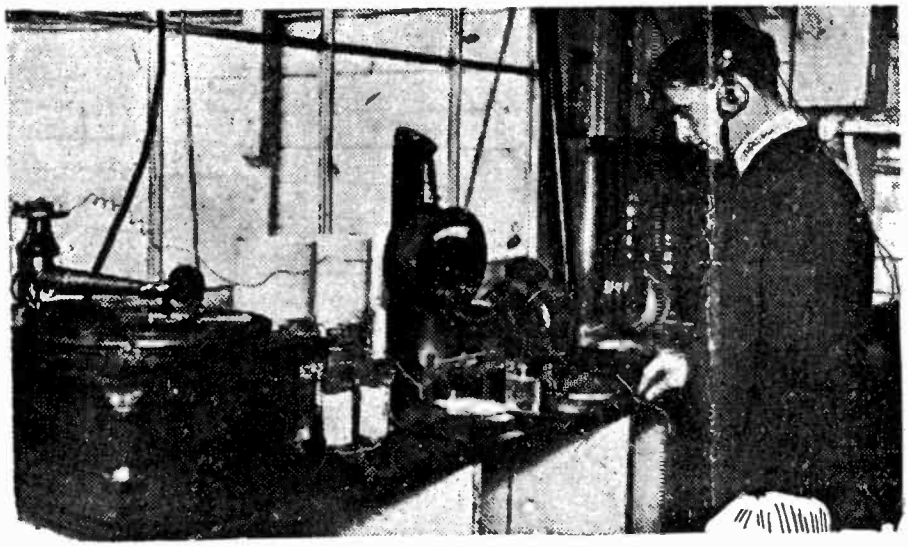
The first amateur radio call book 1912.

The number of amateur operators was increasing daily now, so that the club decided to be of further service to the art by issuing a call list of amateur stations. Through the painstaking efforts of the members, and particularly Frank King and Dr. Hudson, a List was compiled by contacts through the air, since this was the only means of getting calls and addresses. The list was blue-printed and sold to all operators at 10 cents a copy upon application to Frank King. This was the first amateur call book ever issued and photographs of the original appear elsewhere on these pages.

At a regular meeting on January 20th, 1912, the club emblem and a club pin designed by Frank King, were unanimously accepted. The pin as illustrated below, was gold on a black background.

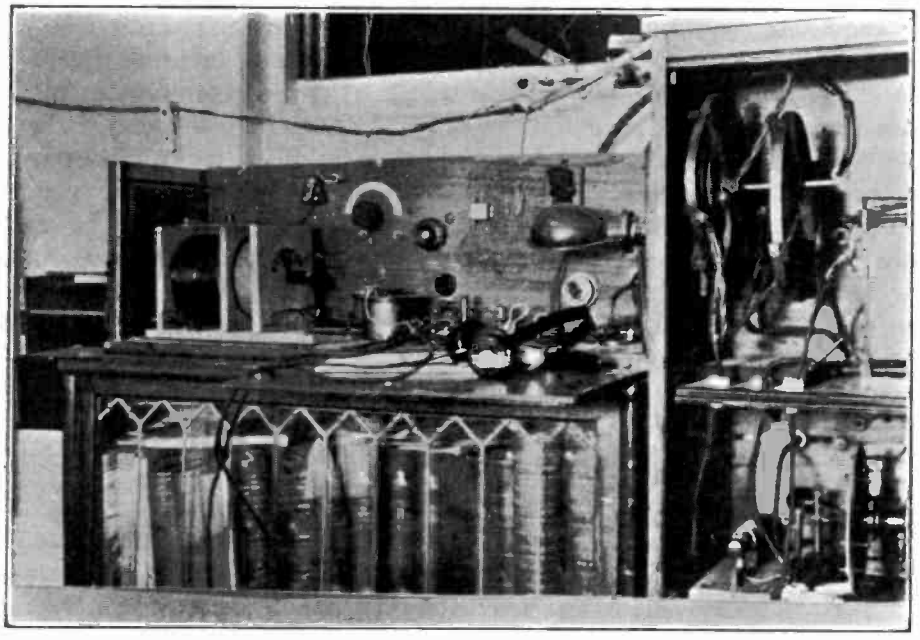
In 1912 the Alexander Wireless Bill was introduced in another attempt to stifle the amateur. This bill purported to do everything that the Depew Bill had failed to accomplish and even more. The Club again took immediate action, killed the bill in committee, and in later years, through the concerted action of its members in the U. S. service after the Armistice, definitely settled the matter.

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



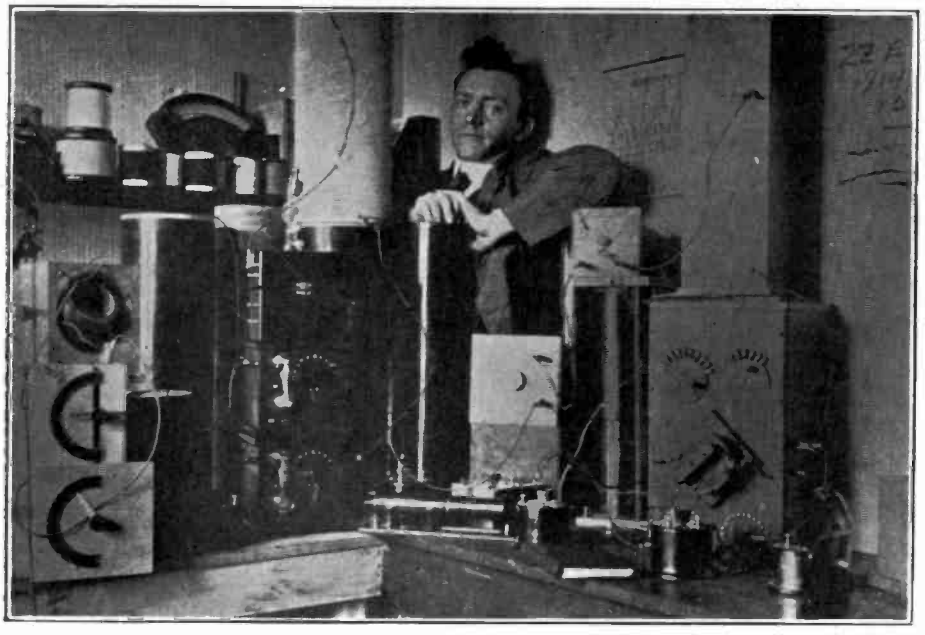
George Eltz at arc radio telephone station "FK", Frank King's house, 326 W. 107th St., 1912. This was probably the first radio broadcasting station on record. Note the phonograph for producing "canned" music.

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



Dave Brown's station, New York City, 1914.
This shows a considerable advance in design over the old days. We now have pancake tuning inductances loose coupled, and rotary spark gaps.

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



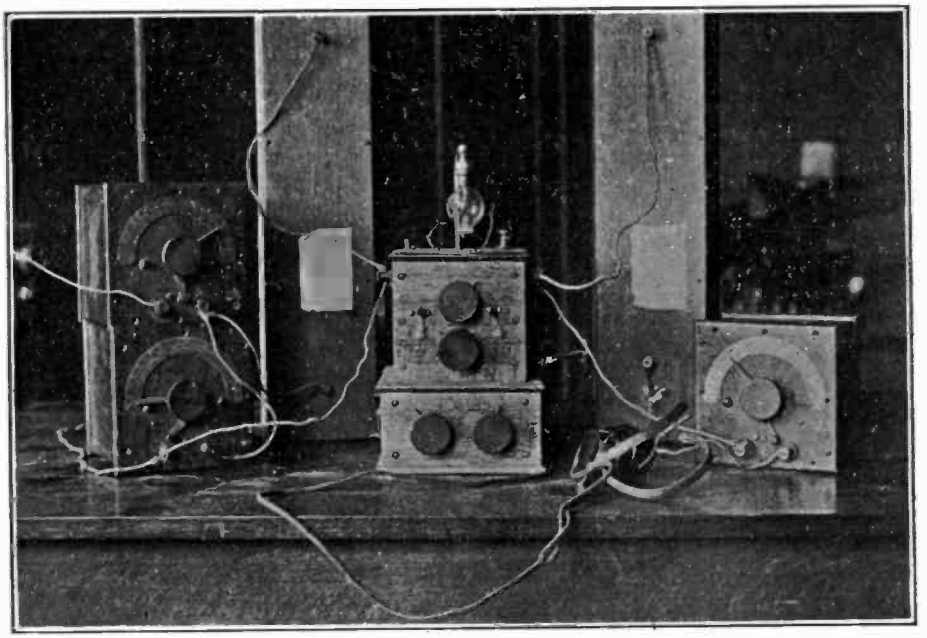
Paul Godley station 2ZE, Montclair, N. J., 1914.
Typical of the Audion and regenerative circuit period. Note the variometer and miles of tuning inductances.

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 Eltz 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.

Equally prophetic, was the disclosure of the Square Law Condenser before the club, by George Eltz in 1913, for the first time in history; since this very instrument was later to become a most important part of all radio frequency measuring apparatus.

The serious nature of the organization thus evidenced, soon attracted the attention of the early radio workers, so that aside from papers prepared by its own members, the Radio Club was soon honored by addresses by such well known radio men as: R. H. Marriott, Dr. A. N. Goldsmith, J. V. L. Hogan, F. Lowenstein, Dr. J. Zenneck, F. Conrad, W. C. White and others, all of whom subsequently became members.



Original apparatus with which E. H. Armstrong discovered the regenerative circuit in 1912.

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.

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 today. 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.

Harry Sadenwater and Louis Pacent listening for trans-Atlantic signals under the Palisades, N. Y., 1914. The angelic expression was probably due to atmospherics.

This also opened another field to the amateur, namely trans-Atlantic 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 spark 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 cleaning 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 WORLD'S ADVANCE

Vol. 31 JULY, 1915 No. 1

TIME was when the wireless operator was considered a nuisance. In the old days he caused more than one commercial and Government operator to employ profane language in voicing his opinion of some one particular amateur, and all of them in general, especially when endeavoring to read a long distance message with a nearby amateur indulging in a friendly conversation with another amateur, or, worse still, holding down his key in order to adjust the spark gap. Conditions are entirely different today. The amateurs, thanks largely to the Government regulations now enforced, have developed into serious experimenters, with their hobby and the interests of others at heart. On more than one recent occasion the amateurs have come to the rescue of Government and commercial wireless operators when both the latter required assistance. A most typical instance of this fraternal co-operation was witnessed a few weeks ago during the visit of the Atlantic Squadron to New York City. The Radio Club of America installed a model radio station in the Hotel Ansonia, the headquarters of Admiral Fletcher and his officers, enabling the visiting Admiral and his staff to communicate with the vessels of the fleet. But the installation of the apparatus did not complete the commendable undertaking. Club members operated the instruments during the entire period of the naval visit and handled no little amount of wireless traffic for the naval officers. The station proved a great convenience to Admiral Fletcher and his officers, and this deed on the part of the Radio Club of America will no doubt serve to bind still closer the tie of friendship between the amateurs and the Government and commercial operators.

The press comments on the Club station at the Ansonia in 1915.

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 today 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.

Radio Club station at Hotel Ansonia, N. Y. C., operated in conjunction with the Navy League in 1915. Operated entirely by club members, this station handled all the traffic for Admiral Fletcher and his staff, while the fleet was in the Hudson in 1915.

Up to 1915 the club had been operating under the original constitution of the old Junior Wireless Club, but it soon became apparent that conditions had changed and the old By-laws had become antiquated. Consequently a new Constitution was drafted and submitted to the members with the following letter:

TO THE MEMBERSHIP OF THE RADIO CLUB OF AMERICA:

It has become quite apparent that the present Constitution of the Club, adopted in 1909, is wholly inadequate in fulfilling the present needs of the Club. The Board of Directors has therefore drafted a new Constitution which it believes allows each individual member ample participation and representation in the Club government but eliminates a large portion of the inefficient and impractable procedure which has tended to characterize much of the Club business of late.

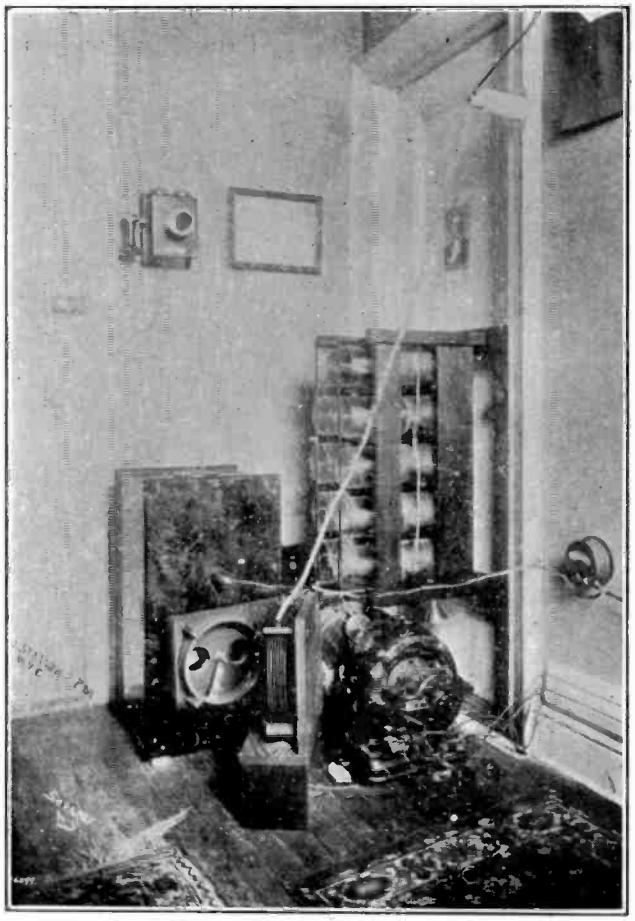
A decided increase in the amount of Annual dues was deemed necessary due to the coming expenses of securing meeting halls, publishing a year book and proceedings, and many other current disbursements which are rapidly increasing due to the extension of Club activities.

Under the present Constitution amendments may be made "at any regular meeting of the Club by a two-thirds vote of the Members present." The Board of Directors considers more expedient the submitting of the proposed Constitution to each individual Member for vote by letter ballot. It is urged that each member will fill in the attached ballot at his earliest convenience and forward it to the Corresponding Secretary.

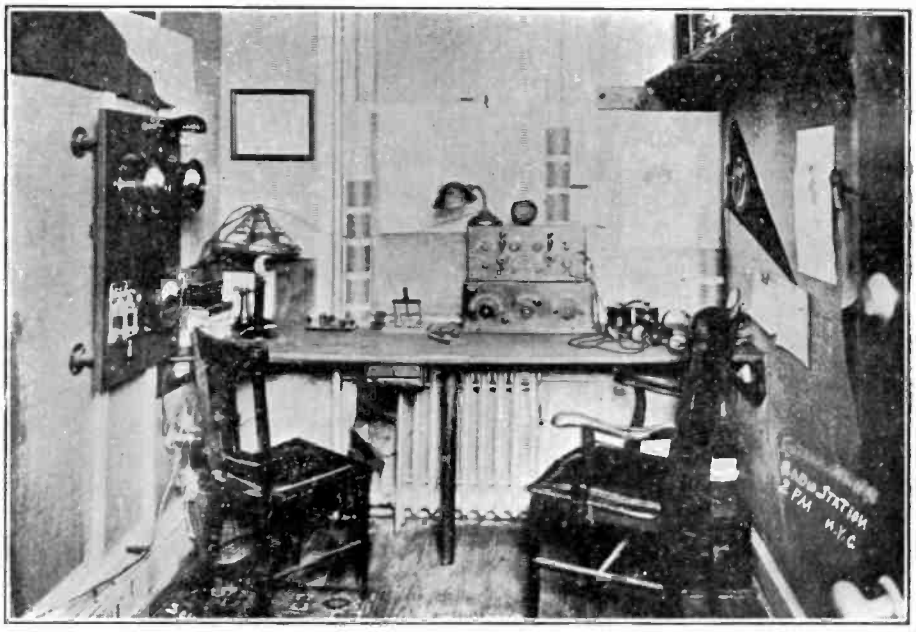
At 8 P. M., May 15, 1915, the accompanying Constitution shall be considered adopted if two-thirds of the votes received by that time are in favor of such action.

Respectfully submitted,
THE BOARD OF DIRECTORS,
GEORGE ELTZ,
L. G. PACENT,
E. V. AMY,
D. S. BROWN, Jr. (Corres. Sec.)
T. JOHNSON, Jr.,

The new constitution was duly adopted and has remained unchanged to date.



Transmitter, Station "2PM", which producted the first transcontinental signals in 1916. Note the synchronous rotary gap mounted between motor and generator, large plated Leyden jar condensers and 1 K.W. United Wireless coffin transformer. This was the very latest equipment at the time.



Record-breaking station, "2PM", John F. Grinan and Adolph Favon, 808 West End Ave., N. Y. C., 1916.

This was the most famous amateur station of its time. A short wave regenerative receiver with one stage of audio frequency amplification was used with great success.

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 Faron, 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 over-land, a feat which had heretofore been deemed impossible with an input of one kilowatt on amateur wavelengths.

This bring us up to the period of the Great War in 1917, when the activities of the club had to be suspended, due to the fact that all the members who were of age enlisted in one branch of the service or another. The following extract from the minutes of the directors' meeting of October 6th, 1917, gives an idea of the policies pursued by the club during this period.

POLICY TO BE PURSUED DURING THE WAR

Question of administration of Club's affairs during existence of extraordinary situation created by the War discussed. A letter from Director T. Johnson, Jr., at present in the service of the Radio Division at Washington and unable to attend, was read. In view of the fact that all but three of the directors (Godley, Pacent and Styles) are now doing military or naval duty, Mr. Johnson's suggestion that Mr. Styles be assigned, pro tem., the duties and powers of the officers and directors engaged in such service and therefore unable conveniently to execute them themselves, was approved. It was the sense of discussion which followed that the arrangement be further approved and ratified by the membership, the situation to be briefly explained to them on the postal card notice of the next meeting, requesting each member to be present thereat to state his approval, or if unable to attend to signify his approval in writing to the Corresponding Secretary. In view of the impossibility of carrying out to the letter the terms of the Constitution and By-Laws and of getting proper representation of membership votes under the present war conditions, it was also the opinion of the directors that, for the duration of the war, the present personnel of the Board and of the Club's officers should be retained intact, the matter also to be called to the attention of the members for their approval in the notice of the next meeting.

The following letter was then sent to the membership in an attempt to be of service in organizing the radio men of the country, and needless to say it proved very fruitful.

February 21, 1917.

To the Membership of The Radio Club of America:

The radio amateurs of the Country are a potential source of aid in the national defense. To realize these possibilties in the most effective way it is necessary that the various organizations be co-ordinated through a central body.

At this grave moment in the affairs of our nation The Radio Club of America is preparing to co-operate with the Committee now engaged in organizing the radio engineers of the country. The Board of Directors is about to submit to this Committee a classified list of the Club members, specifying the particular abilities of each. As it is desired to complete the list **immediately**, you are urgently requested to **fill out the enclosed blank form in detail** and forward it to the Corresponding Secretary **by return mail.**

It is pointed out that the filling out of this form does not involve any obligation, but is for the purpose of obtaining information regarding the qualifications of our membership for possible service in the defense of the nation.

THE BOARD OF DIRECTORS,
THOMAS J. STYLES, Corresponding Secretary.

The war records of those members who enlisted have been chronicled elsewhere, and would make too lengthy a proposition for this article. 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, while with the allied forces in France, in 1918, invented the Superheterodyne receiver which was used in the intelligence service at the front, and as we all know, has since become the universal circuit for broadcast reception.

After the Armistice had been signed and things began to assume a more normal appearance, the club activities were again resumed. The first meeting of the board of directors was held at Keen's Chop House on October 13th, 1919. As a result of this meeting the following letter was sent to the membership.

October 30, 1919.

To the Membership of The Radio Club of America:

Now that the national crisis is at an end, the period of suspension of the Club's activities which became operative in the Fall of 1917 has been terminated by the Board of Directors. At a meeting of the Directors held on Oct. 16, 1919, the following important decisions with regard to our future programme were made:

(1) That a dinner be first tendered to our President Mr. Edwin H. Armstrong, in his honor as a token of our regard and in appreciation of his splendid achievements as a Major in the Signal Corps of the Army and of the honor he has brought to The Radio Club of America.

(2) All dues prior to January 1, 1920, whether in arrears or otherwise, to be stricken from the records, dues to be payable and to date from January 1, 1920.

(3) Recommendations made to the Committee on Papers to avoid, in future, presentation of what might be termed "highly technical" papers. This Committee has in store a treat for the members in the forthcoming delivery of lectures bearing on the tremendous amount of research conducted, and the actual practical results obtained in the radio field during the War, supported by data on construction of apparatus, and, whenever possible, by exhibition of apparatus.

(4) A time to be appointed by the Chairman at each meeting to provide for informal discussions on any radio subjects.

Arrangements are now in progress for the resumption of our regular monthly meetings. Statements of dues will be mailed by the Treasurer, Mr. E. V. Amy, at the proper time. Further notice with respect to the next meeting of the Club will be sent you.

The following items are bulletined herein as they will undoubtedly prove of interest to many members:

National Service Committee, Engineering Council, 10th and G Sts., Washington, D. C.—This body is sending regularly to the Club bulletins which are of general interest to all engineers throughout the country. It obtains the latest information on all Government engineering activities of any character. It extends a cordial invitation to all our members to make use of its service. The Council is, in effect a coordination of all engineering efforts of the country. Such bulletins as have been received will be displayed at the next Club meeting.

U. S. Employment Service—Professional and Special Section, 16 East 42nd St., New York—Wishes to interest our members in the work it is doing in placing highly trained professional and technical employees who have been released from the Army, Navy and war work.

Engineering World, New York and Chicago—The publisher will gratuitiously devote 30 to 40 words in its want columns to each engineer who has been in the service of the country and who seeks employment. It will put a small star at beginning of each want ad, and replies must be addressed in care of the Club.

The Directors are desirous of obtaining from the members a brief record of their activities during the World War, their present addresses, etc. Will you therefore fill out and return at once the form below?

Respectfully,
THOMAS J. STYLES, Corresponding Secretary.

The dinner, with Major Armstrong as guest of honor, was scheduled for November 19th, as per the following announcement:

Announcement of
DINNER AND RECEPTION
To Be Tendered by the Membership of The Radio Club of America to Its President
MR. EDWIN H. ARMSTRONG
Major, Signal Corps, U. S. Army

To the Members:

The name of Edwin H. Armstrong is known, by reason of his invention of the Armstrong Regenerative Audion Circuit, not only to the members of The Radio Club of America, but in every corner of the world where radio communication is used. When the radio amateurs of the United States were confronted with the discouraging restrictions of the Act of 1912, there was apparently no alternative left to them but to abandon practice of the art. How the then existing gloom was dissipated, and how the amateur was rehabilitated by Mr. Armstrong's introduction of his circuit and his invitation to all amateurs to freely use it for their own purposes, needs no repetition.

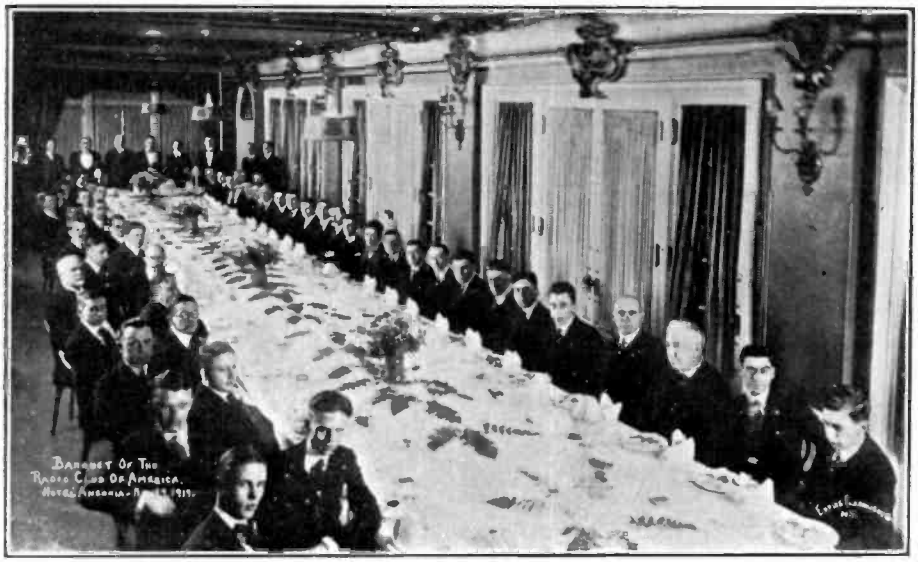
Mr. Armstrong recently returned to the United States and to civilian life after long and continued service in France with the United States Army. The opportunity is ours to show our appreciation of him as a fellow-amateur and as President of our Club—one who has rendered distinguished service to the nation, and brought honor to the Club by reason of the nature of that service, during the World War. A Committee composed of members of the Board of Directors was formed for the purpose of having the membership tender Mr. Armstrong a Dinner. The expenses will be defrayed by subscription of the membership. The cost will be approximately four dollars ($4.00) per plate. The Dinner, which will be **strictly informal**, will be given at the HOTEL ANSONIA, BROADWAY and 73rd STREET, NEW YORK CITY, on WEDNESDAY EVENING, FEBRUARY 19, 1919, at seven-thirty o'clock. Tickets are four dollars ($4.00) per person.

Will you make every possible effort to insure the success of the Dinner by being present YOURSELF. Let this be an after-the-war "get together" occasion. Set everything else aside just this once, and, if you may be thinking of the cost of the ticket, consider the saving in dues which resulted from their suspension in 1918 and 1919. Bring your friends and relatives if you wish.

Please indicate how many tickets you desire by filling out and detaching the blank below, forwarding it to the Treasurer with your remittance (payable to him) at your earliest convenience so that the Dinner Committee may make proper reservation, using the enclosed stamped addressed envelope. Send check, money order or express order.

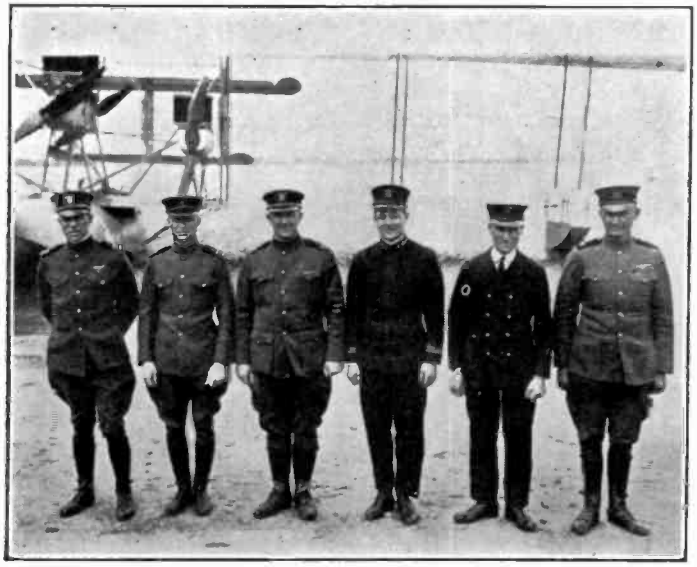
Very respectfully,
THOMAS J. STYLES, Corresponding Secretary
for the Dinner Committee.

The affair was a great success. Many prominent men were present, and due homage was paid to Armstrong for his outstanding work with the Expeditionary Forces, as well as his many other worthy achievements.



Radio Club Banquet given in honor of Howard Armstrong at Hotel Ansonia, 1919.

In 1919 the first successful flight across the Atlantic was made by the U. S. Navy, from Halifax to Portugal. 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 NC1. 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.



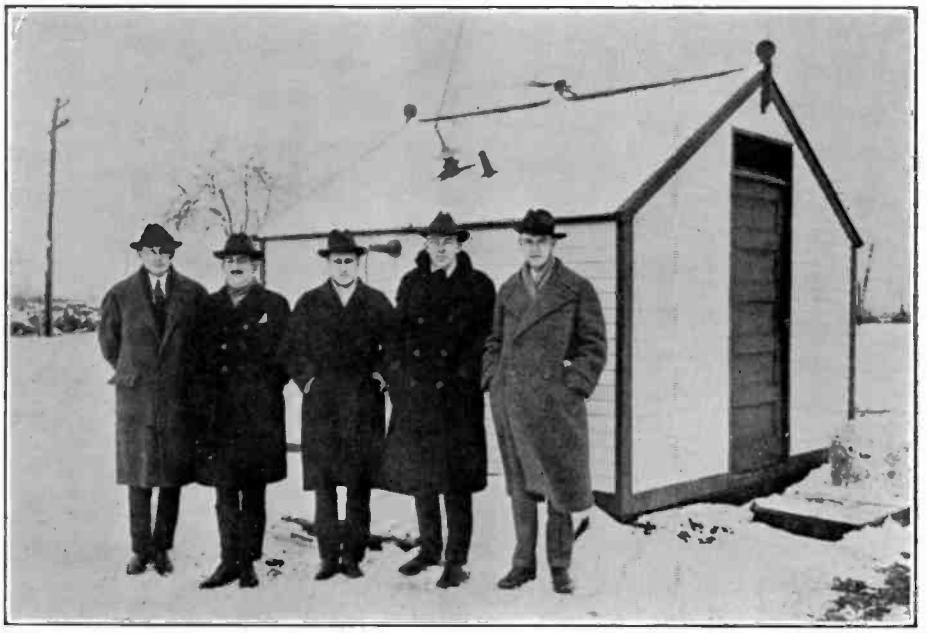
Trans-Atlantic flight 1919.
Crew of the NC1, Harry Sadenwater, third from right.

Now that all war restrictions had been lifted, the amateur came into his own once more, and bent to the work of reconstruction with a vim. Old poles and antennas were once more erected and transmitters revamped. To be sure things were not like the good old days, for the Department of Commerce regu-

lations had to be rigidly adhered to, but with new developments and experience gained during the war, amateur communication became even bigger and better. The advent of the tube transmitters opened the field of radio telephony and a good many of the erstwhile telegraph hams were already embracing this new development. Three of the club members, Ernest Amy whose call was 2VK, Harry

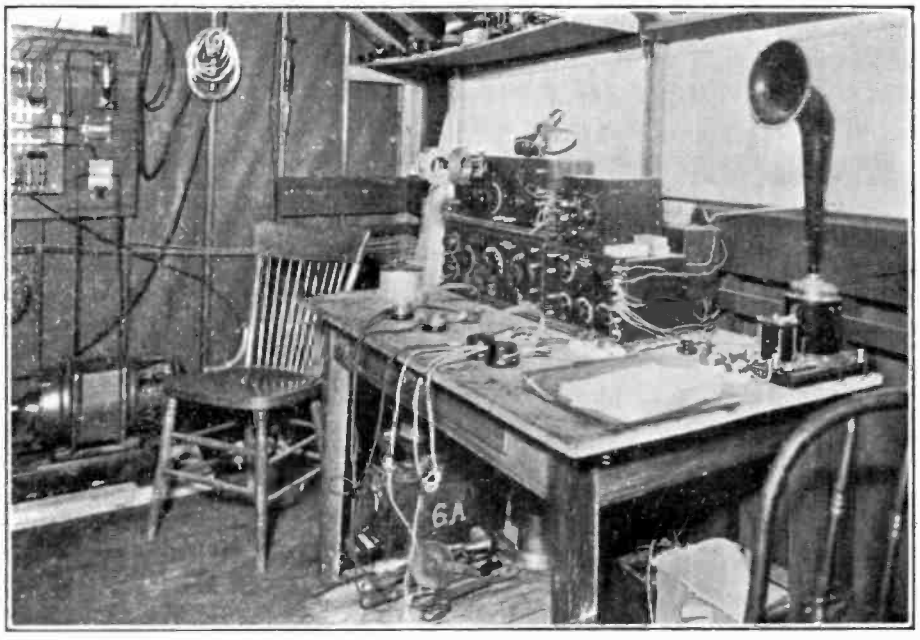
Postcard sent by "Harry" from the Azores.

Sadenwater, 2PZ, and George Burghard, 2SS, maintained very reliable telephone communication across the city using exceedingly low power on 200 meters. In fact on several occasions these stations were picked up at a distance of 50 miles. Regular musical programs were transmitted through the medium of a phonograph, and this constituted the first real amateur radio broadcasting with tubes.



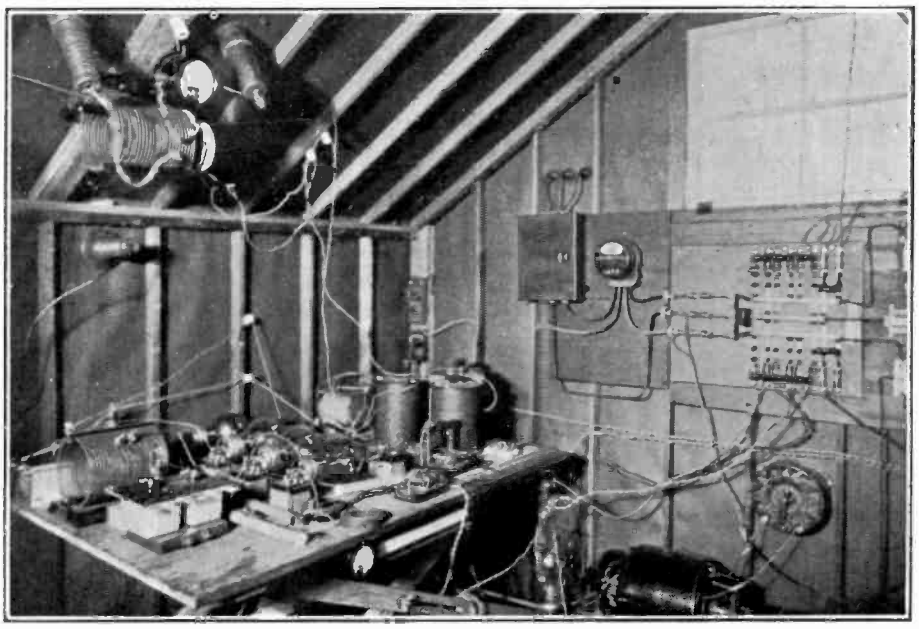
Operating staff, station "1BCG". Left to right: Amy, Grinan, Burghard, Armstrong, Cronkhite.

The idea of transmitting American amateur signals across the Atlantic originated with one of the prominent members of the Club before the world war, when Louis Pacent presented the matter for the consideration of the board of directors. Nothing definite was accomplished, however, and several later attempts



Receiver at station "1BCG", Greenwich, Conn., 1921.

were abandoned as too costly at the time. In 1921 the American Radio Relay League decided to run a transatlantic test and send a representative to England to receive the American signals. Paul Godley, one of our oldest members, was selected as the logical man to carry on the reception.

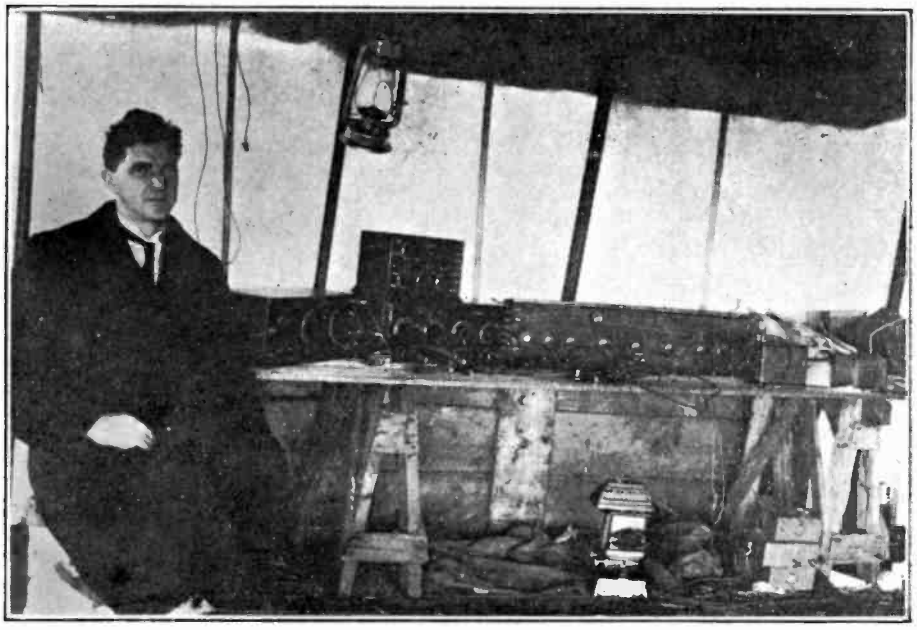


Transmitting apparatus at station "1BCG", Official Radio Club of America station, which established two World records in the amateur Transatlantic tests in 1921, by transmitting a twelve word message to Ardrossan, Scotland, and three messages to Catalina Island, Calif., direct.

On November 18th, 1921, six members of the Radio Club of America at an informal meeting, decided to build a transmitting station that would be heard in Europe. The six men were: E. H. Armstrong, Walker Inman, E. V. Amy, John Grinan, Minton Cronkhite, and George Burghard. Much discussion as to the locations of the station followed, but it was finally decided to build at Greenwich, Conn., on the site of Cronkhite's present station 1BCG.

The construction of the station and all technical data has been recorded elsewhere, and a description would be too lengthy for this article. It suffices to say that, the antenna system consisted of a "T" type cage with a 100 foot flat top 70 feet high, and a radial counterpoise in place of a ground. Four type U.V. 204 Radiotrons were used in the transmitter, one as the master oscillator and three in parallel as amplifiers with a 2500 volt direct current power supply.

The station was a great success, and was awarded the prize offered by Mr. Burnham, of England, for the best station in the test. 1BCG's signals were heard in every state in the Union, in Scotland on December 9, 10 and 11; England,

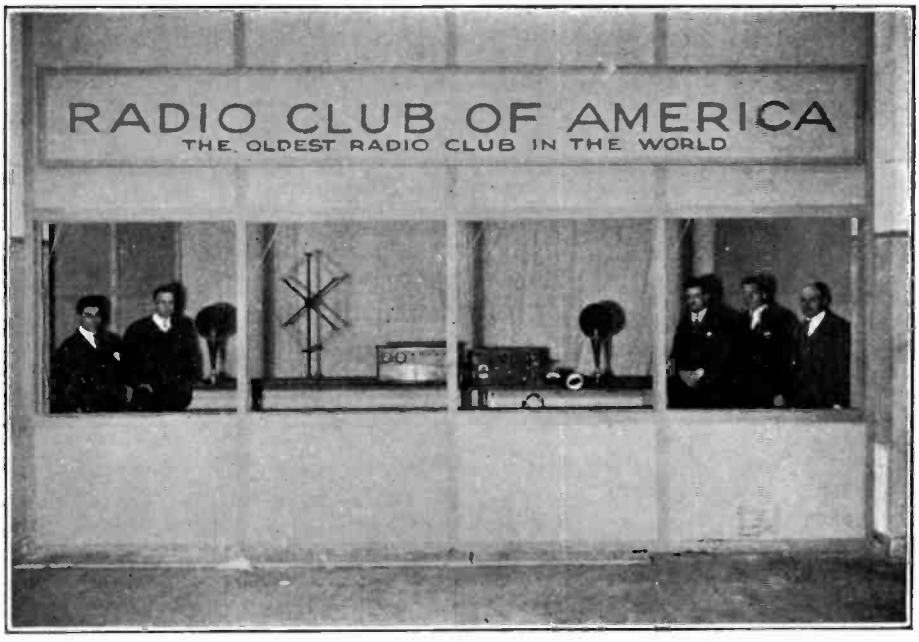


Trans-Atlantic receiving apparatus installed and operated by Paul F. Godley at Ardrossan, Scotland. Ass't. Operator Piersen. 1921.
In this tent, which was blown down on one occasion by a high wind, Paul received the now famous message from the Radio Club station 1BCG at Greenwich, Conn.

Germany, Holland, Porto Rico, Vancouver, B. C., California and the State of Washington. The greatest distance covered was to Amsterdam, Holland, approximately 3800 miles, mostly over water, and 2600 miles over land to Smith River, Calif. Last but not least 1BCG sent three complete messages to 6XAD in Avalon, Catalina Island, Calif., and one 12 word message to Paul Godley in Ardrossan, Scotland, at 9.45-10.00 P. M. on December 11, 1921; all with an input of 990 watts and a wave length of 230 meters. This was the first time in history that an amateur station sent a complete message across the continent or across the Atlantic, and perhaps the first time that this feat had ever been accomplished with less than a kilowatt input and a wave length of 200 meters. This aroused such interest, in view of the low power and shortwave used, that such prominent men as Professor M. I. Pupin of Columbia University, and David Sarnoff, General Manager of the Radio Corporation of America, went to Greenwich to visit the station, and as Professor Pupin put it, in his inimitable way, "To see what you boys are doing"

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 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.



Radio Club receiving booth at Radio Show in Grand Central Palace, 1922.

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 two-

fold 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 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.

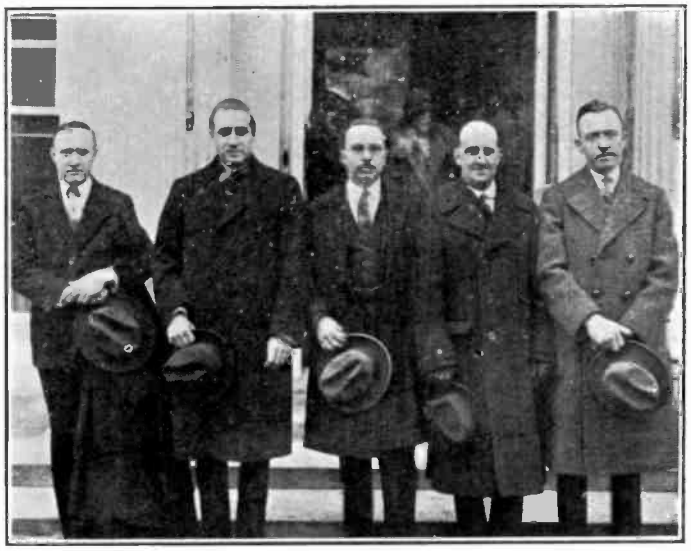
This system proved very successful and in spite of many sceptical opinions at the outset, sufficient volume was produced to fill the hall amply, and on the last night, the signals from WEAF were reproduced with such intensity that several of the audience on the main floor were seen to hold their hats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

With the advent of Radio Broadcasting a new problem now faced the amateur, namely, that of interfering with broadcast reception. The Radio Club realizing the seriousness of the situation at once started a campaign of education and its policies can best be summed up in the following article written by its president at that time:

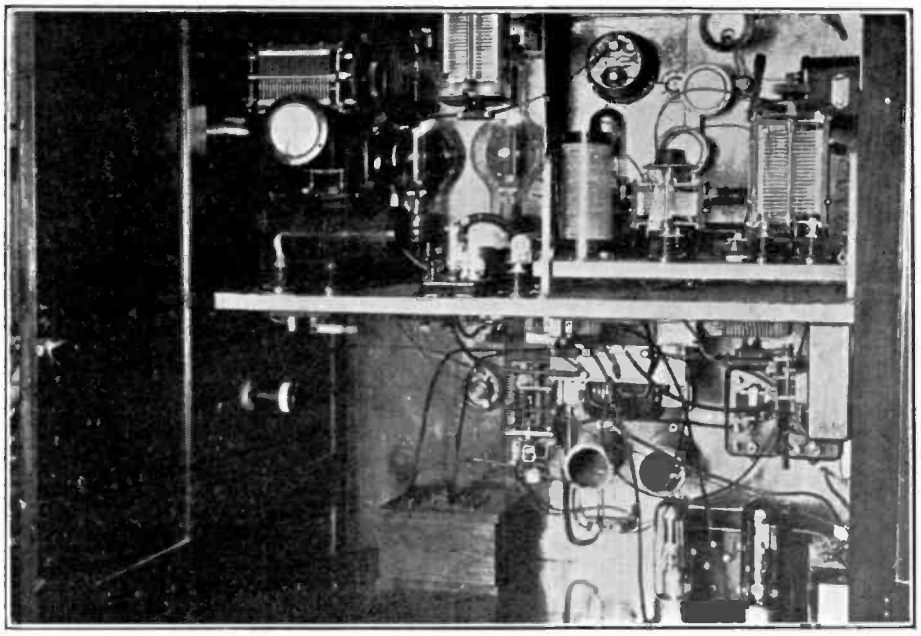
"The Radio Club of America was organized to propagate the art of radio telegraphy and telephony in all its branches, and true to this ideal it has always lent its aid to the best of its ability to all phases of the art. It originated as an amateur organization with a scientific purpose. It fought for the continued existence of the amateur and helped to educate him. It lent a helping hand to commercial radio, by research and cooperation 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 pleas-

ure 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 cooperate 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."



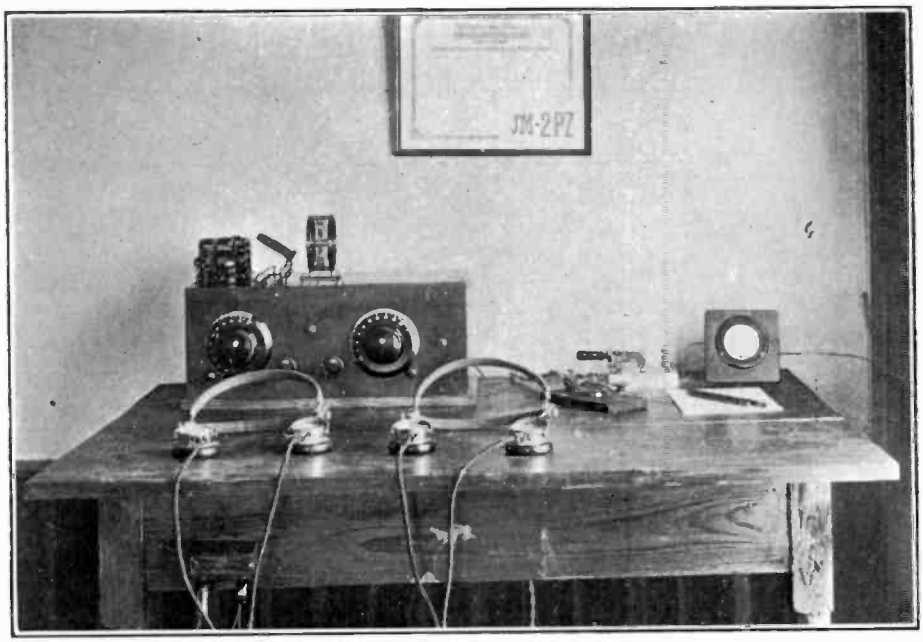
Radio experts at the White House in 1923. Left to right: Howey, Burghard, Hogan, Sheppard, Godley.

But the club did not confine its activities along these lines, entirely to the amateur. In 1923 the Boston American organized a committee of radio experts to present the problem of interference by Naval stations, which were causing great annoyance to broadcast listeners, to President Coolidge. Messrs. Paul Godley, J. V. L. Hogan and George E. Burghard, were asked to serve on this committee and



Transmitter, station "2AG", C. R. Runyon, Jr., Yonkers, N. Y., 1927. This is a typical layout of the C. W. tube transmitter, short wave, period.

visited the President in Washington on Dec. 10th, 1923. Jack Hogan, acting as spokesman for the committee, so ably stated the case that even the laconic Mr. Coolidge uttered an exclamation when he heard that his own radio speech had



Receiver, station "NJ2PZ", John Grinan, Kingston, Jamaica, B. W. I., 1926.

been rendered unintelligible in his home town, through the interference of the transmitting station at the Boston Navy Yard. The matter was at once referred to Secretary Hoover.

Now, the short wave era of amateur radio was at hand. To be sure the original small boys had grown to be full fledged men of affairs. Most of them

Amateur Casts Vote 1,700 Miles Away by Radio

John Grinan in Jamaica on Business Listens In on the Discussions at Meeting in Yonkers.

Sends Meeting Proceedings 1,700 Miles

Casting his vote at a recent board of directors' meeting at the Radio Club of America, although 1,700 miles away, John Grinan, old wireless amateur, in business in Jamaica, West Indies, "sat in" on the balance of the discussion, getting the entire proceedings from his friend, C. R. Runyon jr., 544 North Broadway, Yonkers, where the meeting was taking place.

This is believed to be the first authentic time that a vote was asked for, and received, all by radio, while the meeting was in progress.

Hears Proceedings of Meeting

Following the receipt of the vote Grinan followed the proceedings of the meeting, being kept constantly informed about the developments by Runyon, who stayed at the key of his transmitter. The conversation, started some time after 5 p. m., continued on until a quarter of 7, when the distant operator and director signed off to keep were sent down, and assembled quickly, with the friendly help of Runyon, who checked by wireless the various adjustments made by the experimenter in Jamaica. Some changes in the apparatus layout were advised by radio, and later made, which improved signals to a great extent.

Although the authorized wave-band for American amateurs communicating on short waves is from 35.7 to 42.8 meters, Grinan has been using 33 meters. This is the official wave alloted him by the British Postoffice authorities. His power is but fifty watts, and the sending has been mostly done in the late afternoon, during daylight

In New York Runyon has a crystal controlled push-pull 250-watt set, which is tuned to 80 meters. His call letters are 2AG. Grinan has been assigned VJ-2 PZ.

C. R. Runyon jr. operating his amateur station at Yonkers.

New York Tribune, February 6, 1927.

held prominent radio positions in that rapidly growing industry. Naturally the character of the membership of the club as well as that of the papers, underwent a similar change. The club had now all the earmarks of a genuine scientific body. The spirit of the organization, however, never changed. These men, now engineers, executives or scientists were still amatuers at heart. Many of them still had their own stations, and using the very latest equipment were nightly communicating with the whole world on 80 meters and below. Notable among these experimenters we find Randy Runyon and John Grinan who attained great prominence with their activities. Runyon's station 2AG was located in Yonkers, N. Y., and from there he worked practically every country in the world.

In 1925 when the Hamilton Rice expedition went to the Amazon River in Brazil, John Swanson, an old member of the club, went along as chief radio operator. They were equipped with long and short wave apparatus, but most of the traffic was handled through Runyon at Yonkers, who was in nightly contact with Swanson on Short waves. In fact, on one occasion when the branch expedition was lost up the river, 2AG succeeded in working them on their portable set, when they could neither raise nor hear the base station, and relayed their position to the main camp thus ultimately bringing about their rescue.

AMATEURS RELAY PRIZE FIGHT STORY

Radio Club Station and Jamaica "Ham" Reach Tom Heaney's Friends in Antipodes.

Through the various steps of broadcasting, short-wave transmission by dot-dash, and relaying from a distant point where conditions happened to be more favorable at the time, a blow-by-blow description of the boxing bout between Tom Heany and Poulino Uzcundum was placed in New Zealand and published in the afternoon papers just a few hours after the fight, when New Yorkers had tuned in for the night.

The fight, blow by blow, was broadcast by Jack Philbin, through Station WMSG in Manhattan. This broadcast was picked up with a superheterodyne at Station 2 AG in Yonkers and transmitted an instant late on a 40.9 meters to NJ 2 PZ at Jamaica, British West Indies, some 1,500 mile away. An effort was made to work New Zealand, the home of Tom Heany, direct, but the fading on the 40.9 meter wave length was too severe for direct operation.

At the end of the fight, however, NJ 2 PZ transmitted the blow-by-blow description to OZ 2 AC at New Zealand, on 21 meters. The latter amateur station was the scene of excitement, as newspaper representatives received the dot-dash reports juset as rapidly as they were transcribed, and then rushed off to get their stories into type for the afternoon edition.

In order to keep up with the blow-by-blow description of the rapid-fire announcer, it was necessary to telegraph letters for whole words, and combinations such as "Heany lands right on jaw" became simply "H R J" in this nam shorthand.

Station 2 AG is the offical station of the Radio Club of America, and is owned and operated by C. R. Runyon, jr. At the Jamaica end was John Grinan, also an active member of the Radio Club of America and an old hand at amateur radio.

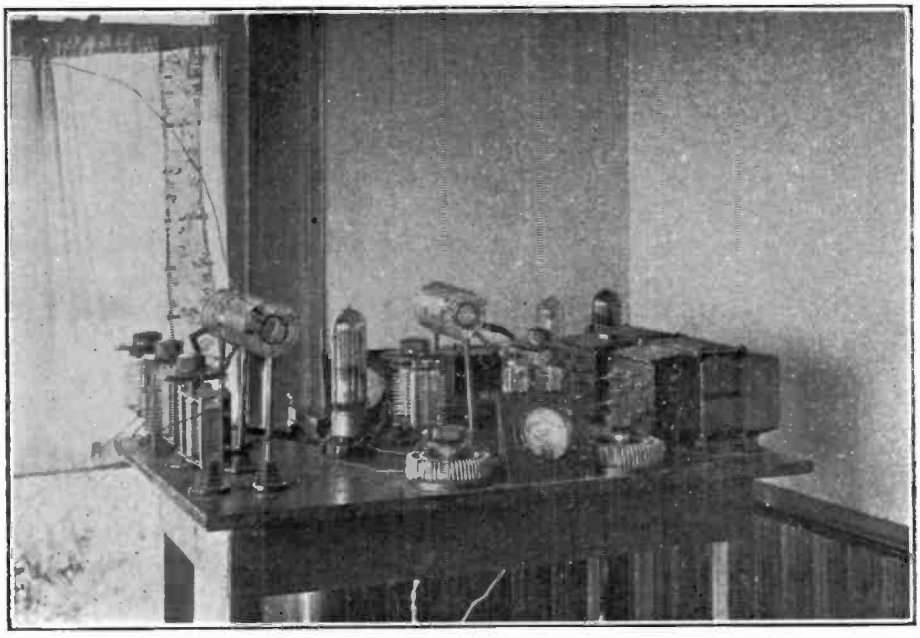
Brooklyn Times,
April 17th, 1927.

Johnny Grinan, who has the distinction of being the first amateur to send transcontinental signals and messages, as well as trans-Atlantic messages, built his station NJ 2 PZ in Kingston, Jamaica B.W.I. This station later known as VP 5 PZ grew to be one of the most famous amateur stations in the world. He worked every country, and on several occasions worked distant stations the long way around the globe. At the time of the Tom Heaney fight in the U. S. he succeeded in receiving the returns from a U. S. station and relaying them direct to Tom's home town in New Zealand, blow for blow, for which he was roundly thanked by Heaney's admirers some 7000 miles away.

One night in 1927 the Radio club directors were holding a meeting at Runyon's home in Yonkers. A very important matter was up before the board and a single vote became necessary to decide the question. Randy simply turned on the juice, called John in Jamaica, explained the situation to him, and John cast the deciding vote by radio, thus creating a somewhat novel precedent.

These are of course only a very few of the interesting incidents of radio progress. Space will not permit the telling of the activities of the many other, now middle-aged, small boys, but we know that they too, are still true to their old love, Radio.

On May 13th, 1926, the Radio Club held its first regular annual banquet at the Hotel McAlpin in New York City. It was indeed a gala affair, over 150 prominent radio men attended, among whom were, Professor M. I. Pupin, David Sarnoff, Gano Dunn, E. H. Armstrong and J. V. L. Hogan. Professor Pupin was the guest of honor and made a stirring speech which was broadcast through the facilities of station WMCA. In his speech the Professor denounced the White-Dill



Transmitter, station "NJ2PZ"

bill, which was pending at that time, and purported to take the control of radio out of the hands of the department of commerce and empower a special Federal Radio Commission to deal with the difficult problems of regulation. He closed his address with this parthian shot of advice to the Senate: " 'Noli me tangere,' which in plain Anglo Saxon means, 'hands off.' "

Radio Club 17th anniversary banquet, Hotel McAlpin, N. Y. C., 1926.
Prof. M. I. Pupin guest of honor.

Several other speeches were made during the course of the evening, and as a crowning event Professor Pupin and David Sarnoff were made Honorary members of the club. A good time was had by all.

THE WORLD:

LEAVE RADIO 'AS IS,' URGES PROF. PUPIN

"Government Hands Off" Is General Tenor of Speakers at Annual Dinner

SENATE'S PLAN DENOUNCED

Hoover Praised for His Policy of Co-operation

"The Government must keep its hands off radio," was the tenor of speeches at the annual dinner of the Radio Club of America, in the Hotel McAlpin last night. Among those who stressed this necessity before the 140 diners were Michael Pupin, professor of electro-mechanics, Columbia University; David Sarnoff, Vice President and General Manager of the Radio Corporation of America; Gano Dunn, consulting engineer, Past President of the American Institute of Electrical Engineers; Major Edwin H. Armstrong, inventor of the regenerative and super-regenerative radio circuits used throughout the world, and John V. L. Hogan, consulting radio engineer. E. V. Amy, President of the Radio Club of America, presided.

Prof. Pupin and David Sarnoff were elected honorary members of the club.

Prof. Pupin told how the club was started by radio amateurs. Although some of these have become great experts, he said, they are still amateurs in the highest sense of the world. Commercial considerations were not allowed to bias the scientific opinions of either himself or his audience. Continuing, he said:

"It is not so much the occasional inventor who nurses a great technical art as it is the intelligence of a well organized and liberally supported research laboratory. When I think of that I am perfectly convinced that very few of the great advances in the telephone art would have happened under Government ownership.

"Some six or seven years ago I opposed a bill which proposed to place the radio art under Government ownership. The Congressional Committee believed me. If it had not we would have no radio broadcasting art to-day. This art was developed in this country first, because you and I and our industrial research laboratories were free from all interference on the part of bureaucracy.

"The Department of Commerce has consulted us, because it has found that nothing can be done without us, the parents. It has a democratic and not a bureaucratic method of procedure. To replace it by another instrumentality of the Federal Government would mean to eliminate from the present critical condition of the young radio art an intelligent and experienced co-operator without any assurance that the new instrumentality will ever be equal to its task.

"If it is proposed that this new instrumentality shall be a commission, resembling in its authority and mode of operation an Interstate Commerce Commission, then it will certainly be a failure. Who can tell to-day whether a year or two, or several years hence, the best wave lengths for broadcasting will be ten, fifty, 100 or several hundred metres? Who can tell what will be in the very near future the best method of establishing selectivity? Who can tell what additional means must be employed to diminish the annoyances of static?

"President Coolidge is right when he favors the Department of Commerce to co-operate, just as heretofore, with the creators of the radio art in the solution of the outstanding problems.

"The Senate is wrong when it proposes to solve a complicated scientific problem in its own way without a thorough knowledge of the science which the solution demands."

New York World, May 14, 1926.

Later in the same year when the broadcast situation was becoming dangerously involved due to the pending legislation, the club went on record by issuing the following resolution, passed at a special meeting of the board of directors:

"RESOLVED that until the present limitations of the powers of the Department of Commerce shall have been removed or other provisions made by legislation, no broadcaster should change his wave length or hours on the air or increase his power without first receiving the approval of a committee representative of the art organized for the purpose, and be it further

"RESOLVED that the Radio Club of America, organized for the object, among others, of developing the radio art, hereby declares that the present condition in the radio field, caused by the temporary removal of legal restrains, is a new occasion for the exercise of that capacity of self-government and respect for the interest of the public, in which the radio art has led, and it further declares that it will hold its members responsible in the opinion of the club for their conduct in the observance of the principles underlying these Resolutions."

R. C. of America for Continuance of Old System

Radio Club Thinks That Hoover Regulations Worked Well.

AT a special meeting of its board of directors the Radio Club of America—the oldest radio organization extant—drew up a resolution backing the regulations heretofore rigidly observed in broadcast practice. While the club has no authority other than over the activities of its extensive membership, the action at this time is significant in the sense that this club has always stood for the rights of radio amateurs and broadcast listeners, thereby safeguarding the best interests of the radio art.

The resolutions drawn up by the board of directors of the Radio Club of America, with regard to the present broadcast situation, read as follows:—

"Resolved, That until the present limitations on the powers of the Department of Commerce shall have been removed or other provisions made by legislation, no broadcaster should change his wave length or hours on the air or increase his power without first receiving the approval of a committee representative of the art, organized for the purpose; and be it further

"Resolved, That the Radio Club of America, organized for the object, among others, of developing the radio art, hereby declares that the present condition in the radio field, caused by the temporary removal of legal restraints, is a new occasion for the exercise of that capacity of self-government and respect for the interest of the public, in which the radio art has led; and it further declares that it will hold its members responsible, in the opinion of the club, for their conduct in the observance of the principles underlying these resolutions."

The club has always taken an active interest in all legislation outlined to affect the rights of radio amateurs and broadcast listeners. In 1910 a delegation was sent to Washington to protest against the Depew bill, and this measure was largely responsible for the defeat of that bill. In 1912 action was taken to defeat the Alexander bill. These bills aimed to stifle the activities of the radio amateur. In 1910 one of the first amateur radio telephone stations in the world was constructed and operated by members of the club. Music broadcast from it was received by many of the U. S. battleships anchored in the Hudson River. In 1921 the first amateur message ever sent across the Atlantic was transmitted from a club station erected for that purpose, the message being received in Scotland by a club member who went abroad for the test. For these and other reasons the Radio Club of America can be expected to follow the present broadcast developments with more than ordinary interest.

New York Telegram, August 7th, 1926.

In March, 1927, when the smoke of battle had cleared and the White-Dill bill had become a law, the Radio Club once more arose to the occasion, and strongly recommended the appointment of Robert H. Marriott, one of its most prominent and honorary members, to the newly formed Federal Radio Commission. Ernest V. Amy, president of the club at the time, sent a telegram to President Coolidge, urging the appointment.

Boosts Marriott as Commissioner

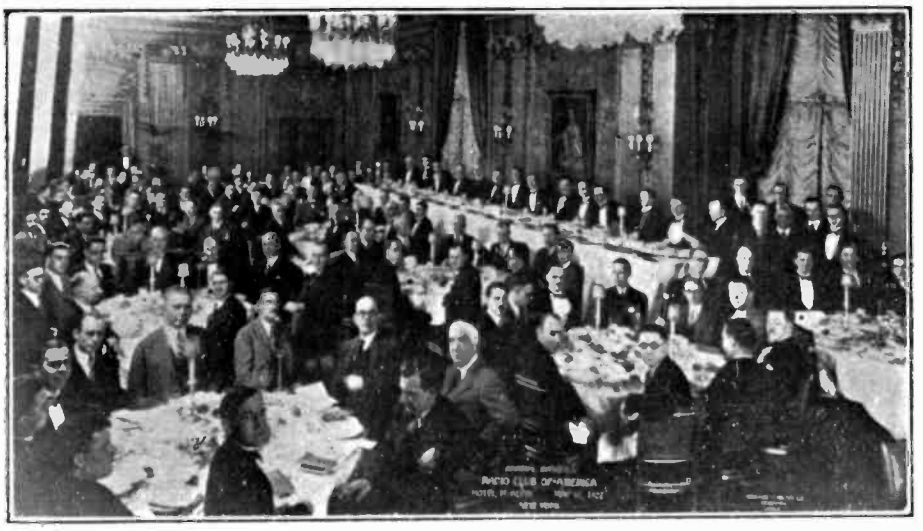
The appointment of R. H. Marriott, first president of the Institute of Radio Engineers, is being sponsored by various radio organizations. The Radio Club of America, when informed of the passage of the Dill-White bill Friday evening, sent the following telegram to President Coolidge:—

"Oldest radio club in the world begs you to consider R. H. Marriott, of New York, for member of the Radio Commission. Mr. Marriott is an old and experienced radio man—knows art and practice thoroughly. He is not connected with any company or interests, has wide acquaintance and support in the radio field and is universally liked. Mr. Marriott would make an ideal and popular choice as one of the five Radio Commission members."

New York Telegram, February 26th, 1927.

In the past few years there had, to be sure, been much discussion about incorporating the club, but no definite action had been taken. Towards the latter part of 1928 the board of directors finally took the necessary steps by appointing a special committee to have the papers drawn up. The result was, that on February 4th, 1929, the club was duly incorporated under the Membership Corporations Law of the State of New York, and became the Radio Club of America, Inc.

After the huge success of the seventeenth anniversary banquet in 1926, at which Prof. Pupin was the guest of honor, it was decided to hold regular annual affairs of this sort in the spring of each year. This rule was rigidly adhered to for several years, much to the enjoyment of all concerned, but in later years, due no doubt to the well known depression, a decided deviation occurred. The last annual dinner was held in 1931, and as a matter of record a full list of all club banquets is given below.



18th anniversary banquet of the Radio Club of America, Inc., Hotel McAlpin, N. Y. C., 1927.

Oldest Radio Club Holds Banquet

The nineteenth anniversary of the Radio Club of America was celebrated with a banquet at the Hotel McAlpin last night at 7:30, to mark the founding of what is probably the oldest radio club in the world.

Robert H. Marriott, honorary member of the club and past president of the Institute of Radio Engineers was the honorary guest. The toastmaster's duties were managed by Harry Sadenwater, radio operator on the NCI in the first transatlantic flight, who is now broadcast engineer of the General Electric Co. at Schenectady

New York Telegram, June 2nd, 1928.

1926 May 12th, Hotel McAlpin, 17th anniversary. Guest of honor Prof. M. I. Pupin.

1927 May 12th, Hotel McAlpin, 18th anniversary. Guest of honor George F. McClellan N.B.C.

1928 June 1st, Hotel McAlpin, 19th anniversary. Guest of honor R. H. Marriott.

1929 May 15th, Hotel McAlpin, 20th anniversary.

1929 Oct. 4th, Hotel McAlpin, special testimonial dinner to Captain Henry J. Round of England.

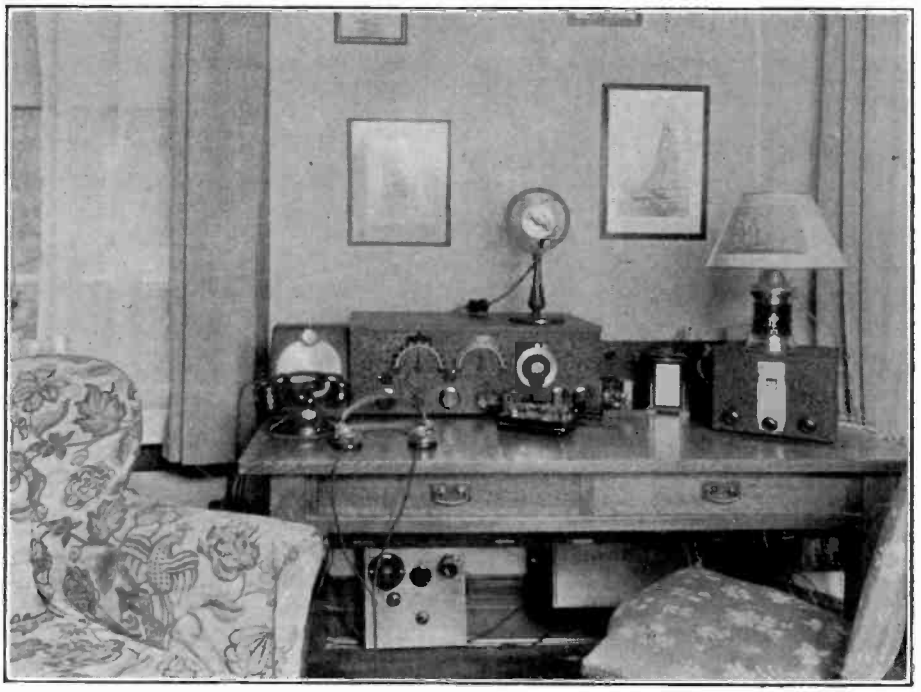
1931 April 21st, 22nd anniversary Beefsteak Dinner at the Elks Club in Brooklyn.

This brings our story up to modern times, and before closing let us once more scan the activities of the grown-up small boys who were responsible for the club's beginning. The accompanying photographs of typical amateur experimental stations of the period 1932-1934, certainly give an idea of the tremendous progress which has been made over the span of twenty-five years. The small boy now has become a veritable scientist. New developments have come thick and fast and he has embraced them with the same zest and thirst for knowledge with which he welcomed the advent of the electrolytic detector and the rotary gap.

Of course the frequencies in use today are vastly different from the early hit or miss days, the allotted amateur bands now being: 160, 80, 40, 20, 10, and 5 meters. The equipment now consists of, crystal controlled master oscillator power amplifier transmitters, producing the steadiest of C. W. signals, and short wave superheterodyne receivers with crystal filters. The antenna systems are also carefully designed from formulas, of the matched impedance type, for the exact operating frequency. Naturally the achievements of such stations, which are in

fact practically the equal of any commercial station in design, are astounding, particularly in reliability and annihilation of space, but unfortunately space will not permit their recording on these pages.

Both the stations illustrated, are equipped with the very latest systems of modulation, and radio telephony, on all frequencies permitted by law, is used most of the time. Of special interest is the 5 meter or 60 megacycle telephone. This new field of endeavor took the amateur by storm, and nightly, numerous duplex conversations can be heard over distances of 30 miles or more. The apparatus shown is of the master oscillator power amplifier type, and the receivers employ the Armstrong super-regenerative circuit. The fascination of duplex telephony is obvious, and particularly on these ultra short waves, because of the absence of static interference and fading. The greatest distance covered so far has been about 100 miles, at which duplex contacts have been maintained quite successfully. This would seem to be rather a meager performance, as compared with the

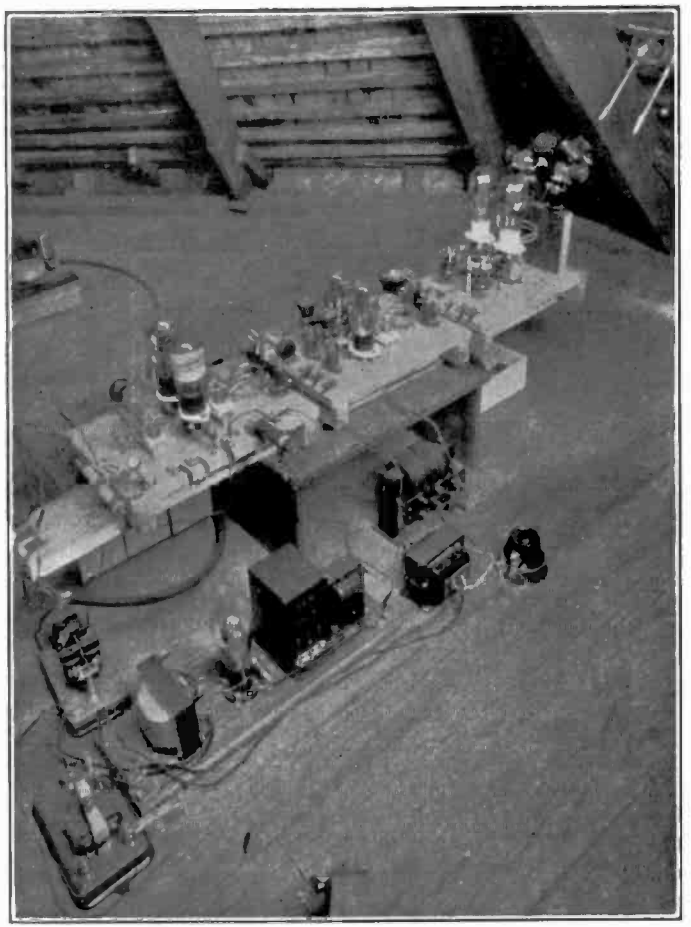


Receiver, station "W2AG," C. R. Runyon, Yonkers, N. Y., 1933. Note—single signal short wave superheterodyne center, and super-regenerative 5 meter receiver on the right. Randy Runyon was the first amateur to develop and use the single signal superheterodyne receiver, which is now the last word in C. W. reception.

distances covered on other frequencies, but when we consider the inauspicious beginning of 20, and 40 meter transmission and the tremendous progress made in a short time, the future for 60 megacycles looks very bright indeed. In fact new developments are coming at such a rate of speed that, if one remains idle for a month or two, one becomes a horrible greenhorn all over again. Even at the present writing, several amateurs, notably our old friend Randy Runyon, are maintaining successful telephone communication over some thirty miles, on two and one-half meters with beam transmitters.

This most certainly shows the results of that undying zeal and love for radio, which has imbued these once small boys since the beginning. It is our one hope that this ardor may never be dampened, and that by example and sharing of knowledge this same spirit may be passed on to those who come afterwards.

Transmitter of "W2AG". C. W. crystal controlled M.O.P.A. 900 watts.



5 meter master oscillator power amplifier transmitter at "W2AG", 1933.

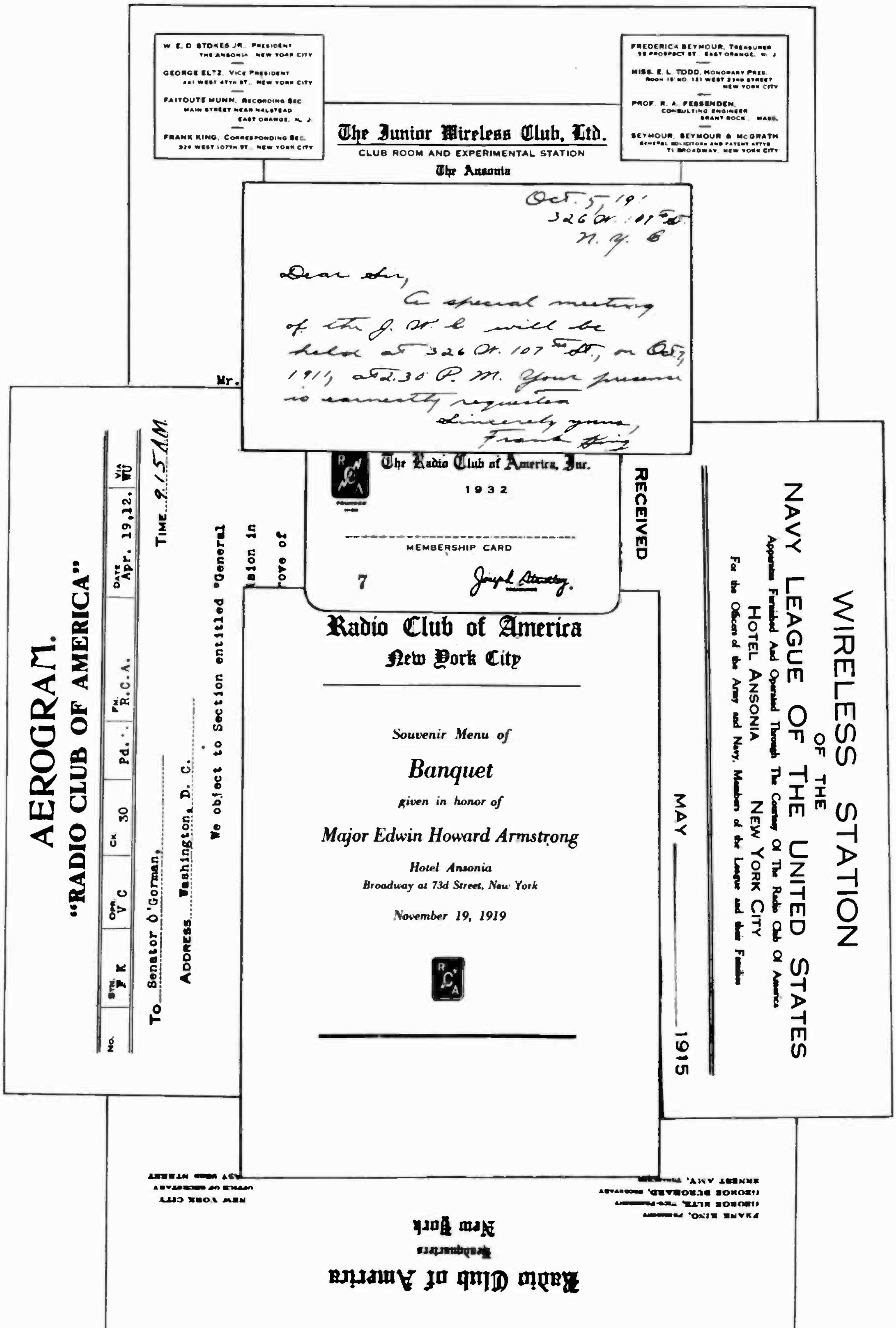
Station "W2GEC". G. E. Burghard, 520 East 86th St., N. Y. C., 1934. Left to right: Frequency meter. single signal superhet, 5 meter super-regenerative receivers, Modulator panel, C. W. transmitting panel, 20 to 180 meters, and 5 meter M.O.P.A. transmitter.

In conclusion, let us say, that this History was written with a twofold purpose. First, to chronicle as accurately as possible the most interesting club events of the past twenty-five years, and secondly to try and give a general idea of the development of the small boy who was responsible for its beginning. We have purposely omitted, with but a few exceptions, the recording of the many truly great scientific, literary, and engineering achievements of the members, because of their unweildly nature. Some idea of their magnitude can be gained, however, by browsing through other sections of this volume i.e. "Proceedings" and "Who's Who".

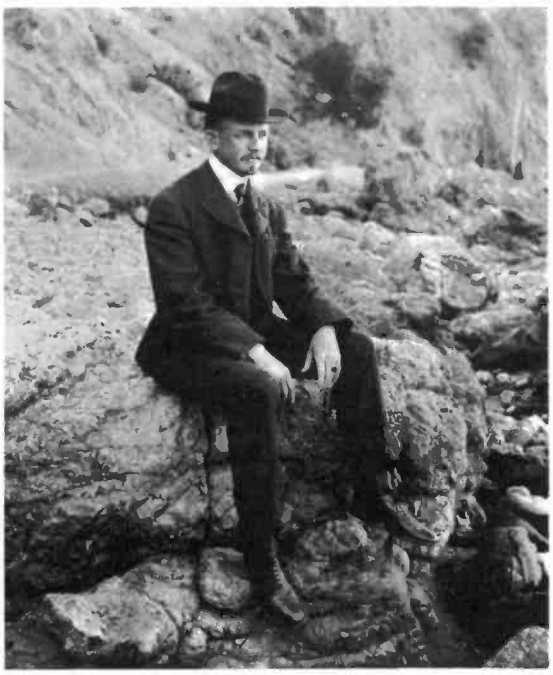
We fully realize, that the apparent character of the club has, quite naturally, changed with the years. The Radio Club has become a respected scientific body, but the spirit of friendliness and cooperation which lies deep within, has never changed, and our old friend, Professor Pupin, very beautifully complimented us on this rare quality, at the Seventeenth Anniversary Banquet, when he said:

> *"You love this art for its own sake and not for what profit it brings you. If I thought otherwise I would not be with you this evening."*

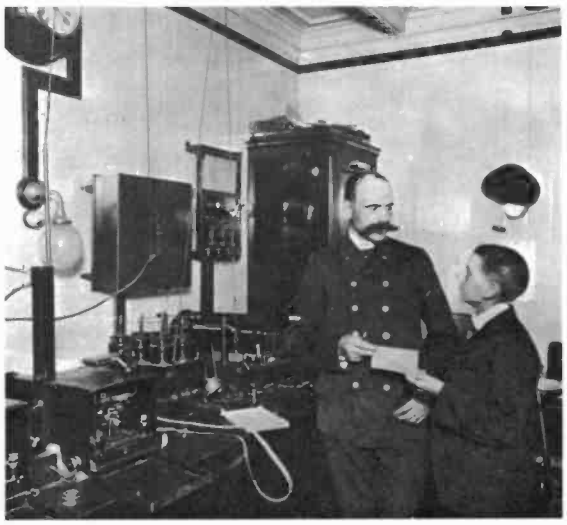
Therefore, permit us to say, that, if these pages have succeeded in arousing in the older members and instilling in the newer ones, that spirit of friendliness, cooperation and unselfish desire for radio knowledge, which was the prime factor of our beginning, and is the sole reason for our continued existence; then, this story has more than accomplished its purpose.


W. E. D. STOKES JR., PRESIDENT
GEORGE ELTZ, VICE PRESIDENT
FAITOUTE MUNN, RECORDING SEC.
FRANK KING, CORRESPONDING SEC.
The Junior Wireless Club, Ltd.
CLUB ROOM AND EXPERIMENTAL STATION
The Ansonia
FREDERICK SEYMOUR, TREASURER
MISS E. L. TODD, HONORARY PRES.
PROF. R. A. FESSENDEN, CONSULTING ENGINEER
SEYMOUR, SEYMOUR & McGRATH
Oct. 5 - 1911
326 W. 107th St.
N. Y. C.
Dear Sir,
A special meeting of the J. W. C. will be held at 326 W. 107th St., on Oct. 7, 1911, at 2.30 P. M. Your presence is earnestly requested.
Sincerely yours,
Frank King
The Radio Club of America, Inc.
1932
MEMBERSHIP CARD
7
AEROGRAM.
"RADIO CLUB OF AMERICA"
Date Apr. 19, 12.
Time 9.15 A.M.
Fm. R.C.A.
Ck 30
To Senator O'Gorman,
Address Washington, D. C.
We object to Section entitled "General
RECEIVED
Radio Club of America
New York City
Souvenir Menu of
Banquet
given in honor of
Major Edwin Howard Armstrong
Hotel Ansonia
Broadway at 73d Street, New York
November 19, 1919
WIRELESS STATION
OF THE
NAVY LEAGUE OF THE UNITED STATES
Apparatus Furnished And Operated Through The Courtesy Of The Radio Club Of America
HOTEL ANSONIA
NEW YORK CITY
For the Officers of the Army and Navy, Members of the League and their Families
MAY 1915
Radio Club of America
Headquarters
New York

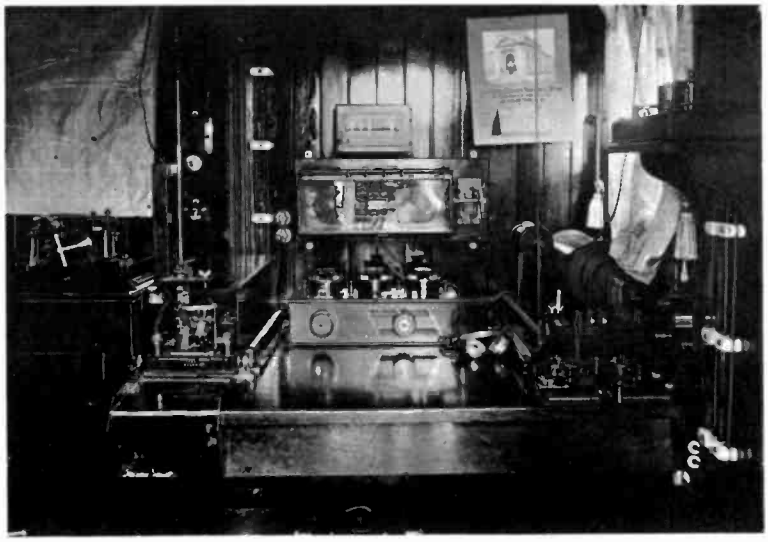
Editor's note: At the time that Part I of this history was compiled in 1934 many photographs of old time stations and equipment were received from the membership, for which we were profoundly grateful. Unfortunately, a good many of these rare pictures arrived too late to be included in the Silver Year Book. We now take pleasure in presenting a selected few of these old time photos in the Golden Year Book, with the hope that they may prove of interest to the reader.



Robert H. Marriott supervising the building of the American Tel. and Tel. Co. Wireless station on Catalina Island Calif. in May of 1902. "Pop," as he was known to all his friends, is an Honorary Member of the Radio Club and the first president and founder of the Institute of Radio Engineers.

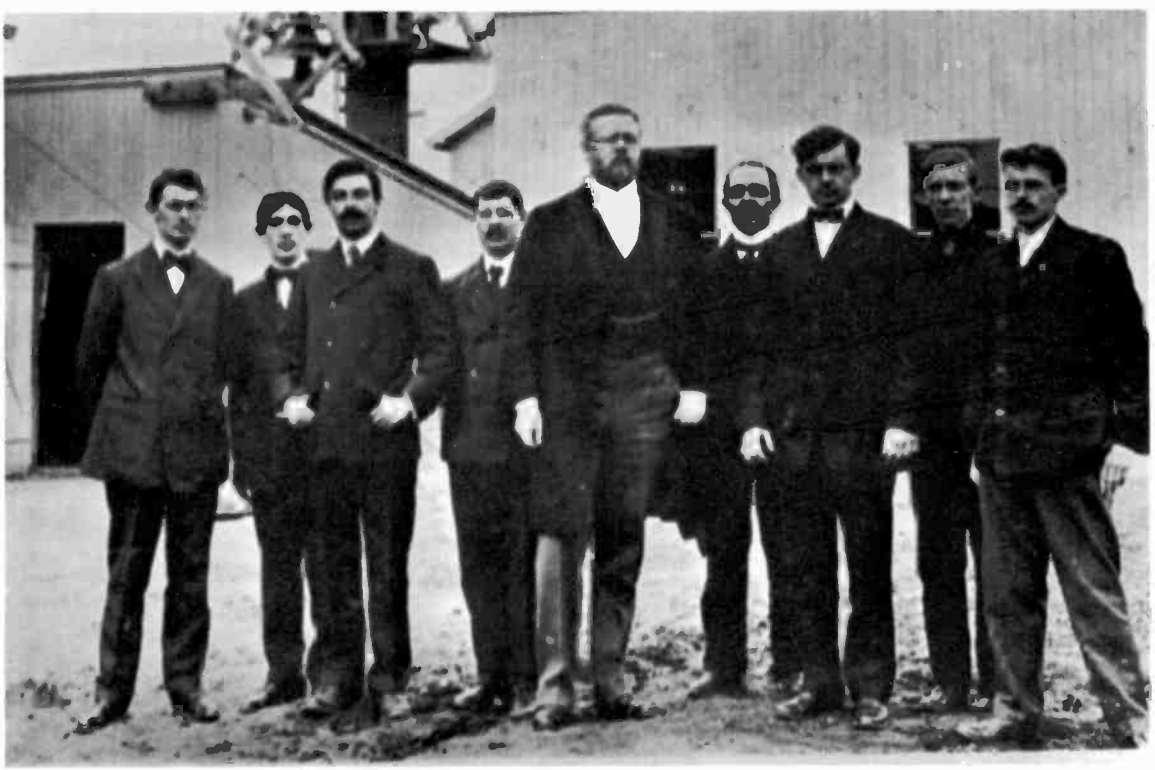


Radio installation aboard S. S. Kaiser Wilhelm II, North German Lloyd, 1902.

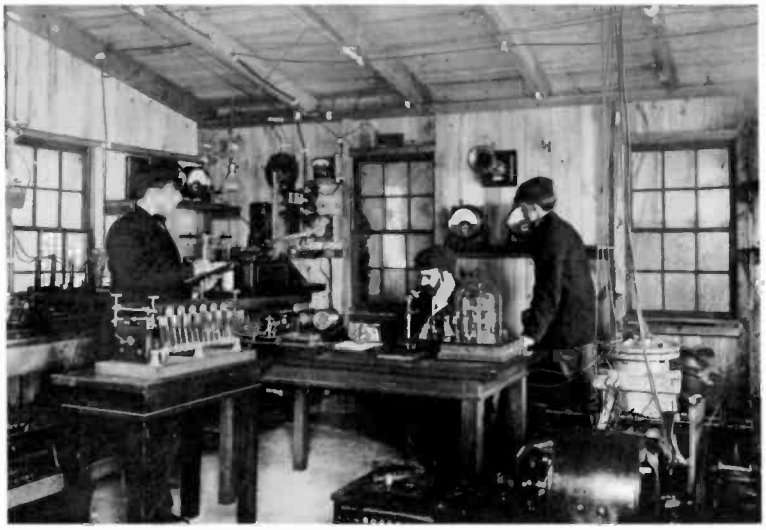


Early Marconi ship station of 1905.

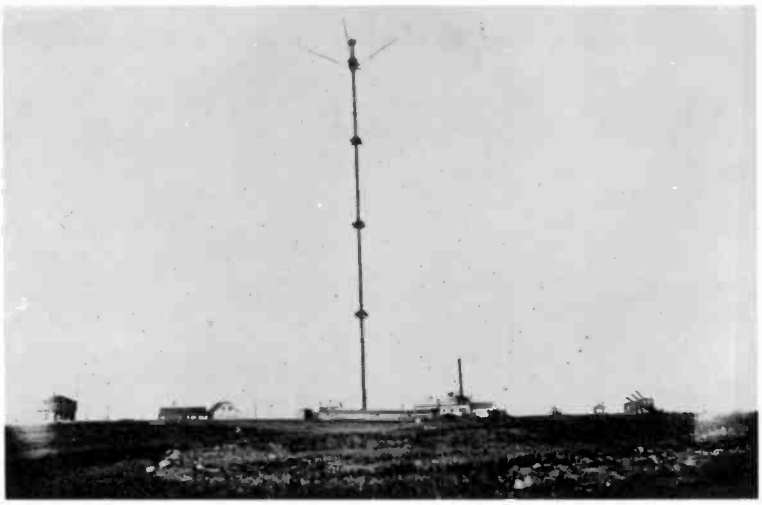
Elmo N. Pickerill operating the De Forest Wireless Telegraph station at Colorado Springs in 1905. The installation was made by Charles B. Cooper and Pickerill, and was used for inter-city service, as well as stock promotion.



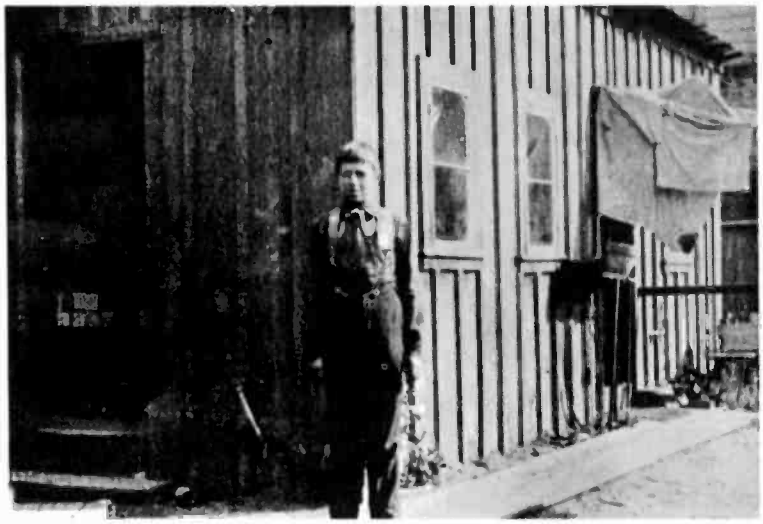
Reginald A. Fessenden and his staff at Brant Rock, Mass. in 1907. Left to right: H. R. Hatfield, F. P. Mansbendel, George Davies, Dr. Fessenden, Maurice Wesco, Adam Stein, Harry Sparks, and Guy Hill. Professor Fessenden was the Consulting Engineer for the Junior Wireless Club Ltd.



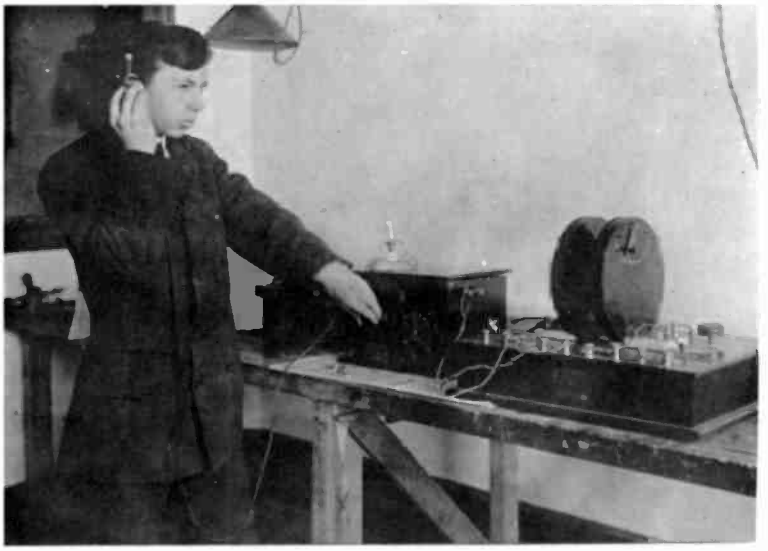
The laboratory at Brant Rock. Left to right: Stein, Mansbendel, and Hill. The high-frequency alternator is shown in lower right hand corner. 1907.



The antenna system at Brant Rock. 1907.

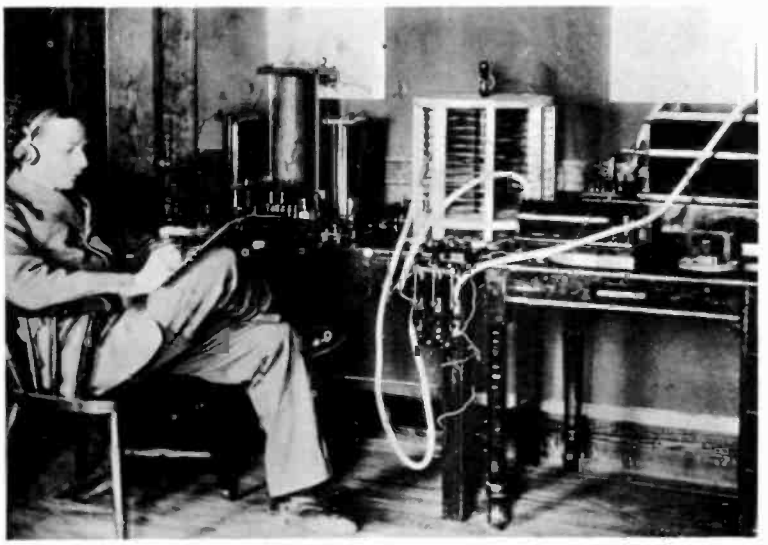


Lewis Clement standing before the shack of his station "BD" in Oakland, California in 1906, just after the earthquake.

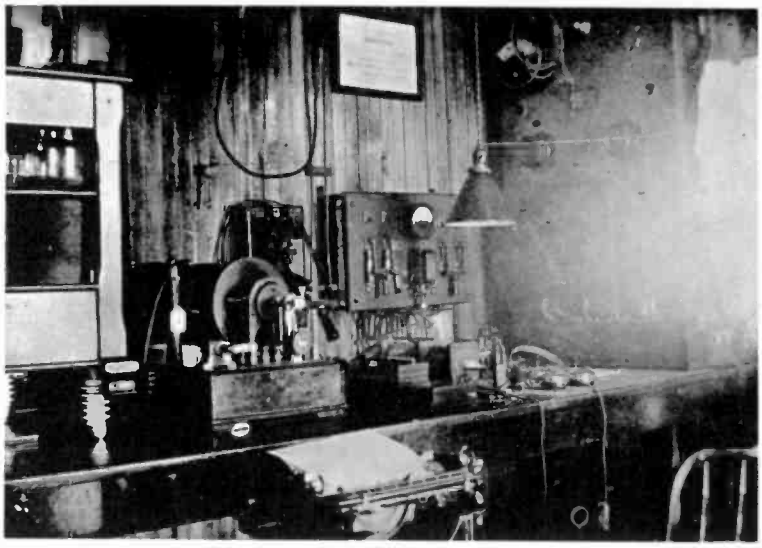


John V. L. Hogan adjusting a receiver in the Park Building Laboratory, 3rd Ave. and 18th Street New York City in 1906.

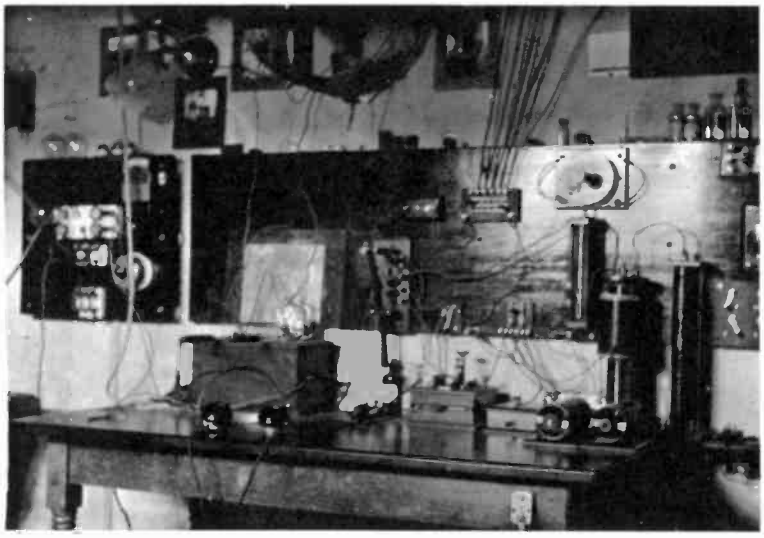
Typical United Wireless shore station of the 1907 period.



Joseph Knapp operating his amateur station "JFK" in New York in 1907.



The wireless shack aboard the S. S. Camaguay, showing a typical ship board installation of the 1910 period.

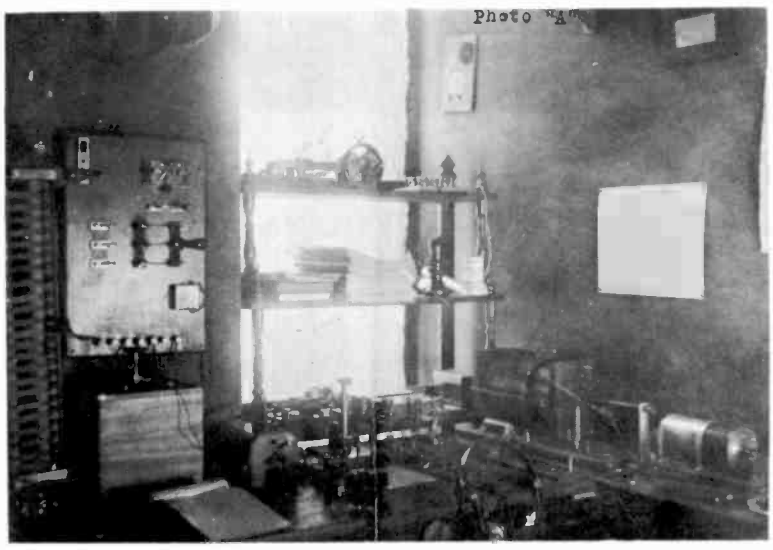


Amateur station "CM" owned and operated by Lloyd Espenschied in Brooklyn, N. Y. in 1910.

Harry Sadenwater, lower left, entertaining the passengers in the good old days of 1911, when the wireless operator was the social lion of the ship.

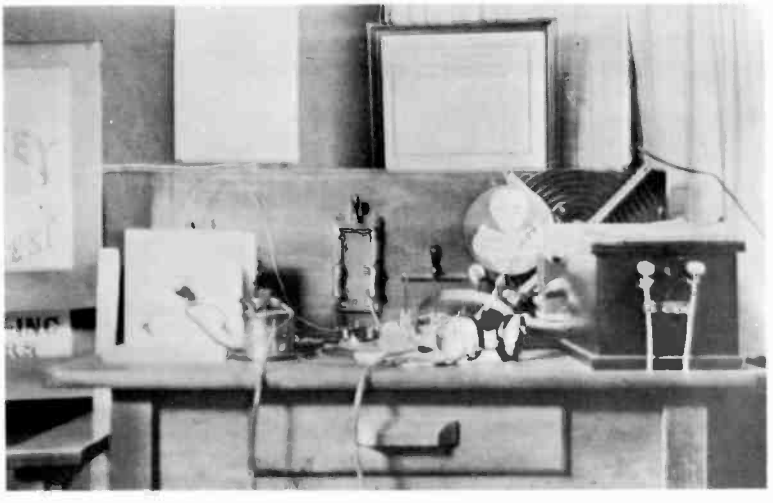
David Sarnoff chief operator, shown with staff at wireless station "WSC," Siasconset, Mass. in the old Marconi days of 1908. Left to right, standing: A. H. Ginman, Charles J. Weaver, sitting: J. Cowden, David Sarnoff.

Pierre (Pete) Boucheron, Chief Wireless Operator aboard the S. S. Camaguay in 1910. Note the insignia on the cap.



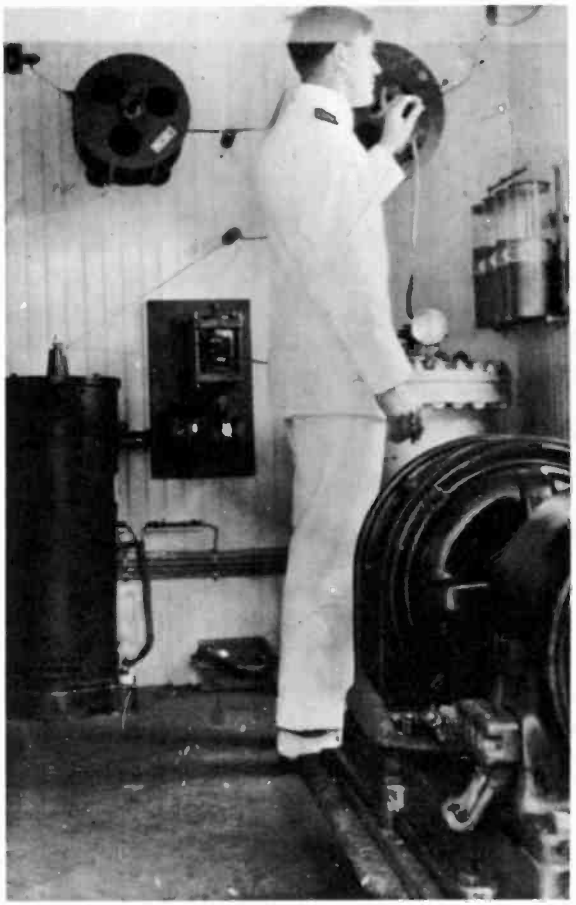
Amateur station of George T. Droste at 2132 Glebe Ave., Bronx, N. Y. in 1908. All the apparatus was home made. Note the tin can variable condenser lower right with loose-coupler behind and ribbon wound transmitting helix at left of picture.

Marconi Wireless station "AX" on Steel Pier in Atlantic City, N. J. with operator RM, Bob Miller at the key, in 1912.

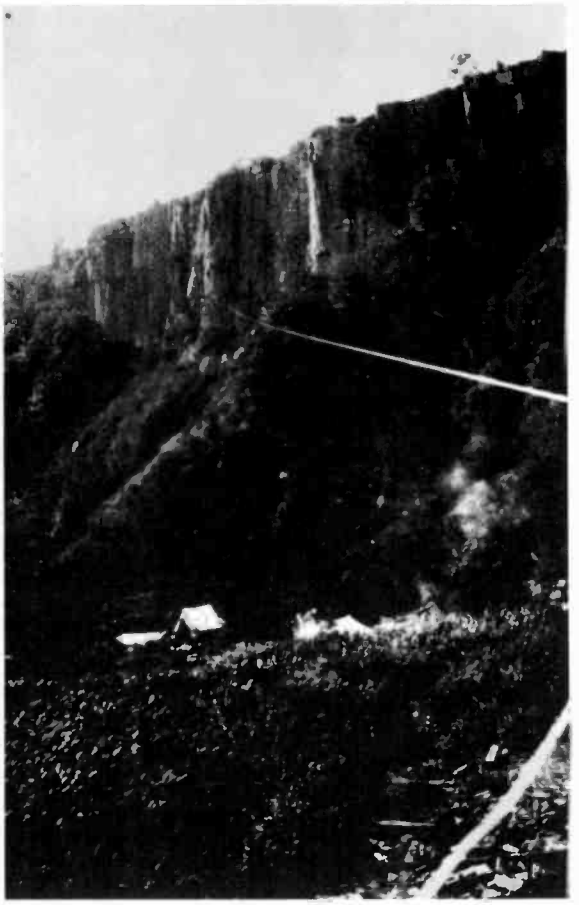


Amateur station of Donald D. Way, New York City, 1912.

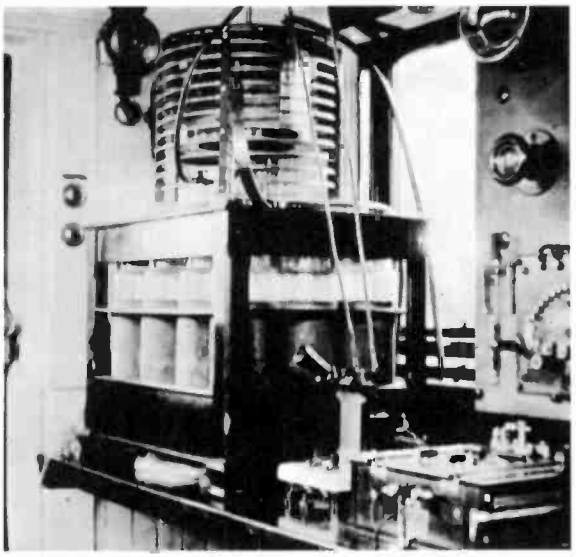
Arthur R. Nilson operating his station "1UW" in Providence, R. I. in 1912.



Fred Muller, Chief Wireless Operator, S. S. Pastores, United Fruit Co. tuning up a 2-kw Fessenden Synchronous Nesco QS transmitter, in 1913. Note the 400-lb. compressed air condenser in background.

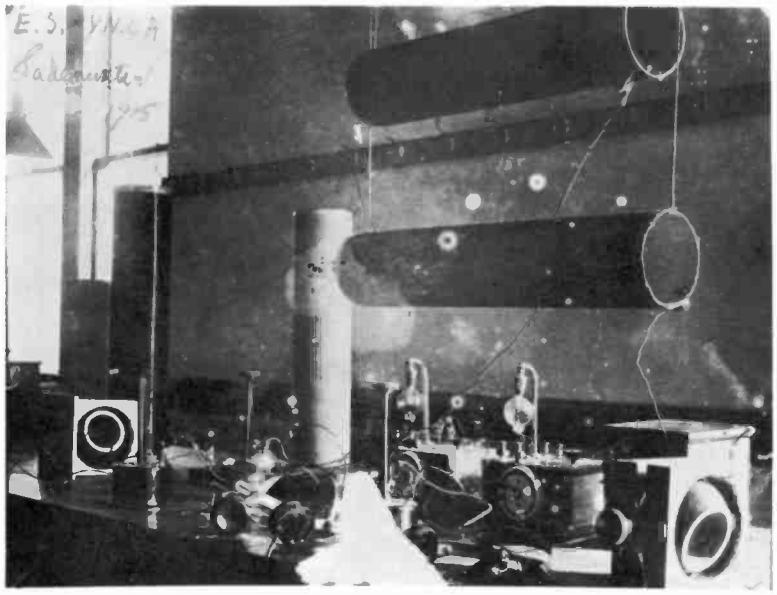


This was the antenna wire strung from the top of the Palisades on the Hudson River, used by Paul Godley, Louis Pacent, and Harry Sadenwater in 1914 to listen to long wave trans-atlantic signals.

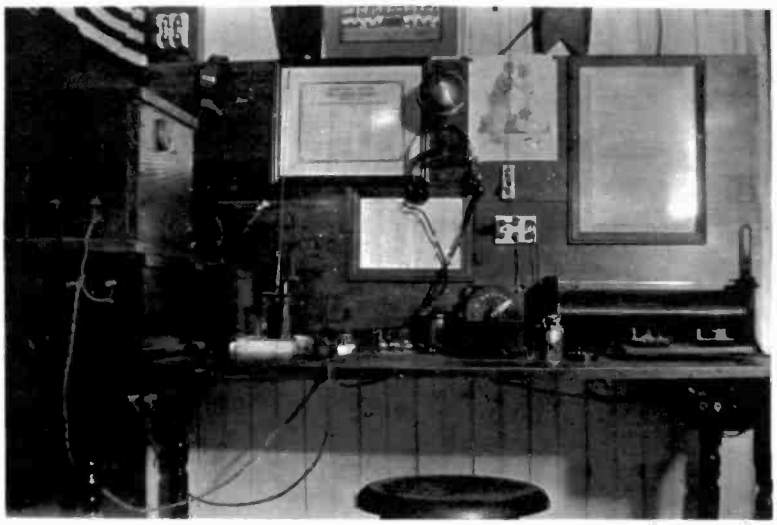


Wireless installation aboard the U. S. Nautical Training Ship "Ranger." The early members of the Radio Club took a yearly cruise aboard the Ranger as apprentice Navy wireless operators. 1914.

After inspecting a United Fruit Co. ship in New York Harbor in 1914, Radio Inspector Harry Sadenwater (left) and Fred Muller (center) chief wireless operator for United Fruit, pose for a picture. Note the decremeter in case slung over Harry's right shoulder.

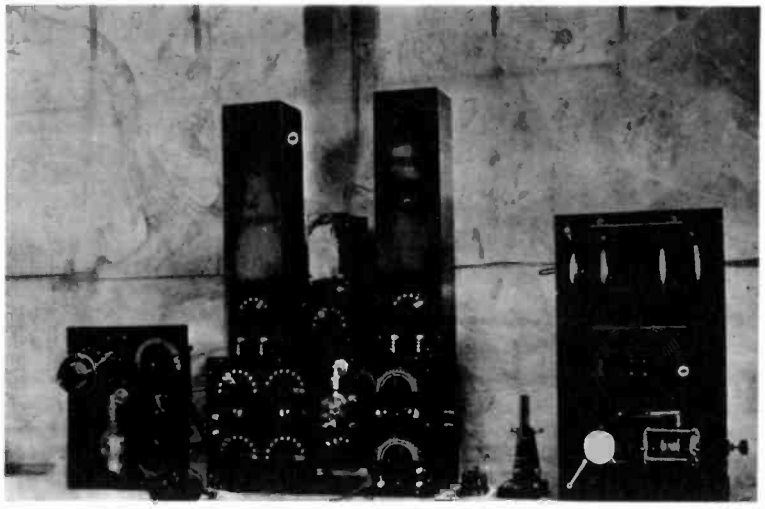


Amateur station of the East Side Y.M.C.A. East 86th. St., New York City in 1915. The apparatus was installed and operated by Harry Sadenwater who also gave a course of instruction in Wireless Telegraphy there. Note the long wave tuning coils and the two variometers and Audion bulbs.



Amateur station "1VW" built and operated by George C. Delage in 1915.

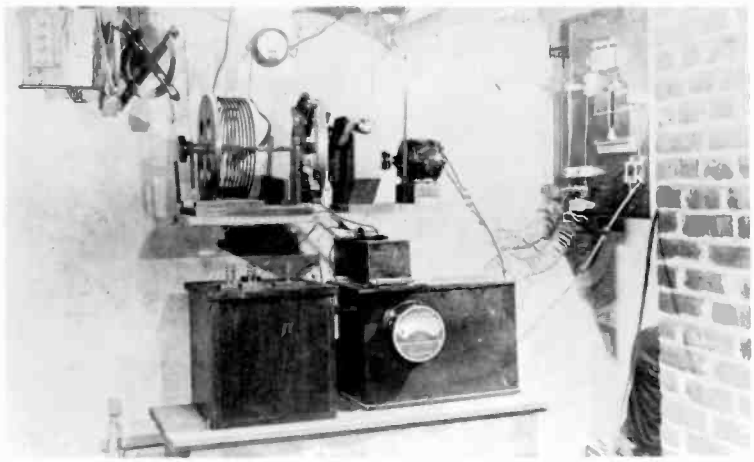
Some of the boys on an outing to the Tuckerton, N. J. high power radio station in 1915. They brought their own test equipment, etc. Left to right: Howard Stanley, A. B. Cole, Victor Camp, Al Morgan, and Paul Godley.



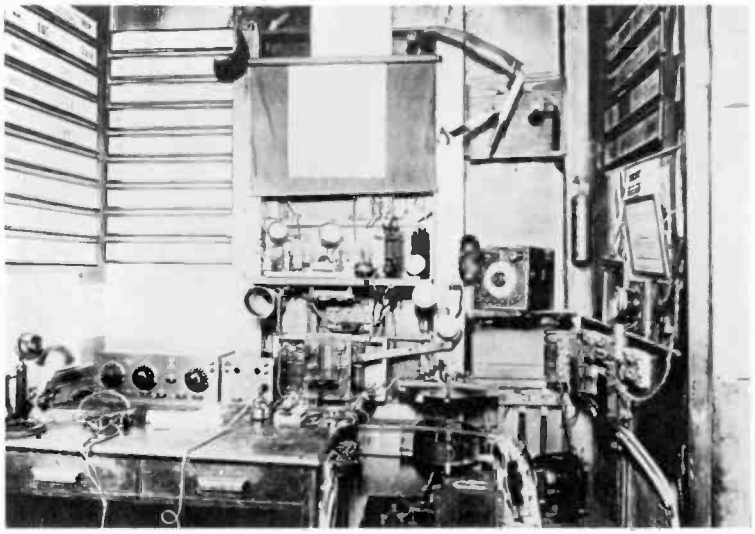
This was some of the first apparatus built especially for the amateur in cabinet form by Alfred H. Grebe in 1915. Left to right: Vacuum-tube radio telephone transmitter, long- and medium-wave regenerative receiver and quenched gap spark transmitter.

Amateur station "2KK" owned by Howard B. Day, Westfield, N. J. 1915. Note the two Audion bulbs.

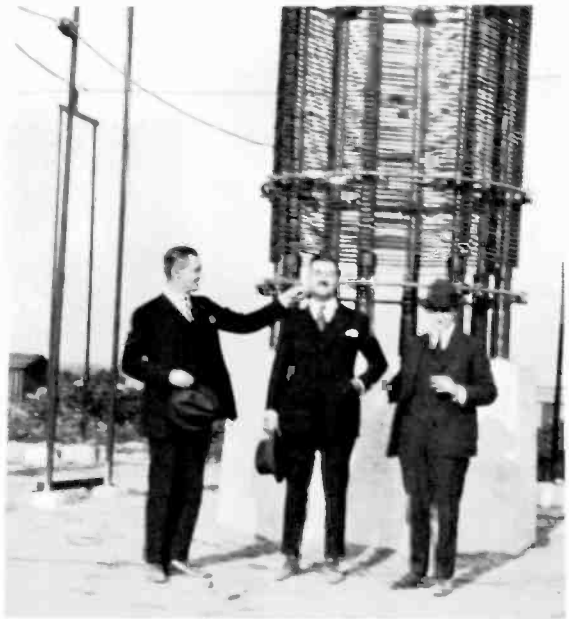
John V. L. Hogan testing a regenerative circuit at the National Signaling Co. Labs. in 1917.



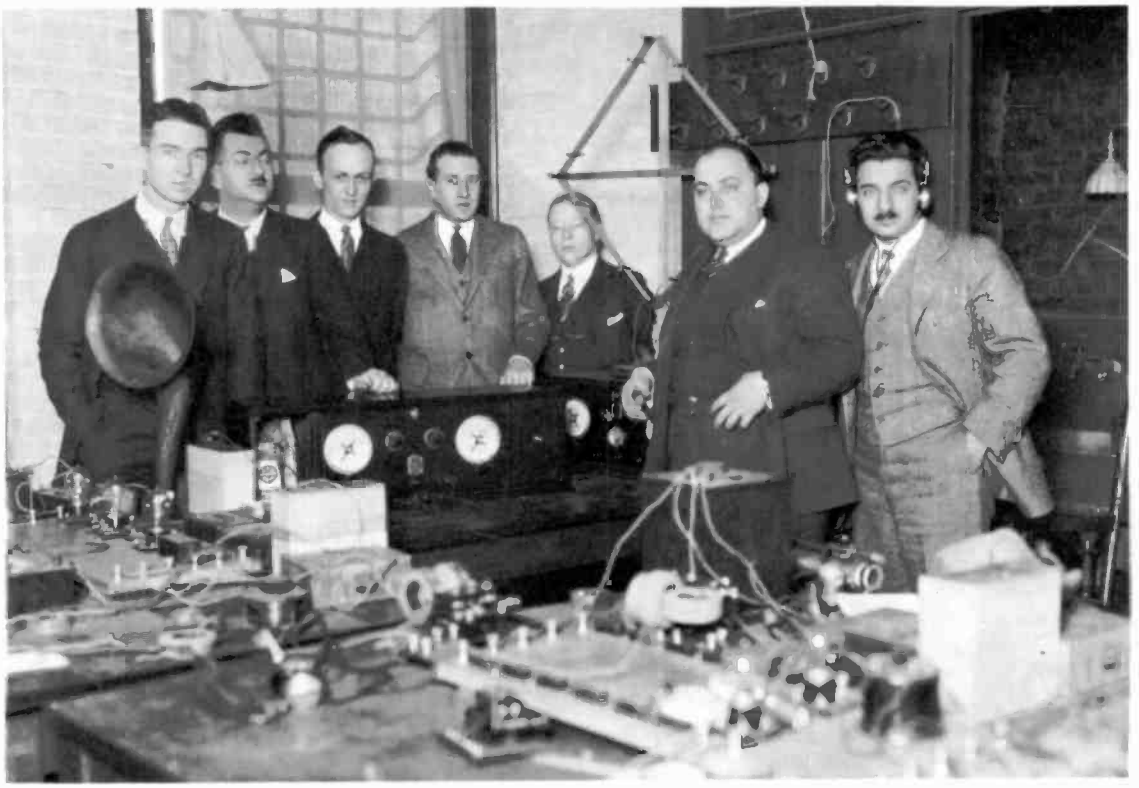
Typical amateur transmitter of the rotary synchronous spark gap era in 1919. The rig was built and operated by Lester Spangenberg in New Jersey.



The prize winning amateur station, "2OM" in 1923. Owned and operated by Frederick Ostman of Ridgewood, N. J.

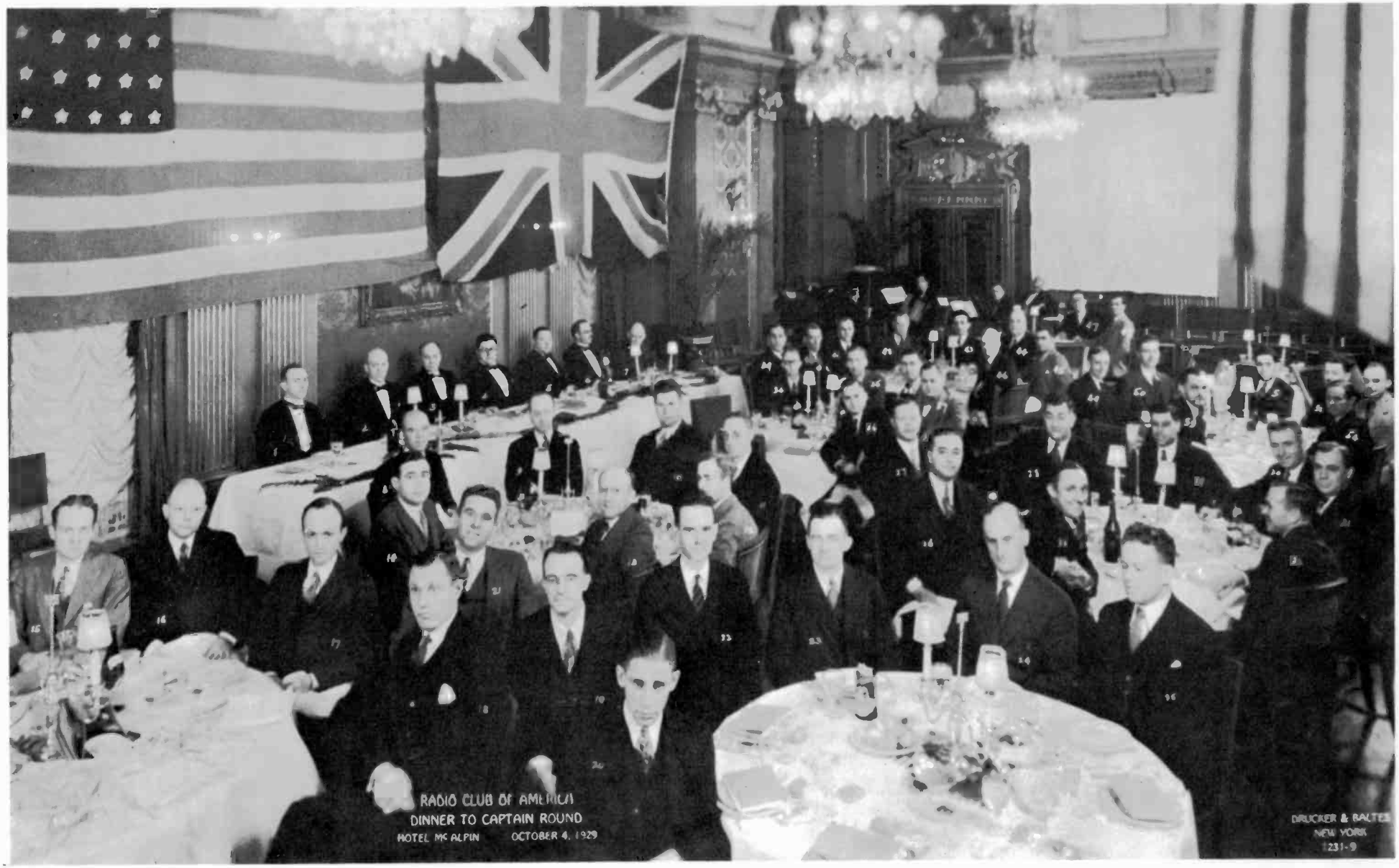


Ernest V. Amy, John Grinan, and George Eltz testing for static during a visit to the high-power transmitting station of R.C.A. at Rocky Point, Long Island in 1925.



Radio Club members listening to the effect of the total eclipse of the sun on the radio spectrum, at Hartley Research Laboratory, Columbia University, New York, in 1925. Left to right: Frank King, John Grinan, R. H. McMann, George E. Burghard, Thomas Styles, Louis Pacent and Jose Consiglio.

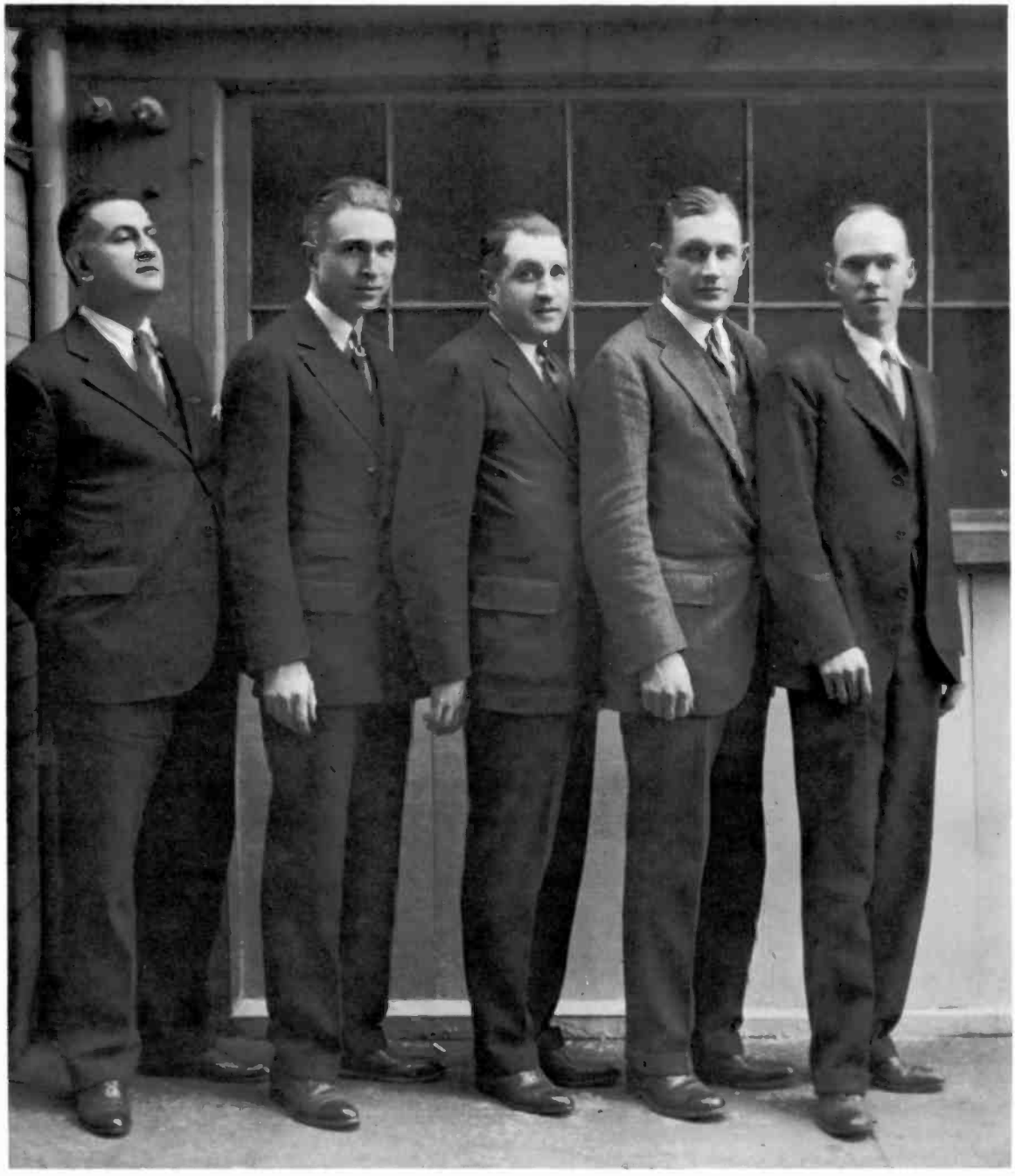
Navy Listening Station, Bush Terminal, Brooklyn, N. Y., 1917. Right to left: Harry Sadenwater, Frank King and George Burghard.


RADIO CLUB OF AMERICA
DINNER TO CAPTAIN ROUND
HOTEL McALPIN OCTOBER 4, 1929
DRUCKER & BALTES
NEW YORK
1231-9

Dinner Tendered to Captain H. J. Round
by the
Radio Club of America
at the Hotel McAlpin, New York, October 4th, 1929

1 Paul F. Godley
2 Edwin H. Armstrong
3 Captain H. J. Round
4 Lewis M. Clement
5 David B. Sarnoff
6 John V. L. Hogan
7 Robt. H. Marriott
8 Wm. A. Winterbottom
9 Julius Weinberger
10 H. H. Beverage
11 Frank Wiegand
12 Max Batsel
13 Mr. Wood
14 Alfred McCormack
15 Stephen Simpson
16 Thos. J. Styles
17 R. H. McMann
18 Ernest V. Amy
19 Julius G. Aceves
20 N. I.
21 F. Klingenschmidt
22 N. I.
23 Wilson Aull
24 Wm. T. Russell
25 Walter S. Lemmon
26 N. I.
27 Harry Sadenwater
28 John F. Grinan
29 Jos. J. Stantley
30 G. B. Sweeney
31 J. F. Shaughnessy
32 Hon. Fredc. R. Colie
33 C. R. Runyon, Jr.
34 Keith Henney
35 Howard Rhodes
36 Mr. Brigham (Bro. 37)
37 C. E. Brigham
38 N. I.
39 Carl Goudy
40 N. I.
41 H. A. Wheeler
42 Allen B. DuMont
43 N. I.
44 W. H. Barkley
45 Wayne B. Eaton
46 Capt. H. J. Ranger
47 N. I.
48 N. I.
49 C. R. Wright (old OHX)
50 Mr. Brown
51 N. I.
52 N. I.
53 N. F. Wunderlich
54 Wm. F. Diehl
55 John Biselle

NI—Not identified



Charter members of the Radio Club of America lined up before the radio shack in Frank King's back yard at 326 West 107th. Street, New York. It was here that the special meeting of the Junior Wireless Club was held on October 21, 1911, when the name was changed to The Radio Club of America. Left to right: John Grinan, Frank King, George Burghard, Ernest Amy, Faitoute Munn. The picture was taken in 1929.

A HISTORY OF THE RADIO CLUB OF AMERICA, INC.

By GEORGE E. BURGHARD

Part II

The year 1934 was indeed one of great importance to the Radio Club for it marked the twenty-fifth year of its existence. Just twenty-five years ago that small group of young boys met in the Ansonia Hotel and founded what is now the oldest Radio Club in continued existence on record. This of course called for a celebration and the President appointed a special 25th. Anniversary Committee to make suitable arrangements. As a result the Silver Anniversary Year Book was published. It contained a complete history of the Club from 1909 to 1934, a list of all papers read before its members during that time, autobiographies of all the members, photographs of all the past presidents, articles by prominent members and a Preface written by one of the founding members George Eltz Jr which will bear repetition here. Some fifteen

---

PREFACE

In preparing this, our twenty-fifth anniversary number, the Committee have a keen appreciation of the responsibility imposed upon them by the membership.

Twenty-five years represent practically the entire life span of that most fascinating of the communication arts,—Radio. Our membership has contributed more than its share to the perfection of the science as it is known today. Statistics are therefore available in vast array ready for sorting, sifting, and compilation into neat paragraphs,—that no one will read.

The committee had to decide whether we should prepare a statistical type of anniversary number or whether we should attempt, to the limit of our poor powers, to incorporate in the book some of that spirit which led to the foundation of the club and to which can largely be attributed its continued existence.

To the members of the committee the answer seemed more than obvious, statistics could not be ignored, they were important, yes, but only as the limbs of a tree are important. Statistics are the result of growth just as are the limbs of a tree, it is the spirit, the upward urge that is responsible for both.

In no engineering association is the spirit of growth, the urge to seek new pastures as strongly emphasized as in the Radio Club of America, Inc. Founded in 1909 by a group of school boys whose sole bond, when the club was formed, rested in their interest in "Wireless", the club has continued ever since with that bond as its strongest and greatest asset.

The school boys have grown up, they are now middle-aged men, but when they meet, as they do very frequently, the same spirit, the identical urge to find something new in "Wireless" is always present. If the founders of this club and its early membership bequeathed anything to the club it was this spirit of unrestrained curiosity and willingness to reveal to others without hesitation the results of personal experiments in the beloved art.

There is something big, something cosmic, about radio that washes away the petty things that so trammel other arts and sciences. The rich and the poor, the wise man and the student, meet through the medium of the ether and are comrades. This is the spirit of your club, treasure it, foster it, for when it dies the club dies with it.

When the club was founded radio was an unknown quantity, almost a plaything. How it has developed, the part it played in the World War and the position it holds in the world today is known to all of us. It has been exploited by big business, fortunes have been made and lost in it but the bond that founded the Radio Club is still good. Radio, to those who truly understand its spirit, is above exploitation.

There is no other radio association quite like the Radio Club, no other group quite so free of the commercial taint, old and young, we are amateurs when we meet in the Radio Club, let us remain so.

The statistics on our membership have been cut to the barest possible outline. A glance through the membership list will reveal the reason for this. To do full justice to the achievements of some of our members would require a volume many times thicker than we could afford. It is our desire to slight no one, rather are we actuated by that amateur bond which attributes to each in equal measure, the same spirit, the same desire for development, regardless of past achievements.

It is in this spirit that your committee present to you your twenty-fifth anniversary year book.

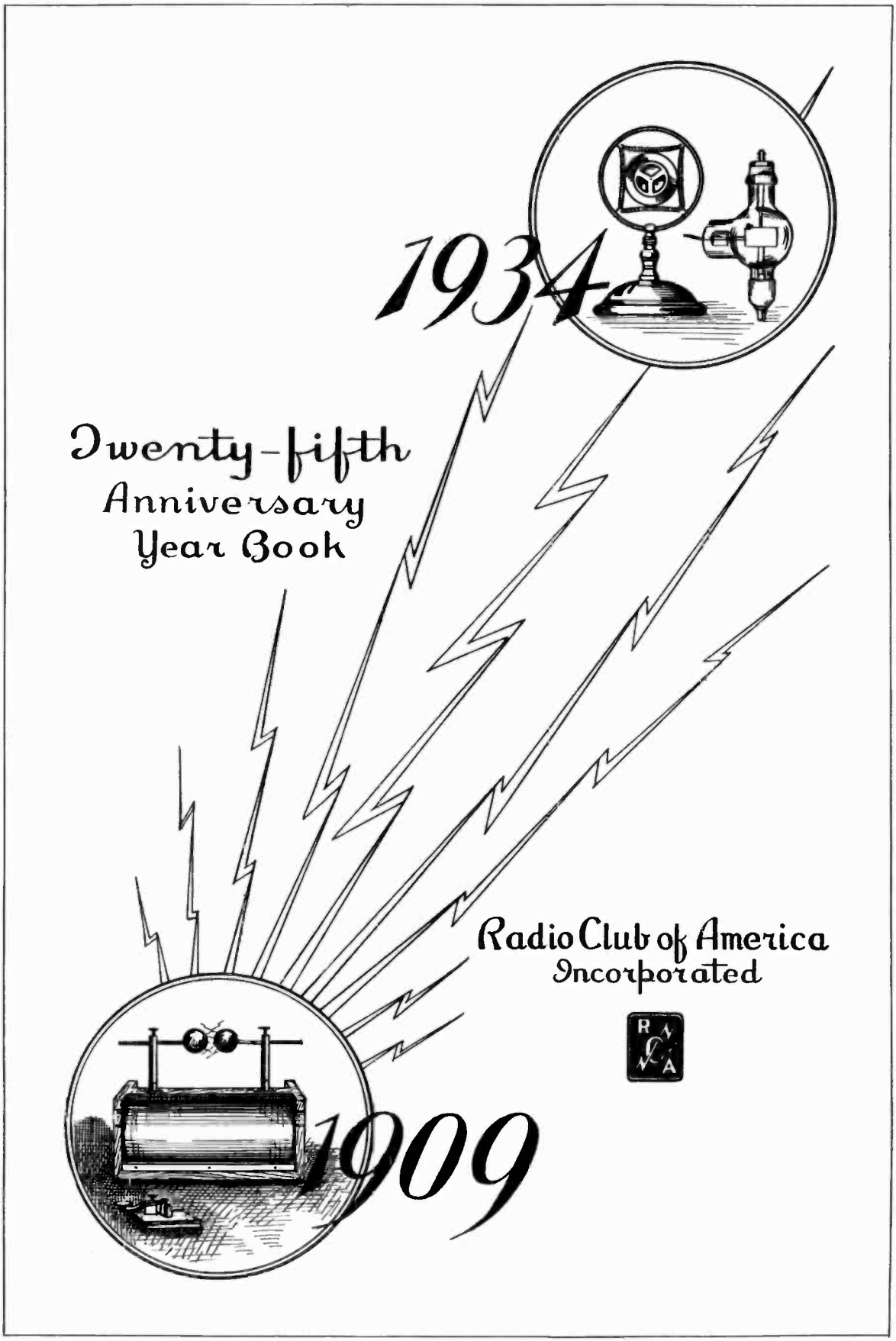
GEORGE ELTZ, JR.

Preface to Silver Year Book by George J. Eltz, Jr.

hundred copies of the Silver book were printed and it was well received by the radio press as is evidenced by the clippings shown herewith. It was sent to libraries and institutions all over the world and is at the present time a collector's item. The cover design which was drawn in black on a solid silver background made a striking combination.

For some time members of the Club had been carefully considering the proper way to honor Major Armstrong for his many great achievements in the Radio Art, as well as his interest and faithfulness to the Radio Club of America. In December of 1935 Larry Horle conceived the idea of creating a medal to be awarded from time to time to a member who had done outstanding work in the radio field, and to be known as The Armstrong Medal. He discussed his idea with Harry Sadenwater and George Burghard. They heartily agreed with him and proposed bringing the matter to the attention of Ralph Langley, the President of the club. At his suggestion a resolution was drawn up dedicating the medal to Edwin H. Armstrong and providing for the presentation of an engrossed scroll evidencing this fact, to the Major at the reading of his paper on Frequency Modulation before the club on December 19th. 1935. This of course needed the approval of the Board of Directors and as time was very short all the directors were contacted by phone and their approval received. The scroll was duly prepared and presented to Major Armstrong at a special meeting held in Pupin Hall, Columbia University on Thursday December 19th. 1935. The paper was titled "A New Method of Reducing the Effect of Disturbances in Radio Signalling by Frequency Modulation" and attended by an overflow crowd. The Major was taken completely by surprise and thanked the club profusely for the honor bestowed upon him. The scroll which was beautifully engrossed in colors unfortunately was not ready on the night of the meeting so the President presented Armstrong with a copy of the text and the real scroll duly signed by all the officers and Directors was delivered to him informally later in the year. A facsimile of scroll is shown on page 68.

It now became necessary to produce the actual medals and President Langley appointed Harry Sadenwater and George Burghard a committee of two to take immediate action. To make a long story short; the medal was designed in Camden N. J. by Messers. Vassos, Stevenson and J. P. Barnes and the sculptor was Harry Straubel. First a master was made in bronze and then a mould was made from it and the medals cast in solid silver from the mould. Thirteen medals were made in all, at a cost of $336.00. One finished medal was given to each of the designers as per agreement, for their services. The remaining ten were retained by the



Cover design of Silver Year Book 1934.

Radio Club of America Celebrates 25th Anniversary

Dedicated to the "spirit of good fellowship and the free interchange of ideas among all radio enthusiasts" the Radio Club of America, Inc., has issued a special Year Book in commemoration of its 25th anniversary. Among the names appearing in the roster of present and past leaders of this pioneer club (said to be the oldest radio club in the world) are to be found many long since prominent in the world of radio communication as it is known today, and several now appearing on the roster of active members of the A.I.E.E.

Quoting from opening paragraphs of the Year Book:

"The story of the Radio Club of America begins over a quarter of a century ago, during the really dark ages of the radio art, about 1907. . . . Here we find a group of small boys who, according to the true American spirit, were so interested in flying that they formed the Junior Aero Club of U.S.

"In conjunction with their experiments in aviation, these youngsters had, for some time, also been interested in what was then known as wireless. In fact, the new idea of sending messages without wires had proved itself so fascinating, that they found themselves actually devoting most of their spare time to tinkering with wireless apparatus. There were at this time a small number of so-called amateur wireless experimenters in and about New York City, so the boys decided to form a new club with wireless as an object."

"Accordingly, . . . a special meeting of the Aero Club, for the purpose of forming a new club, with wireless telegraphy and telephony as its main interest. . .was held at the Hotel Ansonia in New York City on January 2, 1909. . . . Thus, the Junior Wireless Club Limited was founded," and bore that name until October 21, 1911, when it was changed to the Radio Club of America in recognition of its expanding membership and interests.

The Year Book presents a comprehensive outline of the history of the club, lists the major contributions of its members to communication literature, and includes a roster of members and of past and present officers. Copies of the Year Book are said to be available at the club's executive headquarters, 11 West 42nd Street, New York, N. Y.

Among the present and past officers of the Radio Club of America are noted the following members of the Institute:

Ernest V. Amy (A'19, M'28) consulting engineer, Amy, Acebes and King, Inc., New York, N. Y.
Carl Dreher (A'23, F'33) sound director, RKO Studios, Inc., Los Angeles, Calif.
George J. Eltz, Jr. (A'21) co-owner, Continental Sales Company, Hartford, Conn.
Lawrence C. F. Horle (A'20, M'22) consulting radio engineer, Newark, N. J.
Harry W. Houck (A'21) consulting engineer, Camp Hill, Pa.
Theophilus Johnson, Jr. (A'18) commercial engineer, General Electric Company, Schenectady, N. Y.
Ralph H. Langley (M'34) consulting engineer, New York, N. Y.
Louis G. Pacent (M'18, F'30) president and technical director, Pacent Engineering Corp., New York, N. Y.

TWENTY-FIFTH ANNIVERSARY YEAR BOOK OF THE RADIO CLUB OF AMERICA.

A group of schoolboys drawn together by their common interest in the then new art of radio formed the Junior Wireless Club Limited on January 2, 1909. Out of that first meeting has grown the Radio Club of America comprising in its membership every radio experimenter, technician and engineer of importance in the industry today. In celebration of the first quarter century of its activities the club has published this year book which contains photographs of early apparatus, members who were instrumental in promoting the club and a complete history of the development of the organization. An examination of the proceedings of the club from its inception discloses that the majority of the radio inventions which form the bulwark of the modern radio receiver were first divulged to the members. The Anniversary Year Book contains a complete Who's Who of the roster which now includes 320 members.

"RADIO CLUB" SILVER ANNIVERSARY YEAR BOOK

IT GIVES US a great deal of pleasure to be able to review the Twenty-Fifth Anniversary Year Book of the Radio Club of America, Inc. Dedicated to "The Spirit of Good Fellowship and the Free Interchange of Ideas Among All Radio Enthusiasts," this book contains a wealth of information and inspiration in its many pages. In fact, a comprehensive review would, we feel, require nearly as many pages as this year book contains; and so this review shall consist of only a very brief summary of a few of the many highlights incorporated in its 85 pages.

The preface, which outlines the spirit that has contributed so much to the growth and prestige of the Radio Club of America from the eight charter members of the Junior Wireless Club Limited to its present 320, was written by George Eltz, Jr., who it happens was one of those charter members.

"A History of the Radio Club of America, Inc.," by George E. Burghard, traces in a very interesting and vivid manner the story of the Radio Club from its beginning in 1909. Mr. Burghard has condensed his material into some 38 well-illustrated pages.

Immediately following is a foreword by Lawrence C. F. Horle. This foreword precedes the complete listing of the Proceedings of the Ra Club. To appreciate the value of this . sting of the Proceedings, even if only for reference purposes, one needs but glance at names of the engineers who have presented papers.

An enrollment of past officers, condensed history of each member, and the Constitution of the organization completes this year book.

The members of the Twenty-Fifth Anniversary Year Book Committee, namely, George E. Burghard, Ernest V. Amy, Edwin H. Armstrong, George J. Eltz, Jr., John F. Grinan, Lawrence C. F. Horle, Frank King, Robert H. Marriott, Fred Muller, Joseph J. Stantley, and W. E. D. Stokes, Jr., deserve a vote of thanks from the Radio Club.

25 Years of Radio

Radio Club of America, 25th Anniversary Year Book, 1934. Available at the Club headquarters, 11 West 42nd St. (Price $1.00 to members, $1.50 to non-members.)

JANUARY 2, 1909 the Junior Aero Club of U. S. met at the Hotel Ansonia at the instance of W. E. D. Stokes, Jr. to consider a new hobby, radio. The members of this group, now the Radio Club of America, were of gentle age—Mr. Stokes was then 12. Today these boys are grown but their interest in wireless survives. The history of their club is the history of radio in America.

In the Year Book will be found photos of Louis Pacent and Harry Sadenwater listening for signals from Europe, Armstrong's regenerative apparatus, radio stations of E. V. Amy and others, Harry Houck's home-made loose coupler, station 1BCG which pumped 200 meter signals to Europe and caused M. I. Pupin and David Sarnoff to go to Greenwich, Connecticut, to see what "the boys are doing."

The entire book brings back memories of the old and glamorous days. Evidently the committee, under George Burghard, is still amateur at heart. In the Book is a history of each of the several hundred members.

Electrical Engineering, April 1935 (top, opposite page); New York Sun, March 2, 1935 (bottom left, opposite page); Radio Engineering, March 1935 (bottom right, opposite page); Electronics April 1935 (top right).

club together with the master. The mould was then destroyed. To date ten medals have been awarded and for the sake of the record the presentation dates and the names of the recipients are listed below:

ARMSTRONG MEDALISTS

1937—Professor Alan Hazeltine
1938—Dr. Harold H. Beverage
1940—Greenleaf Whittier Pickard
1941—Harry W. Houck
1945—Carman Randolph Runyon Jr.
1946—Charles Stuart Ballantine
1947—John V. L. Hogan
1950—Ernest V. Amy
Edwin H. Armstrong
George E. Burghard
Monton Cronkhite
Paul F. Godley
John F. Grinan
Walker P. Inman
1952—Captain Henry J. Round
1953—Raymond A. Heising
1956—Melville Eastham

In view of the fact that the last of the ten Medals was presented in 1956, the Medal Committee was instructed by the Board of Directors to proceed with making a new mould from the Master, and casting a new supply of Armstrong Medals for future use.

The Board of Directors of
of
The Radio Club of America
to
Edwin Howard Armstrong
and to all others to whom these presents may come
Greeting

Be it known that at a special meeting of the Board of Directors of The Radio Club of America held December 19, 1935, in New York City, the following Resolution was adopted by unanimous consent:

Whereas - Edwin Howard Armstrong for many years has diligently, earnestly and effectively given council and encouragement in the guidance of The Radio Club of America, and

Whereas - We look back with pride and honor to the presentations before our meetings of his basic inventions: The Regenerative Circuit, The Superheterodyne and Super-Regenerative Systems and tonight The New System for Eliminating Noise by Frequency Modulation, each of outstanding importance in the Radio Art. Therefore be it

Resolved That a properly engrossed parchment copy of this Resolution be presented to Edwin Howard Armstrong at the conclusion of the presentation of his Paper on Noise Suppression by Frequency Modulation this evening as an expression of our deep appreciation of his keen technical knowledge and untiring willingness to work, and his outstanding contributions to Radio Art and Science. And be it further

Resolved That, in further token of appreciation, The Radio Club this day hereby establishes an award to be known as the "Armstrong Medal", to be bestowed by the Board of Directors of The Radio Club of America upon any person within its membership who shall have made, in the opinion of the Board of Directors, and within the spirit of the Club, an important contribution to Radio Art and Science.

Done at New York this 19th day of December, one thousand nine hundred and thirty-five.

Ralph A. Langley
President

Corresponding Secretary

Board of Directors

Scroll presented to Armstrong dedicating the Medal.

The Armstrong Medal. Front (left) and reverse sides.

It will be noted from the above that an Armstrong Medal was not awarded every year. This is because it is given in accordance with the conditions and requirements formulated in the establishment of this honor by the Board of Directors of the Club. Quoting from the Scroll: "The Radio Club this day hereby establishes an award to be known as the "Armstrong Medal," to be bestowed by the Board of Directors of The Radio Club of America upon any person within its membership who shall have made, in the opinion of the Board of Directors, and within the spirit of the Club, an important contribution to Radio Art and Science."

Although it was the original intention of the Directors to hold banquets annually as anniversary celebrations, nevertheless the depression of 1929 somewhat upset the schedule. There were no banquets held until the 27th Anniversary in 1936.

Professor Alan Hazeltine receiving the first Armstrong Medal from John Miller President of the Radio Club on Oct. 29 1937. Left to right; Edwin H. Armstrong, Prof. Hazeltine, John Miller, Harry Sadenwater, George Burghard.

In 1937, the Board of Directors decided to present the first Armstrong Medal to Professor Hazeltine for his great contributions to the Radio Art.

This was indeed a special occasion and the presentation was made at the twenty-eighth anniversary Banquet held at the Engineers Club New York City on October 29th. 1937. About two hundred members and their guests enjoyed the proceedings and Professor Hazeltine's most gracious acceptance, in the true Radio Club spirit.

CITATION *on the occasion of the* AWARD *of the* ARMSTRONG MEDAL *to* LOUIS ALAN HAZELTINE

The award of the Armstrong medal for 1937 by the Radio Club of America to Professor Louis Alan Hazeltine is in recognition of his outstanding contributions to the art and science of radio communication.

To the public his name will always be associated with the neutralized frequency amplifying systems which he developed to a complete solution from the mathematical point of view and which resulted in the first commercial high gain radio frequency amplifier with stable characteristics.

To radio engineers his contributions are of a much wider scope, embracing among others, the first and most useful of vacuum tube parameters "mutual conductance". The theory behind this contribution led largely to taking the vacuum tube amplifier out of the realm of experimentation and into the field of calculable engineering.

Professor Hazeltine's contributions to the art have been made with the constant thought of their usefulness to his brothers in the science and the profession and most clearly typify the spirit of the Armstrong award, that of individual research and delving unafraid into the then unknown, to the end that a further advance in the science might be made possible for future engineers to build upon.

From this day on the Banquets were held quite regularly in the Fall or Winter of each year. A complete list of the Anniversary Dinners follows:

Radio Club Banquets.

1936—27th. Anniversary Banquet held at the Engineers Club N. Y. C. October 29th. Toastmaster, Thomas Styles.

1937—28th. Anniversary Banquet held at the Engineers Club N. Y. C. October 29th. First Armstrong Medal to Alan Hazeltine.

1938—29th. Anniversary Banquet held at the Engineers Club N. Y. C. November 4th. Guest of Honor Egbert Von Lepel. Armstrong Medal to Dr. Harold H. Beverage.

1939—30th. Anniversary Banquet held at the Engineers Club N. Y. C. November 29th. Guest Speaker Lenox R. Lohr.

Twenty-eighth Anniversary Banquet at which the first Armstrong Medal was presented to Prof. Alan Hazeltine. Held at the Engineers' Club, New York, on October 29, 1937.

Hazeltine Given Medal By Radio Club of America

Awarded Armstrong Medal for Contributions to Radio Communication

Dinner Last Friday

He Is Cited for Design of Neutrodyne Circuit

Louis Alan Hazeltine, Professor of Physical Mathematics at Stevens and eminent mathematician and radio engineer, was awarded the Armstrong Medal for "his outstanding contributions to the art and science of radio communication" at a dinner at the Engineers' Club in New York City last Friday evening. The award was made by the Radio Club of America, of which Professor Hazeltine is a member. He is the first to receive the award.

Miller Reads Citation

John H. Miller, the President of the Radio Club of America, presented the Medal to Professor Hazeltine and read the following citation:

"The award of the Armstrong medal for 1937 by the Radio Club of America to Professor Louis Alan Hazeltine is in recognition of his outstanding contributions to the art and science of radio communication.

Extensive Contributions

"To the public his name will always be associated with the neutralized radio frequency amplifying systems which he developed to a complete solution from the mathematical point of view and which resulted in the first commercial high gain radio frequency amplifier with stable characteristics.

"To radio engineers his contributions are of a much wider scope embracing among others, the first and most useful of vacuum tube parameters — mutual conductance. The theory behind this contribution led largely to taking the vacuum tube amplifier out of the realm of experimentation and into the field of calculable engineering.

"Professor Hazeltine's contributions to the art have been made with the constant thought of their usefulness to his brothers in the science and the profession and most clearly typify the spirit of the Armstrong award, that of individual research and delving unafraid into the then unknown, to the end that a further advance in the science might be made possible for future engineers to build upon."

Among those attending dinner Friday evening were several Stevens men: Lawrence C. Horle, '14, formerly an Instructor in the Physics Department and a close friend of Professor Hazeltine; Lincoln G. Walsh, '26, and William F. Bailey, '33, formerly an Instructor in the Electrical Engineering Department.

Professor Hazeltine is a graduate of Stevens of the class of '06. He did not become engaged in radio work, however, until 1915. Since that year he has devoted himself quite completely to this branch of study, with particular stress on the mathematical point of view. As a result he has made some of the fundamental developments in the science of radio. His most outstanding development was of the neutrodyne principle, which is the neutralization of capacity coupling in vacuum tubes, preventing oscillation. Professor Hazeltine is now President of the Institute of Radio Engineers.

The Stute, Stevens Institute
November 3 1937.

Professor Hazeltine

THE Radio Club of America, a group of the country's outstanding radio engineers, has awarded to Professor Hazeltine its first Armstrong Medal. Though candidates for the award are restricted to Club members, this actually lessens the prestige of the award very little or not at all, for every one who is any one in radio is a member of the Club. The awarding of the Medal to Professor Hazeltine, then, places him in the radio research field second only to Mr. E. H. Armstrong, in whose honor the Medal was founded, and who is, in Professor Hazeltine's own words, the "patron saint" of the Club.

To speak thus definitely of Professor Hazeltine's eminence is only to put into words what radio men have known and Stevens men have surmised for some time. It has not before been an "accepted fact" for the records because Professor Hazeltine is to a rare degree disinclined to advertise himself; zealous champions of our name and fame have not yet called him "Steven's own" because it is unnatural for any Stevens man to think of him as anything but "Hazy," and "Hazy" is a teacher and friend before he is an eminent radio engineer. As Professor Stockwell said when the award was mentioned to him, "I hadn't heard about it, but I'm not surprised."

The incident which led Professor Hazeltine into radio work was interesting. On an evening in 1915 E. H. Armstrong was to present a paper on his recent research in radio. Professor Hazeltine was then a member of the Stevens faculty, and Lawrence Horle, a graduate of '14, was an instructor in the Physics Department. Mr. Horle mentioned the forthcoming Armstrong paper to his colleagues, and they agreed to go together to hear it. Armstrong told of his development of the regeneration principle, a paper which is recognized now as one of the most far-reaching and fundamental in the history of the science. It aroused Professor Hazeltine's enthusiasm and started him on his career.

1940—31st. Anniversary Banquet held at the Engineers Club N. Y. C. November 1st. Guest Speakers Major General J. O. Mäuborgne, Brigadier General Dawson Olmstead. Armstrong Medal to Greenleaf Whittier Pickard.

1941—32nd. Anniversary Banquet held at the Engineers Club N. Y. C. October 31st. Guest Speaker Rear-Admiral S. C. Hooper. Armstrong Medal to Harry W. Houck.

1942—33rd. Anniversary Banquet held at the Engineers Club N. Y. C. November 20th.

1943—34th. Anniversary Banquet held at the Engineers Club N. Y. C. December 10th. Master of Ceremonies George E. Burghard.

1944—35th. Anniversary Banquet held at the Engineers Club N. Y. C. December 1st. Guest Speaker Captain F. R. Furth U. S. N.

1945—37th. Anniversary Banquet held at the Engineers Club N. Y. C. December 7th. Guest of Honor Captain Pierre H. Boucheron U. S. N. Armstrong Medal to C. R. Runyon Jr.

1947—38th. Anniversary Banquet held at the Advertising Club N. Y. C. December 5th. Guest Speaker Major General William J. Donovan. Armstrong Medal to John V. L. Hogan and Stuart Ballantine.

1948—39th. Anniversary Banquet held at the Advertising Club N. Y. C. December 9th. Special Program Honoring Station 1BCG. Armstrong, Amy, Burghard, Cronkhite, Godley, Grinan, and Inman.

1949—40th. Anniversary Banquet held at the Advertising Club N. Y. C. December 2nd. Guest of Honor Major General Harry C. Ingles.

1950—41st. Anniversary Banquet held at the Advertising Club N. Y. C. December 1st. Guest of Honor Rear Admiral J. R. Redmond U. S. N.

1951—42nd Anniversary Banquet held at the Advertising Club N. Y. C. December 4th. Guest of Honor Dr. Millard C. Faught, A.B., Ph.D.

1952—43rd. Anniversary Banquet held at the Advertising Club N. Y. C. December 12th. Guest Speaker Captain L. V. Berkner, U. S. N. R. Armstrong Medal to Captain Henry J. Round.

1953—44th. Anniversary Banquet held at the Columbia University Club N. Y. C. December 11th. Armstrong Medal to Raymond A. Heising.

1954—45th. Anniversary Banquet held at the Columbia University Club N. Y. C. December 10th. Guest Speaker General George L. Van Deusen.

1955—46th. Anniversary Banquet held at the Columbia University Club N. Y. C. December 9th. Guest Speaker Dr. John R. Dunning.

1956—47th. Anniversary Banquet held at the Columbia University Club N. Y. C. December 15th. Guest Speaker Dr. Kenneth L. Franklin. Armstrong Medal to Melville Eastham.

1957—48th. Anniversary Banquet held at the Columbia University Club. December 6th. Guest Speaker Robert B. Stecker.

1958—49th. Anniversary Banquet held at the Columbia University Club N. Y. C. December 5th. Guest Speaker William R. Hutchins.

Note: No Banquet was held in 1946.

Twenty-ninth Anniversary Banquet at which the second Armstrong Medal was awarded to Harold H. Beverage, on November 4, 1938 at the Engineers Club. Egbert Von Lepel was the guest of Honor.

In 1938 the second Armstrong Medal was awarded to Dr. Harold H. Beverage, for his outstanding work on Wave Antennae. The presentation was made at the 29th. Anniversary Banquet held at the Engineers Club on November 4th.

Harold H. Beverage

CITATION

In recognition of his pioneer work on wave antennae and his continued work in this and other phases of the radio art, the award of the Armstrong Medal by The Radio Club of America is made to Harold Henry Beverage.

Almost from boyhood he has been actively interested in all phases of radio, his first amateur station having been built in 1910. As a radio engineer and under the tutelage of Alexanderson, he rapidly made a name for himself in the development of radio transmission.

To both the amateur and professional worker his name has been immortalized in the Beverage antenna, the precursor of wave antennae of all types. His later work in the development of spaced diversity antenna systems is of outstanding importance in present day radio communication. His knowledge of the phenomena involved in the operation of antennae of all types is profound.

The successful use of long distance short wave signals through all types of interference is basically due to his work in the optimum utilization of space power.

Since Armstrong's disclosure of his new system of Frequency Modulation in 1935 before the Institute of Radio Engineers and the Radio Club of America great interest was aroused in the Radio world and the public hailed the invention as a means of eliminating static in broadcast reception. He read a paper titled "Frequency Modulation in Radio Broadcasting" on March 23rd. 1939 before the Radio Club during which he gave some very revealing demonstrations. He showed that the power at the transmitting station could be reduced to an absolute minimum without affecting the quality of the received program or increasing the extraneous noises or static. A very comprehensive article appeared in the New York Times the next morning, commenting on the paper and the importance of the various tests made with the 20 kilowatt station erected by Major Armstrong at Alpine New Jersey and the 600 watt station of C. R. Runyon located at Yonkers New York.

January 23rd. 1939 saw the thirtieth anniversary of the sending of the first radio distress call at sea. It was sent by one of our distinguished members Jack Binns who was the wireless operator on the illfated liner Republic. He sent the now famous signal "CQD" which was the distress call of that time, and brought immediate aid thus avoiding a great disaster and making himself the hero of the hour.

Greenleaf Whittier Pickard was the recipient of the Armstrong Medal award in 1940 at the annual Banquet on November 1st. The event was very ably reported in the October Proceedings under the heading "Club News," and we quote:

"The Annual Banquet of the Club took place on November 1st at the Engineers Club in New York. The usual spirit of gaiety and reminiscence prevailed, and there were numerous amusing anecdotes and personal references.

Following the dinner, President Henney presented the Armstrong Medal to Greenleaf

NEW RADIO MARVEL REVEALED IN TEST

Transmitter Power Cut From 20,000 to 5 Watts Without Affecting Reception

STATIC AT A MINIMUM

System Developed by Major E. H. Armstrong Explained to Radio Club

Some of the hitherto unrevealed wonders of the new "frequency modulation" radio broadcast system developed by Major Edwin H. Armstrong Columbia University electrical engineering professor, were demonstrated last night at the university at a meeting of the Radio Club of America.

Assisted by three engineers of the General Electric Company, Major Armstrong was able to show in a series of tests that the transmitting power of his 20,000-watt station at Alpine, N. J., twelve miles up the Hudson, and a similar 600-watt station in Yonkers, could be reduced almost to the vanishing point without appreciably affecting the quality of the program. At the same time this huge reduction in power, about 4,000 times in one case and 600 in the other, respectively, did not seem to cause an increase in static noises.

In other words he purported to show, and seemed to succeed in showing, that with his unique system high-power stations are not necessary for perfect, noise-free reception.

Directing the tests by telephoning to his operators at Alpine and Yonkers, Major Armstrong first showed the several hundred assembled engineers of the club what music and sound effects "sound like" with his system blotting out the noise generally considered inherent with all types of reception. Each sound was crystal clear and life-like, and murmers of approval were heard from the audience.

Music Is Not Affected

He then asked Yonkers to reduce power from 600 to one watt. Music sent over the wave thus created by scarcely as much as is required to light the bulb of a pocket flash lamp, seemed to suffer not a bit by the reduction. Next he instructed Alpine to reduce its 20,000 watts to a minimum, which he said would be five or six watts of power. The result was about the same as with Yonkers.

Major Armstrong then explained to the assemblage that "I believe this demonstration speaks for itself; certainly it tells us the system actually does step outside the realm of static. We have reduced our sending power almost to the irreducible minimum and still have transmitted music of the same quality without appreciably adding noise."

The Alpine station, erected by Major Armstrong to prove his theories that "frequency modulation will work," utilizes a wavelength of about six meters. The Yonkers station, owned and operated by C. R. Runyon, an amateur, utilizes a wave of three meters.

Next, programs were routed over both channels; Yonkers to Alpine to the Pupin Laboratory at Columbia, where the music was reproduced by a battery of loudspeakers. Results were quite as favorable as when only one channel was employed.

To Appease the Skeptical

A number of sound effects also were tried, to appease those among the gathering who still were skeptical. Extremely faithful reproduction of the original sounds were apparent in all cases. The faintest tinkle of water poured into a glass at the sending station could be heard.

The technical side of "frequency modulation," and the results of tests carried out in the past few months with similar stations at Schenectady and Albany were discussed by I. R. Weir, C. W. Fyler and J. A. Worcester, engineers of the General Electric Company. The gist of all the field results, it was said, has been highly in favor of the Armstrong system, compared with other methods.

The two up-State stations were arranged to operate on both the Armstrong method and the usual type of broadcasting, known as "amplitude modulation," to compare each system. Identical powers were used in each case, and the same wave length was employed. Then, with a receiver arranged to intercept either type of broadcasting, the engineers motored along the fifteen-mile Schenectady-Albany road looking for trouble.

When the transmitters were on "amplitude" broadcasting plenty of trouble was found, Mr. Fyler said. The trouble area began a mile out of Schenectady and ended only a mile or so from Albany, he asserted. The waves interacted and caused noise and whistles.

"With the Armstrong frequency method, however, it was a different story," related Mr. Fyler. "Only in an area a mile wide, midway between the two cities, did we encounter trouble, and even in that area we made the new method work perfectly. All we had to do was move the set's antenna rod a half-inch one way or the other and Schenectady came in and Albany was excluded, or vice versa."

New York Times, March 24, 1939.

Thirtieth Anniversary Banquet, held at the Engineers Club on November 20, 1939. The Guest Speaker was Lenox R. Lohr.

PROGRESS SINCE THE REPUBLIC'S CQD

Anniversary of Disaster Finds Wireless World Revolutionized

THE steamship Republic is thirty years out from the port of Time.

The once proud Queen of the Sea has long since settled in her watery grave; the frantic CQD that flashed from her masthead is lost in the emptiness of space. Marconi, who gave the big ship a tongue with which to summon help, is gone. Endless waves of music now roll out across the waters where the Republic plunged from sight. The Lusitania, the Baltic, Olympic, Titanic, Leviathan, Mauretania and Berengaria have passed from the Atlantic lanes, but not without leaving in their wakes tales of the sea in which wireless added a touch of romance, safety and heroism.

From 1909 to 1939, the Marconi spark has been revolutionized. The wireless of that day, now known as radio, has become a world-wide medium of communication; it has become a social force undreamed of on this January day three decades ago. Up to that time the importance of Marconi's contraptions was not generally realized, but the marine searchlights that played across the murky waters off Nantucket to spot the badly crippled Republic were also spotlights on wireless.

Binns Called for Help

It will be thirty years ago tomorrow that the luxurious liner Republic, bound on a vacation cruise to the warm waters of the Mediterranean, curved out of New York harbor. Caught in a heavy fog off Nantucket, 175 miles east of Ambrose Lightship, at 5:30 o'clock in the morning with her 461 passengers asleep, the big ship was rammed by the steamer Florida.

Quickly Jack Binns tapped from his key the historic CQD, the distress call of that era, and a cordon of ships rushed to the scene, 250 miles from New York. The Baltic was one of the first to arrive for heroic work, and when she came into New York with the rescued on board, Binns was the hero of the hour. Only four lives had been lost. To wireless went the laurels for the invisible life lines it had uncoiled through the fog and darkness. The Republic sank; the Florida with its badly mangled bow slowly limped to port.

The Trio Never Met

The papers of that day which tell the story are now crumbling, yellow and brittle with age. The ever-modest Jack Binns is an official of a radio company in New York, and is frequently seen in Times Square. Always keeping abreast of progress in radio, 1939 finds him deeply interested in television. Commenting on the many magic developments since he called for help from the Republic's lurching and smashed deck, Binns said the other day, "We now have another 'lollapolooza' on our hands—television!" He foresees new wonders, but first, before this branch of radio comes into its own, the program and showmanship problems must be solved.

Captain William I. Sealby of the Republic lives at Vineland, N. J., but generally spends some time abroad each year.

Captain Angelo Ruspini of the Florida, whose masterly seamanship was credited with saving hundreds of lives, by keeping the bow of his ship in the Republic's wound to avert the inrush of water, lives at Great Neck, N. Y. He is now a commuter subject to the whims of the elements that tease the Long Island Railroad. Binns has never met Captain Ruspini, but he remarked the other day, "He did a great piece of work; he was one of the youngest skippers at that time."

How Wireless Has Changed

Wireless has changed some since that CQD. "You bet it has!" chuckled Binns. In 1909, after the wreck, there was no doubt that wireless was something ocean liners should never sail without. But few, if any, expected its waves would wash music across the rooftops and into homes; that a President would be heard in "fireside chats" and reading his message to Congress; that all the world would eavesdrop on a British King abdicating the throne!

No one dreamed that this thing called wireless could be used so effectively by an actor such as Orson Welles to scare the populace through a "Martian invasion." True, Enrico Caruso, according to a dispatch on the day that the Republic shoved off on her last voyage, had signed a contract to sing for $10,000 a week on a tour of English provincial towns, but there is no record that any prophets around the Metropolitan Opera House expected 30 years later a tenor would be paid $4,000 weekly for three or four short songs on a half-hour radio program!

Radio at sea is no longer a dot-and-dash affair secluded in a shack on the upper deck or in a cramped cabin. It has found its voice; it talks from artistically decorated walnut or oak paneled rooms. Transatlantic passengers pick up a telephone in their staterooms. They chat with friends ashore, in cities on the other side of the globe. From mid-ocean one may be talking with Johannesburg in South Africa, another with Shanghai, yet without the slightest interference. And their conversations are unintelligible to curious eavesdroppers, because by a snap of a tiny toggle switch the speech is "scrambled" at the transmitter, to be unscrambled again when the jumbled words strike the telephone station ashore, new magic since the Republic's day.

Jack Binns at the key of a reconstructed transmitter similar to the one with which he sent the first radio distress call (CQD) in history, from the sinking S.S. Republic in 1909.

New York Times, January 22, 1919

President Keith Henney (left) presenting the Armstrong Medal to Greenleaf Whittier Pickard. Dr. Pickard's record in radio research, from the earliest days to the present, justifies the title "Radio's Most Active Pioneer."

Whittier Pickard of Seabrook Beach, New Hampshire. Mr. Henney, and also other speakers later, referred to Pickard's long professional career starting with work on the Perikon detector, signal generators, field-strength measurements, and other subjects; also mentioned was his distinguished family connection as great nephew of the poet, John Greenleaf Whittier. In his acceptance remarks Pickard included a tribute to the Armstrong name, adding humorously that the Armstrong coin has heads on both sides, so that you can't lose.

President Henney then introduced Major Armstrong, who acted as toastmaster. The Major said a few words including the mention of a publication on the use of the wave meter, which was written in the early days—he had found this very interesting at the time. He then introduced the author, our speaker of the evening, now Major General J. O. Mauborgne, Chief Signal Officer of the Army.

In his address, General Mauborgne described conditions in the Signal Corps at our entry into the last war, and compared them with the much better situation prevailing at the present time. At that period, we had practically no apparatus, practically no designs, and practically no knowledge of desired types of equipment; about all we could do was to rush into production of Chinese copies of French and British apparatus. In all these respects of equipment, manufacture, design, and plans, our situation at the present time is far better.

General Mauborgne pointed out particularly that the Signal Corps is ready to consider operable apparatus which is in shape for further development to adapt it to the needs of the service. In distinction to this classification, persons with ideas requiring research, should contact a research group, the National Defense Research Committee, which has been formed under the leadership of Vannever Bush. An additional group under the head of C. F. Kettering, the National Inventors Council, has been formed to consider inventions submitted from any source. These research and invention groups are ready to consider all ideas submitted, and in addition will endeavor to have research projects undertaken, and inventions made, in compliance with specific requests from the military services.

Thirty-second Anniversary Banquet at which Harry W. Houck received the Armstrong Medal. Held at the Engineers Club on October 31, 1941. The Guest Speaker was Rear Admiral S. C. Hooper.

In connection with developments made in the Signal Corps, General Mauborgne mentioned the necessity of terminating the work at possibly 80 or 85 percent of the desired extent, in order to get manufacture of apparatus started. Even under these circumstances, development work generally takes a year, and the inauguration of manufacture an additional nine months, so that it is almost two years before equipment is received in volume. The situation is more difficult on account of the fact that during quiescent times, little money is available for development work, and during critical periods, there is insufficient time. Sufficient money is available now for considerable development and purchase of signal apparatus, the total appropriation amounting to almost $200,000,000.

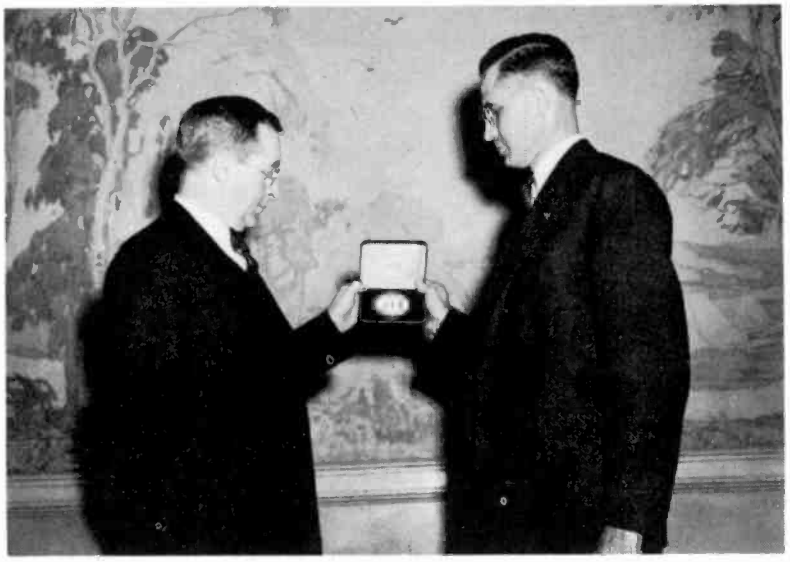
In discussing facsimile, General Mauborgne reported that encouraging results are being obtained. With regard to television, he stated that the requirements are severe, it being desired to see an object the size of an automobile on a dull day by means of a television camera in an airplane at a height of 12,000 feet or more."

Major General J. O. Mauborgne, Chief Signal Officer of U. S. Army, Major E. H. Armstrong, and Brigadier General Dawson Olmstead, Head of the Fort Monmouth Signal Corps Laboratories, at the annual banquet.

Now World war II was well under way in Europe and it was obvious that we ourselves would soon be involved. Accordingly the Board of Directors at its September 16th. 1940 meeting unanimously adopted a provision that the dues of all members who join any branch of the defense services will be waived throughout their term of duty provided they notify the Treasurer of their service connection.

On October 31st 1941 one of our oldest and most prominent members Harry W. Houck received the Armstrong Medal at the 32nd. Anniversary Banquet for his achievements in radio.

More than 130 members and guests attended the banquet and presentation. Major Edwin H. Armstrong, in whose honor the medal was established, gave a brief address following the award. He referred to the wartime days in his laboratory in Paris where Houck assisted him in the development of the first superheterodyne receiver. This was embodied in a large box, very different from the typical small superheterodyne of today. In reminiscing the Major reminded the audience of the difficulties which had to be overcome in making developments in those days. Speaking personally of Harry Houck, he related the true story, already known to various Club members, of how, also in France during the last War, Harry suffered a heavy attack of spinal meningitis, and was being carried out for dead, when he came to sufficiently to say "Where are you taking me?". That question resulted in his being taken back to bed instead of somewhere else, and soon an auspicious recovery began. The guest speaker was



Harry W. Houck (Left) Receiving the Armstrong Medal from President John Callahan

RADIO CLUB MEDAL GOES TO H. W. HOUCK, PIONEER INVENTOR

IS HONORED AT BANQUET

Assisted in Birth of Superheterodyne and Designed Second Harmonic Superhet.

Harry William Houck, consulting engineer, was awarded the annual medal of the Radio Club of America at the organization's thirty-second anniversary celebration banquet held recently at the Engineers Club, New York. Toastmaster at the affair was George C. Conner, with Rear-Admiral S. C. Hooper as the guest speaker. J. L. Callahan, president of the Radio Club, delivered the opening remarks.

Mr. Houck was awarded the medal "for his outstanding contributions to the radio art." Mr. Houck assisted in the development of the superheterodyne and designed the second harmonic superhet, the first type to be placed in large-scale commercial production. His researches on capacitors—paper, mica and electrolytic—made possible the filter systems used in all modern radio receivers.

Radio and Television Weekly,
November 12, 1941.

RADIO AWARD BESTOWED

Armstrong Medal Is Presented to H. W. Houck, Industry Pioneer

The fourth award of the Armstrong Medal for "outstanding contributions to the radio art" was made last night to Harry William Houck, New York engineer and radio pioneer, at the thirty-second annual dinner of the Radio Club of America. The dinner was attended by 150 radio men, many of world-wide reputation, at the Engineers Club, 32 West Fortieth Street. The guest speaker was Rear Admiral S. C. Hooper, director of the radio liaison division, Office of the Chief of Naval Operations, Washington.

In presenting the award J. L. Callahan, the club's president, read the attached citation as follows:

"After assisting at the birth of the superheterodyne in Armstrong's (Major Edwin H. Armstrong of Columbia University, inventor of the superheterodyne receiver and father of the current FM system) wartime laboratory in Paris he designed the second-harmonic superheterodyne, first type to be placed in large commercial production. Radio receivers operating from alternating current power lines leaned heavily on the technique, designs and inventions of the medalist."

New York Times,
November 1, 1941.

CITATION ON THE OCCASION OF THE AWARD OF THE ARMSTRONG MEDAL TO HARRY WILLIAM HOUCK

October 31, 1941

The Armstrong Medal of the Radio Club of America is awarded to Harry William Houck for his outstanding contributions to the radio art.

After assisting at the birth of the Superhetrodyne in Armstrong's wartime laboratory in Paris, he designed the second harmonic superhetrodyne, the first type to be placed in large commercial production.

Radio receivers operating from alternating current power lines, from their very inception, leaned heavily on the technique, the designs and the inventions of the medalist. His researches on capacitors—paper, mica and electrolytic—made practicable the filter systems used in all modern radio receivers.

His studious, detailed, careful experimental attack on any radio problem, with results always worthwhile, should be an inspiration to younger men.

Old-Timers and Speakers at the Banquet. Left to right seated are: Larry C. F. Horle, Director; Rear Admiral S. C. Hooper, Guest Speaker; Harry W. Houck, Armstrong Medalist and Director; and Paul Ware, Vice-President. Standing left to right are: William A. MacDonald, Director; George H. Clark, representing the Veteran Wireless Operators Association; George C. Connor, Tostmaster; John L. Callahan, President: and Edwin H. Armstrong, Director.

Rear-Admiral S. C. Hooper, Director of the Radio Liaison Division, Office of Chief of Naval Operations, Washington, D. C. In his address he pointed out the vast differences in the supply of radio apparatus at the present time in comparison with the wartime days of 1917–18. At that time there were only 12 companies engaged in the manufacture of radio apparatus, prominent among whom were Wireless Improvement, Lowenstein, Simon, and Federal Telegraph. It was then necessary for the Navy to lend considerable financial assistance to its radio suppliers in order to initiate rapid manufacture on a substantial scale. In the matter of apparatus, the changes are even more striking. At that time all transmitters for ships were of the spark type, and all were for single-frequency operation. He mentioned, however, the intense interest in the improvement of the art in those days, and the rapid evolution of inventions, these aspects comparing favorably with present times.

The Black Gang, which had come into notoriety at Club banquets of recent years, was especially noticeable this time, its magnitude having increased to the size of four tables. Here Larry Horle, Ernie Amy, Carl Goudy, Frank King, Dave Brown, and others held forth. They initiated George Burghard as a new member of the Gang. Another member present was Fred Muller, now a Lieutenant-Commander ("2 1/2") in the Navy. However, there was one defection in the ranks of the Black Gang; Paul Ware went high-hat, and sat at the speakers table deserting his fellows.

On December 7th. 1941 the nation was once again plunged into a World conflict. This time as in World War I the entire membership of the Radio Club either joined the armed forces or acted in prominent positions in the war effort. The Club, however, did not suspend operations but maintained its schedule of meetings, papers, proceedings and banquets, under a somewhat curtailed program. At least seven proceedings were published during the duration of the war from 1941 to 1945. To include here the many and varied activities of the members in the war years would be impossible. It suffices to say that many of them reached high rank in the army, navy and airforce and won acclaim and decorations for their services both in the armed forces and in the industrial war effort. Several also patriotically offered the free use of all their patents to the U. S. Government to help win the war.

To Carman Randolph Runyon, Jr. has gone the Radio Club of America's Armstrong Medal. Here, Runyon (right) receives the award from Fred. A. Klingenschmitt (Amy, Aceves and King)

After the war was over and things began to get back to normal, the Board of Directors awarded the Armstrong Medal to Carman R. Runyon Jr. for his contributions to the perfection of the Frequency Modulation system. The award was made at the 36th. Anniversary Banquet held at the Engineers Club on December 7th. 1945.

CITATION

on the occasion of the award of the

ARMSTRONG MEDAL

to

CARMAN RANDOLPH RUNYON, JR.

on December 7th, 1945

* * * *

The ARMSTRONG MEDAL of the Radio Club of America is awarded to Carman Randolph Runyon, Jr., for outstanding contributions to the art.

One of radio's pioneer amateurs, entering that art nearly forty years ago, he contributed to it the multi-spark synchronous gap transmitter, the crystal-controlled frequency-modulated telegraph system, and the single signal radio telegraph receiver.

Starting in 1935 at amateur station W2AG, he built the 100 megacycle frequency modulated broadcast transmitter from which he conducted hundreds of demonstrations whose flawless perfection initiated the renaissance in broadcasting which has now reached the ends of the earth.

The patient, persevering effort required to develop the power for transmission over useful broadcast ranges, the untiring search for the troubles inherent in a new system operated under the most difficult technical conditions, and the imaginative approach to the demonstrations now a part of classic radio history, is an inspiring example of what one man, devoted to his art and skilled in the handling of its apparatus, can contribute to the welfare of all.

As mentioned earlier, the Radio Club was now a full fledged scientific body and its meetings and papers assumed a mature engineering aspect as well. The meetings and social functions attracted not only the public but also the scientific and popular press, as is evidenced by a few selected clippings shown here.

Electronic Application To the Piano Subject Of Radio Club Lecture

On December 14, at 8:30 p. m., there will be presented before a joint meeting of the Radio Club of America and the Music Department of Teachers College, at Millbank Memorial Chapel, Columbia University, New York, a lecture-recital on the Miessner Electronic piano.

The lecture, the title of which is "The Application of Electronics to the Piano," is the first of a technical nature on this versatile new instrument, and will be given by its inventor, Benjamin F. Miessner, of Millburn, N. J. The operating principles, circuits, etc., will be disclosed by Mr. Miessner and illustrated by numerous lantern slides. The musical recital on the Electronic piano will be given by Anton Rovinsky, well known concert pianist, whose recitals on this instrument in concert work and in radio broadcast recitals have created such a wide-spread interest in this new instrument.

This new form of piano, in which electrical pick-up, amplifying and reproducing apparatus, takes the place of the usual soundboard, gives to the keyboard artist a degree of control claimed to be unsurpassed in any other instrument. He can produce, in addition to a dynmic range of fine piano tones, tones characteristic of many orchestral instruments, such as horns, wood winds, plucked and percussed strings.

Talking Machine and Radio Weekly

Thirty-seventh Anniversary Banquet. Engineers Club, December 7, 1945. C. R. Runyon Jr. received the Armstrong Medal and Capt. Pierre Boucheron was the Guest of Honor.

CLUB SEES TELEVISION

Dr. Goldsmith of DuMont Lectures to Engineers.

Some of the television developments that have been made during the last year were the basis of a lecture delivered in Pupin Hall, Columbia University, before the Radio Club of America last Thursday night by Dr. T. T. Goldsmith Jr., research director of the Allen B. DuMont Laboratories.

Dr. Goldsmith traced the history of television from 1839, when Becquerel discovered the photo chemical effect of light down to the light sensitive iconoscope camera of present day equipment. He then discussed the research carried out on various standards of transmission using cathode ray tubes embodying different types of fluorescent screen materials.

The meeting was opened with a novelty skit transmitted by radio in which John L. Callahan, vice-president of the club, addressed the members from the DuMont studios at 515 Madison avenue.

After the conclusion of Dr. Goldsmith's address, images were picked up and reproduced on 20-inch and 14-inch screens. It was explained that the transmitter was using only 50 watts output for the demonstration.

Herald Tribune,
October 26, 1940.

Lacking time to reach Columbia University in time to open a meeting of the Radio Club of America, Club vice-President John L. Callahan solved the problem by scooting over to Allen B. duMont's station W2XWV, at 515 Madison Ave., N. Y. C., and by special arrangements hastily made for the purpose, there televising to the club members assembled in Columbia's Pupin Hall. Sound was sent by land-line to loudspeakers in the hall because the sound channel of W2XWV is in the process of completion.

Radiocraft,
February 1941.

PAUL WARE HEADS RADIO CLUB OF AMERICA

Paul Ware veteran radio amateur and professional was recently elected president of the Radio Club of America. Mr. Ware headed one of the original neutrodyne manufacturing enterprises, Ware Radio Corporation, from 1923 to 1926. Later he served as engineer-consultant for the original Sonora, Thompson Neutrodyne, Splitdorf-Bethlehem and Emerson. In 1936 he joined the P. R. Mallory Co., collaborating in the development of the new Mallory-Ware inductive tuning system. Since 1939 he has been associated with Allen B. Du Mont Labs., Inc., of Passaic, N. J., in connection with various engineering and production problems.

SYNTHETIC BASS IN SETS

By T. K. KENNEDY Jr.

ELIMINATION of harmonics from the gadgets and circuits used to reproduce tone has long been an engineering ideal in broadcasting. Harmonics, to a radio man, means an unwanted something added to the original vibrations of voice or musical instrument called "distortion."

Organs, pianos, trumpets, viols —in fact, most musical instruments—are rich in the harmonics or overtones that add character to sound. For instance, harmonics make it possible to distinguish the tone of a piano from that of a harpsichord, or a trumpet from a trombone.

Radio, however, is different. It is the channel over which the original sound is carried, hence it must add nothing—or very little—of its own making. Such is the all-important engineering axiom that has grown up with broadcasting.

Distortion Is Used

Strangely, recent researches indicate that certain types of distortion are of great value in broadening the range of tonal perception by the human ear. A none-too-perfect acoustical instrument, the ear has distortion of its own. This has been studied by engineers. As a result, it has become known that when certain overtones strike the ear drum the brain interprets them in terms of the basic vibration from which they spring and we "hear" things that do not exist.

For instance, the overtones of low C on the piano suggest to the ear: "You are hearing low C." Hence, the brain creates the tonal illusion of low C.

This fact may have new and far-reaching importance in radio. Even now it has made possible the creation of small radios that trick the ear—make it believe a diminutive set is emitting low basic notes when it isn't capable of doing anything except recreate several overtones of the original vibration.

The Inventor Explains

Such a system has been developed by F. H. Shepard Jr., New Jersey consulting engineer, who demonstrated it recently at a meeting of the Radio Club of America held at Columbia University. On that occasion, to several hundred radio engineers and acousticians, it was apparent that "better" tonal reproduction resulted; preferable, in most cases, to the distortion generally found in small radios.

It was explained that while small radio receivers may distort music because cabinets and loud-speakers are too tiny to create low notes, this has nothing to do with distortion in an electrical circuit. The new system places the cart before the horse and creates "human ear-like effects" in the circuit, which seem to result in distortion-free reproduction.

The principle of employing harmonics to simulate low bass tones, however, is not new. It is used—and has been for many years—in organ building. A church may be too small to house an organ having a thirty-two-foot pipe necessary for the acoustic reproduction of low C. To overcome such a difficulty a master organ builder substitutes for the low-C pipe a much smaller one to emit the next higher harmonic, C above low C, and another pipe to emit the third harmonic. When the two are played together the ear thinks it hears low C and the organ builder's purpose is admirably fulfilled.

New York Times September 21, 1941.

Communications, February 1942.

Suitcase Electron Microscope

As part of a discussion of electron microscopy before the Radio Club of America meeting at Columbia University, New York City, on March 9, General Electric engineers demonstrated the "suitcase" model electron microscope illustrated. The unit is not a production model but is used for demonstration purposes only. It is ten times more powerful than the best light microscope and operates on 110-volt ac power.

The unit is a step nearer the day when a small, compact, and easily operated electron microscope will be available for widespread use by doctors and research men. The microscope proper weighs 78 pounds. A vacuum pump used with the instrument and also of average suitcase size comprises a second unit. It weighs 55 pounds. Weight of the microscope can be reduced still further when certain lightweight alloys can be used to replace steel and other heavy metals now used.

Left to right: Igor Bensen, General Electric Development engineer; F. A. Klingenschmitt, president of the Radio Club of America; and Dr. C. H. Bachman of General Electric's electronics laboratory.

RADIO and Television WEEKLY

December 16, 1942

L. A. DE ROSA SPEAKS BEFORE RADIO CLUB

Louis A. De Rosa, research engineer, presented a lengthy paper on "Synthetic High and Low Audio Frequencies for Hi-Fidelity Reproduction" before the December meeting of the Radio Club of America, last Thursday, at Havemeyer Hall, Columbia University,

Radio Club of America Stages Annual Banquet

The Radio Club of America is staging its 44th annual banquet on Friday evening, December 11, at the Columbia University Club, 4 West Forty-third street, in New York City.

R. A. Heising has been announced as the recipient of the Armstrong Medal Award, and Lloyd Espenschied, a pioneer in the radio-television field. is scheduled to speak on the early history of Mr. Heising's achievements.

Radio and T.V. Weekly, December 12, 1953.

'DISTRIBUTION' MEDIUM *Role Seen For Video*

TELEVISION may become "an even more important distribution medium than a communications medium" but its distribution features cannot be exploited until arrangements are made to collect at the receiving end," Millard C. Faught, public relations consultant, told the 42d anniversary dinner of the Radio Club of America last Tuesday in a speech lauding box office TV.

Dr. Faught, president of the Faught Co., New York—one of whose clients is Zenith Radio Corp., developer of Phonevision — said that "by solving the prosaic problem of 'how to collect the admission ticket' any such workable box office home-television service automatically makes the family living room into a potential movie house, legitimate theatre, sports stadium, class room or even church—complete with collection plate."

The question now is up to FCC, he pointed out, adding that "it may well be the most portentious decision in the history" of the Commission.

He also suggested a number of new uses for radio and TV—use of small FM stations as electronic house organs by industrial concerns, for instance, and use of small stations by "local clubs, Boy Scout troops, chambers of commerce, unions, churches, etc., for those types of community communications which make up the very life blood of a democratic society."

Is Guest Speaker

Dr. Faught was guest speaker at the birthday dinner of the club, an organization of leading engineers. O. J. Morelock, Weston Electrical Instrument Corp., is president. Harry Sadenwater, Radio Engineering Labs, was toastmaster for the dinner, held at the Advertising Club of New York and attended by approximately 200 persons.

Speaking on "Radio and Television . . . Why?", Dr. Faught said at least four subscription TV methods now are being developed and that one of these—Zenith's Phonovision — has completed its first commercial test. The others, he noted, are Skiatron's Subscriber-Vision, Paramount's Telemeter, and "the subscription system that RCA reports as taking form in its labs."

Though he felt that TV may become most important as a distribution medium, he said he also thought it "will achieve its true potentials" by serving in both the distribution and communications fields.

Many fields that depend on "moving the consumer to the product," Dr. Faught said, are experiencing trouble. He said:

"Our colleges and universities (distribution vehicles for ideas and education) are running critically in the red; motion picture theatres by the hundreds have closed in recent months, and many more subsist on such tenuous revenue as popcorn sales; the legitimate theatre has shrunk to islands of defense in three or four of the largest metropoli; cultural distribution facilities, like the Met, are awash with red ink; even the premium stadium sports, like baseball and football, are suffering from rusting of the turnstile; the book publishing business is languishing; and altogether too many church edifices are falling into disrepair, albeit man is in a notably resurgent mood for religious sustenance."

On the other hand, he said, TV "takes the customer to the product"—comfortably, in his own home. Despite the "tacit assumption" that broadcast programs should be free to the set-owner, he continued, television additionally "still has all of its unique potentialities for delivering programs of a sort people are demonstrably willing to pay for . . . these would be the same kinds of programs for which people now pay when they go out of the home to 'consume' them."

Via subscription TV he saw a "potential quadrupling of the motion picture market," plus service to great numbers of shut-ins who cannot go to the theatre anyway. And theatrical first nights, on box-office TV, might provide the producer with "revenue equivalent to that of a year's ordinary run," he continued, noting that subscription television similarly can be a financial boon in many other fields, including education.

Radio Club Of America Elects Officers For 1954

FRANK H. SHEPARD was elected president of the Radio Club of America for 1954. Frank A. Gunther was named vice-president; Joseph J. Stantley, treasurer; O. James Morelock, corresponding secretary and W. Gordon Russell, recording secretary.

Shepard has been a fellow and director of the club for many years. He is a consulting engineer and heads the Shepard Laboratories in Summit, N. J. He has made contributions to radio and hearing aids, industrial instrumentation and controls, feedback systems, ultra-high-speed typing, guided missiles and various restricted projects.

Directors of the club elected to serve for 1954 are: Ernest V. Amy, Edwin H. Armstrong, Ralph H. Batcher, Harry W. Houck, F. A. Klingenschmitt, Jerry Minter and Harry Sadenwater.

Electronics, March 1954.

ANNUAL RADIO CLUB PARTY FRIDAY NIGHT

The Radio Club of America will hold its thirty-second annual banquet at the Engineers Club, 32 W. Fortieth street, New York, Friday night. Guest speaker will be Rear Admiral S. C. Hooper, director of the Radio Liaison Division, Office of Chief of Naval Operations, Navy Department.

The banquet committee is comprised of H. W. Houck, chairman; E. V. Amy, Fred Klingenschmitt, George Burghard and Paul Ware.

Radio and T. V. Weekly, October 29, 1941.

JOHN H. BOSE, an engineer associated with Edwin H. Armstrong, has been elected president of the Radio Club of America for 1952.

Other officers elected to serve during the coming year include: Vice-President Ralph R. Batcher, engineer for the Radio-Television Manufacturers Association; Corresponding Secretary Frank H. Shepard, Jr., president of *Shepard Laboratories;* Recording Secretary Frank A. Gunther, vice-president of *Radio Engineering Laboratories, Inc.;* and Treasurer Joseph Stantley, president of *Continental Sales Company.*

The following men were elected to serve on the board of directors: Ernest V. Amy, Edwin H. Armstrong, George E. Burghard, Alan Hazeltine, Harry W. Houck, Jerry Minter, and Harry Sadenwater.

Radio and Television News, April, 1950.

The Armstrong Medal was awarded to Charles Stuart Ballantine in 1946 but unfortunately due to his untimely death the presentation had to be postponed until 1947 when the Medal was accepted posthumously by his close friend Larry Horle, at the 38th. Anniversary Banquet on December 5th. at the Advertising Club in New York City.

CITATION

on the occasion of the award of the

ARMSTRONG MEDAL

to

CHARLES STUART BALLANTINE

on December 5th, 1947

* * * *

The ARMSTRONG MEDAL of the Radio Club of America is awarded to Charles Stuart Ballantine, for outstanding contributions to the art.

In the period of 1908 to 1916 he pioneered in radio in the Philadelphia area just as the members of the newly born Radio Club similarly pioneered in the New York area.

Out of that early experience came his book, "Radio Telephony for Amateurs" which was, in effect, the first ham bible and from which the long line of similar publications has since descended.

During World War No. 1 and building on the discovery of others of the Club, he developed the loop compass and radio direction finder as the primary and major defensive tool against the otherwise utterly successful submarine warfare of the German Navy.

Shortly after his entrance into the field of broadcast receivers in 1923, he developed the principle of negative feed back as well as of automatic volume control.

Later came his epoch making work in developing on purely mathematical basis the theory of the vertical antenna and its low angle radiation: the soundness of which continues to be attested to by the radiating system of substantially every broadcasting station in the world today.

Later came his work in acoustics: ranging widely from new microphone calibration techniques: the invention of the throat microphone as standardized by the U. S. Army Air Corps, the development of especially high fidelity reproduction and so forth.

His many, many inventions and developments which together comprise far too long a catalog to be here detailed, mark accomplishments made primarily as an individual and all too often unsupported experimenter: who persisting always against odds that would, themselves and alone, have defeated someone of less stamina and enthusiasm won out to the ends that contributed so mightily to making radio communication and radio broadcasting the important instrumentality it is today.

A special delegation consisting of Major E. H. Armstrong, Professor Alan Hazeltine, Lawrence Horle, and Harry Houck visited Mrs. Ballantine at her home in Boonton, New Jersey on Saturday, June 26th. 1948 and presented her with the Armstrong Medal. Major Armstrong in making the posthumous presentation described Stuart Ballantine as "One of the world's most versatile engineers."

The 38th. Anniversary Banquet which was a real bang up affair with Major General William (Wild Bill) Donovan as guest Speaker, also saw the presentation of another Armstrong Medal to one of our Honorary members John V. L. Hogan for his outstanding contributions to the Art.

Charles Stuart Ballantine
Armstrong Medalist—1947

CITATION
on the occasion of the award of the
ARMSTRONG MEDAL
to
JOHN V. L. HOGAN
on December 5th, 1947

* * * *

The ARMSTRONG MEDAL of the Radio Club of America is awarded to John V. L. Hogan, for outstanding contributions to the art.

As a youthful laboratory assistant he painstakingly charted the characteristic curves of the first grid audion that was later to herald a new era in the world of communications.

Fired with the spark of inventive genius, he diligently pursued his studies and experimentation at Sheffield Scientific School, Yale University, where he discovered the ferro-silicon crystal detector. His quest for new ideas and new apparatus motivated his tireless and skillful work resulting in the development of the basic theories for his later invention of the heterodyne receiver.

In 1912, taking time from his research on ink recording of Trans-Atlantic Morse signals, he joined with others in the founding of the Institute of Radio Engineers, an organization that was to become world-wide in bonding together technical men of kindred interests.

A true pioneer, but keenly abreast of every advance of his art, he enthusiastically applied his skill to television and facsimile research inventing the continuous sheet electrolytic recorder. A few years later he established W2XR, the first high fidelity broadcasting station.

His vast experience and technical knowledge proved invaluable to our nation in war, and he gave unstintingly of time and effort to promote the development of electronic marvels that were to hasten peace to a war-weary world.

President Alan Hazeltine presenting Armstrong Medal to John V. L. Hogan at the Banquet held on December 5, 1947.

Lawrence C. F. Horle (right) accepting Armstrong Medal from President Alan Hazeltine on behalf of the late Charles Stuart Ballantine who was posthumously honored for his many inventions and developments in the radio industry. December 5, 1947.

Armstrong Medals Awarded by Radio Club

JOHN V. L. HOGAN, president of radio station WQXR and one of the founders of the Institute of Radio Engineers, was presented on Dec. 5, 1947 with the Armstrong Medal of the Radio Club of America, for his outstanding contributions to the arts of radio, television, and facsimile.

A similar medal was given posthumously to Charles S. Ballantine for his development of radio direction finders in World War I, negative feedback and automatic volume control circuits, mathematical theories of antenna radiation, new microphone calibration techniques, his invention of the throat microphone

John V. L. Hogan (right) receives Armstrong Medal from Alan Hazeltine, president of the Radio Club of America

February, 1948 — ELECTRONICS

Engineers Take Notice: John V. L. Hogan, introducing Prof. Louis Alan Hazeltine, said: "An engineer is a man who takes the word Science and puts two vertical lines through the first letter."

Prof. Hazeltine: Recalling radio activities during the last war, in an address to the members of the Radio Club of America, described radio amateurs as "those who tried anything, hoping that something wonderful would happen — and it frequently did." Referring to his own experiences and those of some of the other oldtimers, he said: "A pioneer is a man who gets shot by the Indians."

Radio-Electronic Engineering & Design, November 1942.

Once again in 1949 the fertile brain of our very good friend Larry Horle was responsible for an important event in the history of the Radio Club. It was Larry who conceived the idea of commemorating the sending of the First Short Wave Transatlantic message from station 1BCG in Greenwich Connecticut on December 11th. 1921 by the erection of a suitable memorial on the site of the original station, and the presentation of awards to the staff. Accordingly President Morelock appointed the 1BCG Memorial Committee to carry out the project in every detail. This Committee had full power to proceed and decided to make the memorial three fold. First; to erect a suitable monument as near to the original site as humanly possible. Second; to present the working staff and Paul Godley with specially struck medallions of the Armstrong Medal in bronze. And lastly to publish a special commemorative issue of the Club Proceedings telling the complete story of station 1BCG and its accomplishments. Contact was made at once with First Selectman Wilbur M. Peck at Greenwich. He was not only receptive but proved to be most enthusiastic about the project and quickly offered an excellent site for the monument on a small square at the intersection of North Street and Clapboard Ridge Road about two hundred feet from the original site of the station. The site was accepted at once and plans were made for the monument itself.

A two ton stone of pure Barre granite was selected and the order was given to Thomas H. Irwin of Old Greenwich to erect it on the chosen site and inscribe on its face the following legend:

> Near this spot on December 11, 1921, Radio Station 1BCG sent to Ardrossan, Scotland, the first message ever to span the Atlantic on short waves. 1BCG, an amateur station, was built and operated by members of The Radio Club of America.

The monument was completed in early October. All Greenwich officials were most cooperative and special thanks go to Park Commissioner, Joseph Dietrich who so carefully landscaped the site and supervised the erection of the stone. The medallions were produced under the watchful eye of Harry Houck and also carefully engraved by his own hand. 5000 copies of the "1BCG Commemorative Issue" of the proceedings were printed and ready for distribution at the dedication ceremonies. A copy of this commemorative issue will be sent as a supplement. The date for the dedication ceremonies was set for October 21st. 1950. It was a beautiful fall day with the leaves in full autumn color and a goodly crowd was on hand. All the medalists were there with the exception of Cronkhite, Grinan and Inman, who were in far away places and unable to make the trip. The whole dedication ceremonies were very well reported in a later issue of the Club Proceedings, Vol. 27, No. 3, 1950, and we quote:

"An epoch in the history of radio communications was fittingly commemorated on Saturday, October 21st at Greenwich, Connecticut when The Radio Club of America dedicated a granite memorial to 1BCG, the first radio station to transmit a message across the Atlantic on short waves.

Club members and others interested in the historic event gathered at the monument site on Clapboard Ridge Road and North Street in beautiful Greenwich, to participate in an excellent program that had been expertly planned by a special committee of the Club. It was truly a beautiful setting for the affair with the Autumn foliage at its brightest and warm sunshine taking the chill from the mid-morning air. The Greenwich High School Band, in its colorful uniforms, entertained with musical selections and there was much reminiscing by old friends who met again for the first time in years as they waited for the ceremonies to get underway.

Promptly on schedule at 11:00 AM, George E. Burghard, Chairman of the Memorial Committee introduced O. James Morelock, Club president. Mr. Morelock welcomed all present for the occasion and gave a brief history of The Radio Club and the story of 1BCG. He

The 1BCG Staff. Left to right: Major Edwin H. Armstrong, George E. Burghard, Paul Godley, and Ernest V. Amy, recipients of 1BCG Medallions and Radio Club Citations. Others honored but not present were Minton Cronkhite, John F. Grinan, and Walker P. Inman.

Radio Club President O. James Morelock presenting a 1BCG Medallion and Citation to George E. Burghard.

Paul Godley records for the Voice of America how he heard 1BCG in Scotland. (*Bottom left*).

The late Larry Horle, chairman of the Awards Committee and originator of the 1BCG Memorial.

described how construction of the station, located only a few hundred feet from the monument site, was started in late November 1921 and completed, less than one month later, just in time to participate in the tests that were climaxed by the historic message transmitted to Ardrossan, Scotland on December 11th. It was this accomplishment by a group of radio amateurs which opened the way for the many commercial communications facilities in service today.

To personally honor the original operators of 1BCG, special medallions and citations were presented on behalf of The Radio Club by President Morelock. Of the recipients, Major Edwin H. Armstrong, George E. Burghard, Ernest V. Amy and Paul F. Godley were present; Minton Cronkhite, John F. Grinan and Walker Inman were unable to attend. With the exception of Mr. Godley who operated the receiving equipment in Scotland, the others were responsible for the design, construction and successful operation of 1BCG.

Honorable Wilbur M. Peck, First Selectman of Greenwich accepted the monument on behalf of his community and assured the Club of its perpetual care. He told of the careful preparation of the monument site by the town and of the special selection of shrubbery to form a beautiful background for the granite memorial. Selectman Peck, spoke of the pride his community felt in having had 1BCG within its boundaries.

Dr. Orestes H. Caldwell delivered the dedication address which proved most interesting because he, as a native of Connecticut, has a wealth of information about Greenwich and its environs. Speaking first about 1BCG, Dr. Caldwell stressed the true significance of that first trans-Atlantic transmission and how a group of amateurs, with limited equipment and pressed for time, accomplished a feat which heretofore the commercial services had deemed impractical.

Greenwich, explained Dr. Caldwell, had also been the scene of other early technical experiments, one of the most outstanding being the first illumination by electricity of a private residence. He further informed his audience of many of the legends of the area, how Lafayette visited the town during the Revolution and of the escape by way of Greenwich of the notorious Boss Tweed. In summarizing Dr. Caldwell's fascinating address, it may be said that he eloquently told of how a neighborhood already rich in historical events was honored by still another recognition—the 1BCG Dedication.

He also commended the Radio Club on its membership and the important part taken in the development of the field of electronics by such men as Armstrong, Houck, Horle, Beverage, Hogan, Amy, Burghard, Godley, Grinan, Inman, Sadenwater, Van Dyke, Morelock and Cronkhite.

During the ceremonies countless pictures were taken by both amateur and professional photographers anxious to record the event for posterity. Tape recordings were made by Walter S. Lemmon, president of World Wide Broadcasting Co., for FM station WGCH and for the Voice of America. Past-president Jerry B. Minter, also made a recording which he presented at the Club's 40th Anniversary Banquet in New York on December 1st.

After the formalities were over many groups retired to the Pickwick Arms for refreshment and lunch. In this famous old hostelry, radio talk was heard on all sides far into the afternoon as stories were told and experiences swapped by those who have helped make radio what it is today. For the newer members and visitors outside the club, it was an enjoyable experience to just sit and listen, for the day will long be remembered as one that is worthy of a page in the world's history of communications."

The Citation accompanying the Armstrong Medallions is shown on the following page.

CITATION

on the occasion of the award of the

ARMSTRONG MEDALLION

to

ERNEST V. AMY

* * * *

The ARMSTRONG MEDALLION of the Radio Club of America is awarded to you ERNEST V. AMY, a member of the enterprising group of amateurs who, through the construction and operation of 1BCG, opened a new era in the field of radio communications.

The possibility of transmitting amateur signals to Europe had often been considered by the Club, but no action was taken until November 18, 1921, when you and your fellow amateurs decided to finally meet the challenge.

Within less than one memorable month the station was designed, equipment built, antennas erected and 1BCG put on the air to be heard across the Atlantic, in every state in the Union, and other far distant points.

Each member of the 1BCG staff was skilled in the technique of radio, as far as the art had advanced, but this skill alone was only in a small measure responsible for the success of the venture.

It was your boundless enthusiasm and amateur spirit of adventure which spurred you on to look beyond the horizon of things already accomplished into that vast field of the untried and unconquered.

Today as an impressive granite memorial is being dedicated at Greenwich, Connecticut, with the inscription: NEAR THIS SPOT, ON DECEMBER 11, 1921, RADIO STATION 1BCG, SENT TO ADROSSAN, SCOTLAND, THE FIRST MESSAGE EVER TO SPAN THE ATLANTIC ON SHORT WAVES. 1BCG, AN AMATEUR STATION, WAS BUILT AND OPERATED BY MEMBERS OF THE RADIO CLUB OF AMERICA, an historic event is fittingly recognized and you may look upon the memorial with the just pride of one to whom the occasion has been dedicated.

FOUNDED 1909

The Radio Club of America, Inc.

11 WEST 42ND STREET
NEW YORK 18

SPECIAL NOTICE

The 1BCG Monument dedication ceremonies, commemorating the first radio message ever to span the Atlantic on short waves, and the awards of the Armstrong medals are scheduled for eleven o'clock Saturday morning, October 21, 1950.

This is an outstanding event in the history of the Club. Don't miss it. Plan to be there and bring your friends. Dr. Orestes H. Caldwell will be the principal speaker.

Automobile: Take Hutchinson River Parkway to North Street turnoff. Site is one mile toward Greenwich, Conn.

Trains: Leave Grand Central at 8:25 A.M. and 9:25 A.M., arriving at Greenwich at 9:37 A.M. and 10:24 A.M. respectively. Taxis available for three mile drive out North Street to site at intersection with Clapboard Ridge Road.

No regular meeting is scheduled for October.

Very truly yours,

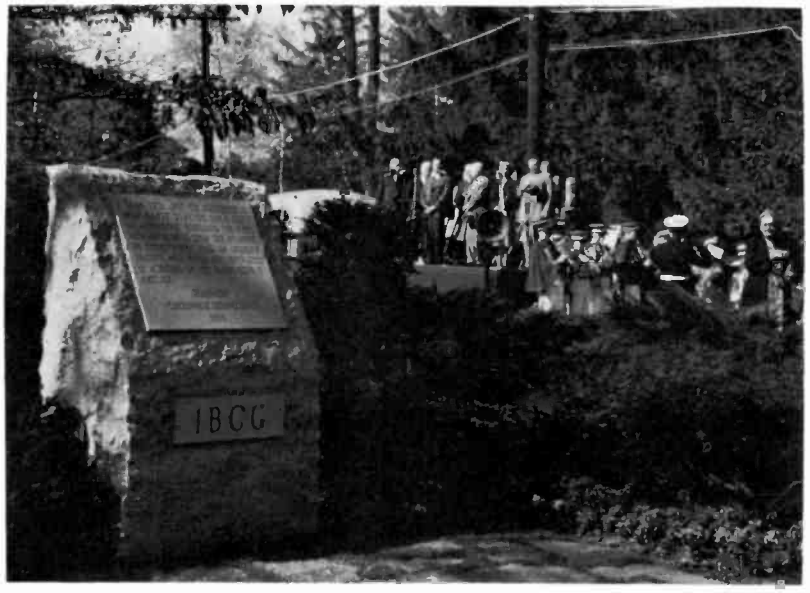
O. JAMES MORELOCK,
President

RALPH R. BATCHER,
Corresponding Secretary

"Hands Across the Sea" Paul Godley who received the message in Scotland shaking hands with George Burghard one of the operators who sent it from 1BCG in Greenwich. Left to right: Edwin H. Armstrong, George Burghard, Paul Godley, Ernest Amy with citation scrolls which they received with the Armstrong Medallions.

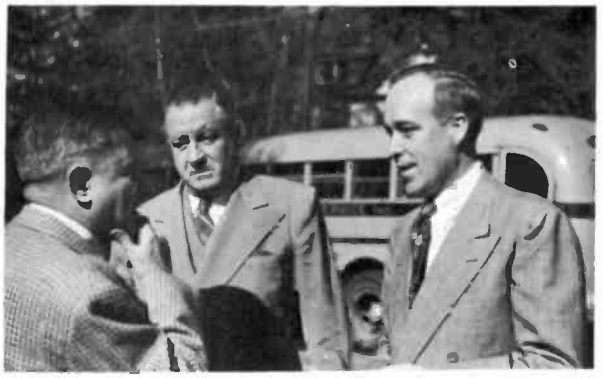
General view of speakers platform at 1BCG ceremonies Greenwich October 21 1950. President of the Radio Club James Morelock presenting Medallion and scroll to E. H. Armstrong.
On platform left to right standing: Harry Houck, Major Armstrong, James Morelock, Seated (with program in hand) Dr. Orestes H. Caldwell, Larry Horle, Mrs. G. E. Burghard, Mrs. Hawley T. Chester, Daughter of Minton Cronkhite who received Medal in his absence, Ernest Amy, George Burghard.

Ernest V. Amy receiving the Armstrong Medallion and scroll from President James Morelock. Seated on platform left to right: (front row) Major Armstrong and the Honorable Wilbur A. Peck, First Selectman of Greenwich.



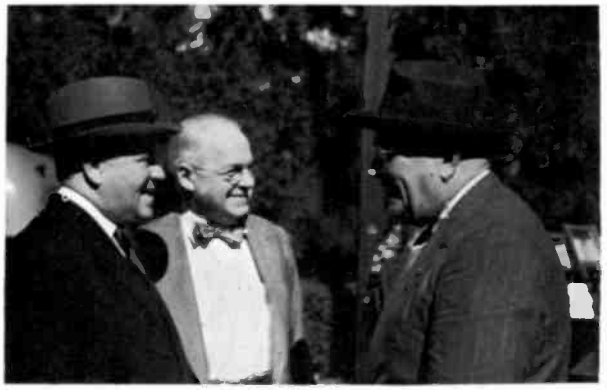
General view of monument after unveiling, at conclusion of ceremonies during the playing of the National Anthem by the Greenwich High School Band.

President Morelock making presentation of Armstrong Medallion to Paul F. Godley who received the message in Scotland. Larry Horle in right background.



Austin Lascaboura talking to George Burghard and one of the operators from the Voice of America, left to right.

Fred Muller (right) and friend talk things over before the ceremonies get under way.



Walter Lemmon (left), Dr. Caldwell and John Weare chatting while things get organized.


1BCG

ELECTRONICS — *December, 1950*

1BCG Memorial

DEDICATION ceremonies by the Radio Club of America for a monument commemorating the first short-wave radio message across the Atlantic were held in Greenwich, Conn. a few yards from the site of the shack that housed the original transmitter.

The historic message was transmitted from amateur station 1BCG on the night of Dec. 11, 1921 using power of less than a kilowatt on a wavelength of approximately 230 meters. It was received by Paul F. Godley, who had been sent to Scotland by the American Radio Relay League for the express purpose of listening for U. S. amateur signals. The success of this test was also a turning point in commercial utilization of short waves, heretofore neglected.

Replicas of the Radio Club of America Armstrong Medals were presented to the original participants at the ceremony. Present to accept the awards were E. H. Armstrong, E. V. Amy, G. E. Burghard and P. F. Godley. Receiving awards in absentia were Minton Cronkhite, J. F. Grinan and Walker Inman.

Monument commemorating first short-wave transatlantic radio message was recently dedicated at Greenwich, Conn., by Radio Club of America

AN EPOCH in radio communications history—Dec. 11, 1921—was commemorated at Greenwich, Conn., where the Radio Club of America Inc. dedicated a memorial to amateur station 1BCG, first to shortwave a message across the Atlantic. Special medallions and citations were presented to 1BCG pioneers by President O. James Morelock on behalf of the club. Four of the original seven operators attending ceremonies are (l to r): Maj. Edwin H. Armstrong, inventor of FM; George E. Burghard, chairman of Memorial Committee; Paul F. Godley, who operated receiving equipment in Ardrossan, Scotland, on the historic day, and Ernest V. Amy. Special occasion, held Oct. 21, was attended by number of engineers and inventors, as well as radio amateurs and experimenters.

BROADCASTING • Telecasting

November 6, 1950

Opposite page.

Dr. Caldwell (left) and Major Armstrong standing on Clapboard Ridge Road which was closed to traffic during the ceremonies.

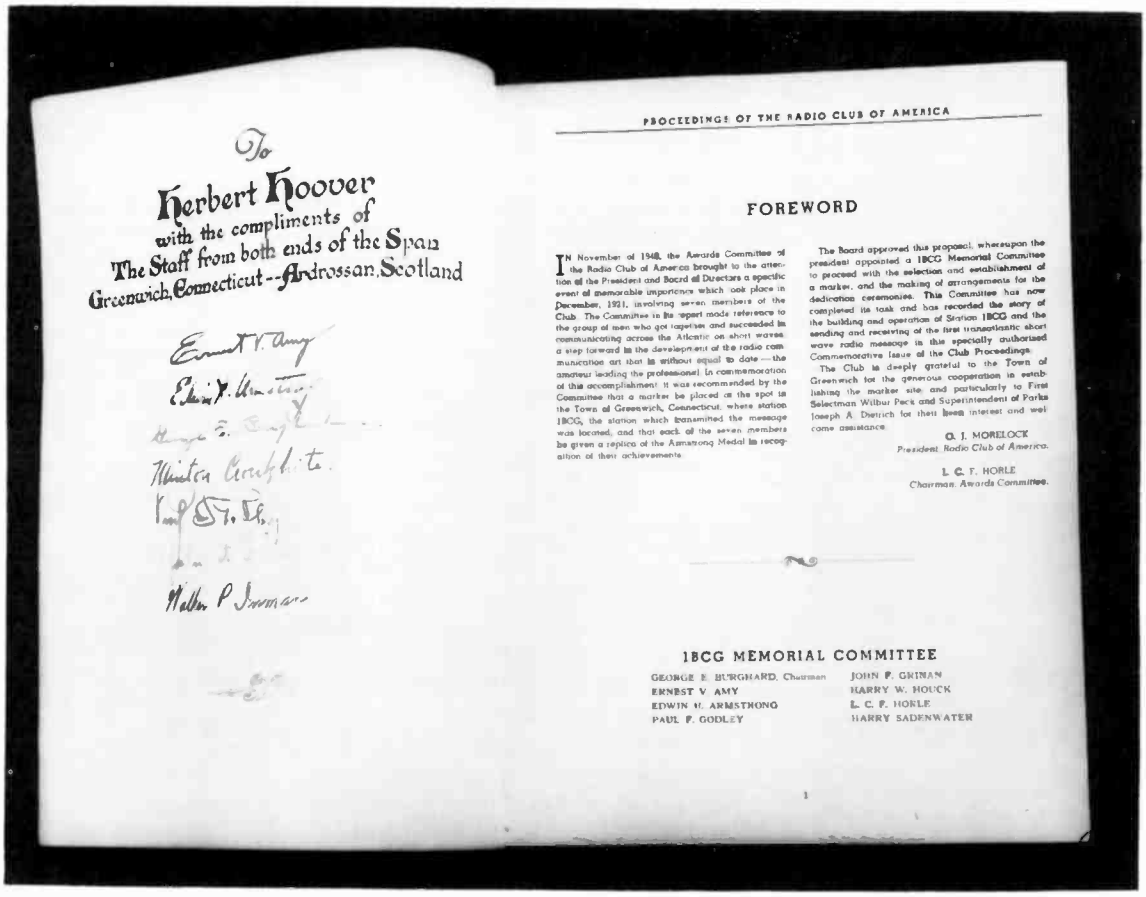
Harry Sadenwater, the mainstay of the Memorial Committee, who was responsible for all the arrangements and did most of the hard work.

The ever smiling Harry Houck after the unveiling of the 1BCG monument.

Former President of the Radio Club Fred Klingenschmitt at the conclusion of the Ceremonies, seems well satisfied.

Admiring the 1BCG monument after the ceremonies. Left to right: Paul Godley, Major Armstrong, George Burghard, W. A. Peck, First Selectman of Greenwich, D. O. H. Caldwell, and Ernest V. Amy.

The Committee had invited Ex-President Herbert Hoover to speak at the dedication but he expressed his sincere regrets at not being able to attend due to a previous commitment. In view of this a specially engrossed page was inserted into a copy of the Commemorative Issue and signed by all the members of the staff of 1BCG and Paul Godley, and sent to Mr. Hoover with a covering letter, for his famous scientific library. He was very grateful and sent us the following letter of thanks and appreciation:



To
Herbert Hoover
with the compliments of
The Staff from both ends of the Span
Greenwich, Connecticut--Ardrossan, Scotland

PROCEEDINGS OF THE RADIO CLUB OF AMERICA

FOREWORD

IN November of 1948, the Awards Committee of the Radio Club of America brought to the attention of the President and Board of Directors a specific event of memorable importance which took place in December, 1921, involving seven members of the Club. The Committee in its report made reference to the group of men who got together and succeeded in communicating across the Atlantic on short waves, a step forward in the development of the radio communication art that is without equal to date — the amateur leading the professional. In commemoration of this accomplishment it was recommended by the Committee that a marker be placed on the spot in the Town of Greenwich, Connecticut, where station 1BCG, the station which transmitted the message was located, and that each of the seven members be given a replica of the Armstrong Medal in recognition of their achievements.

The Board approved this proposal, whereupon the president appointed a 1BCG Memorial Committee to proceed with the selection and establishment of a marker, and the making of arrangements for the dedication ceremonies. This Committee has now completed its task and has recorded the story of the building and operation of Station 1BCG and the sending and receiving of the first transatlantic short wave radio message in this specially authorized Commemorative Issue of the Club Proceedings.

The Club is deeply grateful to the Town of Greenwich for the generous cooperation in establishing the marker site and particularly to First Selectman Wilbur Peck and Superintendent of Parks Joseph A. Dietrich for their keen interest and welcome assistance.

O. J. MORELOCK
President, Radio Club of America.

L. C. F. HORLE
Chairman, Awards Committee.

1BCG MEMORIAL COMMITTEE

GEORGE E. BURGHARD, Chairman
ERNEST V. AMY
EDWIN H. ARMSTRONG
PAUL F. GODLEY
JOHN F. GRINAN
HARRY W. HOUCK
L. C. F. HORLE
HARRY SADENWATER

This is the specially engrossed leaf inserted in the copy of the 1BCG Commemorative Issue, signed by all the members of the staff and Paul Godley, and presented to Mr. Herbert Hoover for his Library.

HERBERT HOOVER

Stanford University
California
July 30, 1951

Dear Mr. Burghard:

I am very much honored by the thoughtfulness of yourself and the staffs connected with the sending of the first shortwave message across the Atlantic. Those autographs on the account of that historic event make it a firsthand document a prize. I have not only looked it over with interest - I have added it to other accounts of those days of discovery and achievement, to "keep the record straight".

My thanks go to you, and will you transmit them also to the signers, and members of the Radio Club concerned. I am glad to have that picture.

Yours faithfully,

Herbert Hoover

Mr. George R. Burghard
Chairman, IRCG Memorial Committee
The Radio Club of America
11 West 42nd street
New York 18, N.Y.

Former President Hoover's much prized letter of thanks and appreciation sent to the Radio Club, on July 30, 1951.

The Radio Club of America, Inc.

DEDICATION CEREMONIES OF 1BCG MONUMENT

Clapboard Ridge Road and North Street

Greenwich, Connecticut

OCTOBER 21, 1950

Eleven A.M.

Commemorating the first radio message ever to span the Atlantic on short waves from Greenwich, Connecticut, to Ardrossan, Scotland, on December 11, 1921

PROGRAM

MUSICAL SELECTIONS
Greenwich High School Band

INTRODUCTION OF O. JAMES MORELOCK
President of The Radio Club of America
by
GEORGE E. BURGHARD, Chairman Memorial Committee

GREETINGS BY THE PRESIDENT

Brief History of the Radio Club

Outline of the story of Station 1BCG

Presentation of the Armstrong Medal Awards

Medalists

ERNEST V. AMY
EDWIN H. ARMSTRONG
GEORGE E. BURGHARD
MINTON CRONKHITE
PAUL F. GODLEY
JOHN F. GRINAN
WALKER INMAN

Address
HONORABLE WILBUR M. PECK
First Selectman, Greenwich

Dedication Address
DR. ORESTES H. CALDWELL

NATIONAL ANTHEM

Program of the 1BCG dedication ceremonies.

November 8, 1950 **RADIO and TELEVISION WEEKLY**

RADIO CLUB UNVEILS MONUMENT MARKING THE SENDING OF FIRST TRANS-ATLANTIC MESSAGE

GREENWICH, CONN., Friday—An epoch in the history of radio communications was fittingly commemorated in this city recently when the Radio Club of America dedicated a granite memorial to 1BCG, the first radio station to transmit a message across the Atlantic on short waves.

Located only a few hundred feet from the monument site on Clapboard Ridge road and North street, construction of 1BCG was begun in late November, 1921. It was completed, less than one month later, in time to participate in the tests that were climaxed by the historic message transmitted to Ardrossan, Scotland, on December 11. It was this accomplishment by a group of radio amateurs which opened the way for the many commercial communications facilities in service today.

To personally honor the original operators of 1BCG, special medallions and citations were presented on behalf of the Radio Club by its president, O. James Morelock. Of the recfpients, Major Edwin H. Armstrong, George E. Burghard, Ernest V. Amy and Paul F. Godley were present; Minton Cronkhite, John F. Grinan and Walker Inman were unable to attend. With the exception of Mr. Godley, who operated the receiving equipment in Scotland, the others were responsible for the design, construction and successful operation of 1BCG.

The affair was attended by men in all phases of electronics; famous engineers and inventors joined with the youthful experimetners and radio amateurs in dedicating a monument that will be a shrine to radio men over the entire world.

NEW YORK TIMES, SUNDAY, OCTOBER 22, 1950.

1ST SHORT-WAVE CALL TO EUROPE IS MARKED

Special to THE NEW YORK TIMES.

GREENWICH, Conn., Oct. 21—A granite monument commemorating the first short-wave message to span the Atlantic Ocean was unveiled here today. Officials of the Radio Club of America, which made the tests on Dec. 11, 1921, and town officials participated in a short ceremony viewed by 100 persons.

The monument is in a small park at North Street and Clapboard Ridge Road, a few yards from the field in which short-wave station 1BCG was set up in 1921 with a 108-foot tower. The call letters were held by Minton Cronkhite, early Greenwich "ham" operator.

Four of the seven men who participated in the 1921 test attended the ceremonies today. Bronze medals were presented by O. James Morelock, president of the Radio Club of America, to Ernest V. Amy, Edwin H. Armstrong, George E. Burghard and Paul F. Godley and accepted by representatives for Mr. Cronkhite, John F. Grinan and Walker Inman.

Mr. Godley received the historic message at Ardrossan, Scotland, after having identified the 1BCG Morse code signals for two previous nights.

Dr. Orestes H. Caldwell of Greenwich, radio controls pioneer, who gave the dedication address, said that before the 1921 test trans-oceanic broadcasting had been only by long-wave broadcasting stations, which needed huge amounts of power in towers hundreds of feet high.

LAWRENCE C. F. HORLE
1892-1950

It was by a very sad turn of fate indeed that the very man who conceived the idea of commemorating the achievements of 1BCG and who was hale and hearty at the dedication ceremonies should be taken by death on October 28th. only one week after he saw the fruits of his labors crowned by the ceremonies at Greenwich. He was one of our oldest members and one of the most active. He will be sorely missed but never forgotten by all who had the privilege of knowing him. The statement below appeared in the 1950, issue of the Radio Club Proceedings, and expresses our feelings, although inadequately.

"Mr. Horle, well known to Radio Club members and prominent in the engineering profession, died on October 28 after a brief illness, at Newark, N. J. His age was 58.

He started pioneering in radio in his early boyhood. When only 14 years of age he operated an amateur station and later became one of the organizers of the New Jersey Wireless Association.

A graduate of the Stevens Institute of Technology, he taught for two years at that institution before becoming affiliated with the Navy Department as a radio engineer. During World War I he was largely responsible for the planning of the Navy's Anacosta, Maryland radio research laboratory.

In the following years he was chief engineer for the DeForest Radio Telephone and Telegraph Company, a Vice-President of the Federal Telephone Manufacturing Company, an engineering consultant and chief engineer and director of the Data Bureau of the Radio Manufacturers Association.

Mr. Horle was elected as a member of The Radio Club of America in November 1913, and became a Fellow in 1926. He held the offices of Vice President in 1921 and 1931, Recording Secretary in 1922 and President in 1932. In 1922, 1924, 1930 and from 1933 to 1949, he served as a Director of the Club. Mr. Horle was most active in club affairs serving on many committees; he was Chairman of the Awards Committee and originated the 1BCG Memorial which was dedicated just one week prior to his death.

He joined the Institute of Radio Engineers in 1914 and became a Fellow in 1925. In 1940, the IRE elected him as President and in 1948 that organization awarded him the IRE medal for "contributions to standardizations both in peace and war."

On December 12th. 1952 The Radio Club awarded the Armstrong Medal to Captain Henry J. Round for his important work in the early days of Radio and in World War I. The presentation was made by President John Bose at the 43rd. Anniversary Banquet at the Advertising Club New York City.

CITATION ON THE OCCASION
OF THE
AWARD OF THE ARMSTRONG MEDAL
TO
HENRY JOSEPH ROUND
December 12, 1952

The award of the Armstrong Medal by The Radio Club of America to Henry Joseph Round is in recognition of his contributions during half a century to the radio art, and especially of his revolutionary developments during World War I in the fields of direction and position finding and the high amplification of short wave signals.

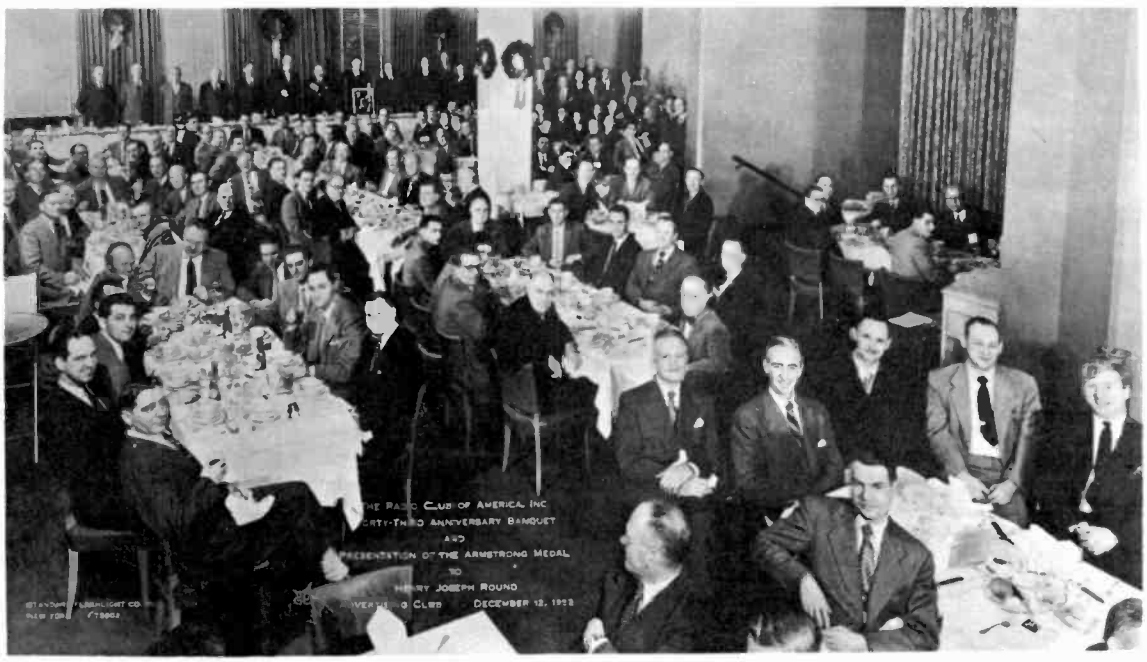
In 1902, upon completion of his engineering studies, he joined Marconi's Wireless Telegraph Co., Ltd. and after a short course of instruction came to America where he operated "BA"—the Babylon, Long Island, station of the American Marconi Co., the first commercial wireless station in this country. Returning to the British Company in 1907, his research career began as assistant to Marconi in the innumerable long distance experiments on the Clifden, Ireland—Glace Bay, Nova Scotia circuit, the first, and until 1912, the only transoceanic circuit in existence. His invention of the balanced crystal receiver contributed much to the success of the circuit and was the most effective means of combating static known for many years.

His discovery of the regenerative self-heterodyne circuit, independently of its invention in the United States, led him into the vacuum tube field in all its ramifications. He pioneered far in advance of all others in the amplification of signals of short wave lengths; likewise he led the world in the exploration of the 100-meter wave region when he demonstrated in 1921 its long night time range by transmission from England and from the Netherlands to Norway.

Captain Round's greatest achievement came during World War I, when commissioned in the Royal Engineers and assigned to the Intelligence Corps, he developed position finding equipment of extraordinary accuracy, together with means for amplifying weak high frequency currents to a degree then undreamed of. The result of this work had an immediate and profound effect upon the outcome of World War I. It marked also the advent of the direction finder as a practical and useful entity for the service of humanity as we know it today.

President of the Radio Club John Bose presenting the Armstrong Medal to Captain Henry J. Round (right) at the 43rd Anniversary Banquet.

General view, 43rd. Anniversary Banquet held at the Advertising Club, New York, December 12 1952.



At the Speakers table on the occasion of the Armstrong Medal award to Captain Round. Left to Right: Lloyd Espenschied, Paul Godley, Prof. Alan Hazeltine, unidentified, Capt. L. V. Berkner Guest Speaker, John V. L. Hogan.

Right side of Speakers table. Left to right: John Hogan, (with pipe), President John Bose, Captain Round, medalist, Major Armstrong, Harry Houck, Harold Beverage, C. R. Runyon Jr. Ralph Batcher, George Burghard.

Armstrong Medallist

CAPTAIN H. J. ROUND, who will be remembered by our older readers as the originator of the Round "soft vacuum" valve and the regenerative self-heterodyne circuit (1913) and for his development of d.f. equipment during the first World War, has been awarded the Armstrong Medal by the Radio Club of America. The award has been made "in recognition of his contributions during half a century to the radio art, and especially of his revolutionary developments during World War I in the fields of direction and position finding and the high amplification of short-wave signals."

CAPT. H. J. ROUND (right) receiving the Armstrong Medal from the president of the Radio Club of America.

Wireless World, London, February 1953.

CAPTAIN ROUND RECEIVES ARMSTRONG MEDAL

Capt. Henry J. Round of England (right) received the prized Armstrong Medal from John Bose, president of the Radio Club of America, at the Club's 43rd annual banquet. The Medal was awarded to Capt. Round in recognition of his pioneering work in radio, especially in the fields of radio direction and position finding and the amplification of short-wave signals. During World War I the direction-finding apparatus he designed and operated made it possible to trace the movements of the German Fleet, making possible interception by the British Fleet in the Battle of Jutland

Electronics, February 1953.

Radio Club Group Honors Briton

Capt. Henry J. Round, of England, was awarded the prized Armstrong Medal, at the 43rd anniversary banquet of the Radio Club of America, in New York, Dec. 12, before an appreciative audience of 175 members and guests. Capt. Round received the medal in recognition of his pioneering work in radio direction and position finding. During World War I the apparatus he designed and operated made it possible to trace the movements of the German Fleet at the Battle of Jutland. John V. L. Hogan served as toastmaster of the Club proceedings.

Telegraph and Telephone Age, January 1953.

In 1953 the Armstrong Medal was awarded to Dr. Raymond A. Heising for his invention of the system of modulation which bears his name and his many contributions to long range Radio Telephony. The presentation was made at the 44th. Anniversary Banquet on December 11th. at the Columbia University Club.

CITATION ON THE OCCASION
OF THE
AWARD OF THE ARMSTRONG MEDAL
TO
RAYMOND A. HEISING
December 11, 1953

The ARMSTRONG MEDAL of The Radio Club of America (1953) is awarded Dr. Raymond A. Heising in recognition of his outstanding contributions to Radio Communication.

A pioneer in the art of vacuum tube radio telephony, he invented the system that solved an early modulation problem in a most simple and practical manner. The system today bears his name.

Beginning work on high frequency wire and radio telephone transmitters in 1914 in the laboratory of the Bell System, he specialized in the development and construction of transmitters of progressively increasing power, this work culminating in the construction and the placing in successful operation of the experimental transmitter installed at the Arlington, Virginia station of the U. S. Navy, from which the human voice was first projected via radio across continental and oceanic distances.

His direction of research and development in the field of long-distance radio telephony continued, culminating again with the design and construction of the first transmitter utilized in the establishment of the overseas telephone service now known to all of us. His engineering contributions in this field are unexcelled.

John Bose, President of the Radio Club of America, presenting the Armstrong Medal to Dr. Raymond A. Heising.

Electronics, February, 1954.

Heising Awarded Armstrong Medal

RAYMOND A. HEISING was presented the Armstrong Medal by the Radio Club of America at its 44th annual banquet, in recognition of his many notable contributions. He was an early worker with electron tubes and invented the system of modulation which solved a radio telephone problem simply and practically. The system today bears his name.

In 1914 Dr. Heising entered the laboratories of the Western Electric Co., specializing in the development and construction of radio transmitters of increasing power.

His other activities include carrier currents, piezo-electrics and fundamental research. He retired recently from the Bell Laboratories after 39 years of service.

FM Inventor Improves His System, Putting 3 Programs on Single Wave

By JACK GOULD

A frequency modulation radio station can transmit simultaneously two or three different programs on a single channel under a new transmission system announced yesterday by Dr. Edwin H. Armstrong, Professor of Electrical Engineering at Columbia University and inventor of FM radio.

Under the system, a set owner would tune his FM set once as at present and receive the first program. Then he could flip a switch and receive a second program. Flip the switch again and he would receive a third program.

Under the new system, the existing thirteen FM stations in New York City could offer a total of thirty-nine programs at the same time.

Present FM transmitters could be modified for the new system at a cost of "a few thousand dollars," according to Dr. Armstrong, but listeners at home would have to buy new FM receivers. The system, the inventor said, does not work with AM, or amplitude modulation, radio. AM stations broadcast in the so-called standard band between 550 and 1,600 kilocycles.

Dr. Armstrong, whose inventions have played a major role in shaping the technical course of modern broadcasting, said one station could offer simultaneously a classical music program, a popular music program and a news program.

"Economically the broadcaster could sell twice or three times as much advertising," he observed.

The availability of two channels on which to transmit from the same station, Dr. Armstrong said, would make practical "three-dimensional sound" on radio, also known as binaural transmission.

Announcement of the system promised to pose a new problem for the Federal Communications Commission, which prohibits own-

Continued on Page 18, Column 3

New York Times, March 17, 1953.

In past years Armstrong had made it a practice to make first disclosures of his inventions before the Radio Club of America. This he did for two reasons: First because he always took a great interest in the Club and secondly because commercialism was reduced to an absolute minimum at all the Club meetings and he felt he could speak more freely. Thus on October 13th. 1953 the Club was blessed with another first when Dr. Armstrong and John Bose read a paper titled "Some Recent Developments in the Multiplexed Transmission of Frequency Modulated Broadcast Signals" and demonstrated their system, at a meeting in Pupin Hall Columbia University. The tests were expertly carried out and proved a discovery of major and far reaching proportions.

DISCUSS FM SYSTEM: J. H. Bose and Dr. E. H. Armstrong

FM Inventor Improves His System,

Continued From Page 1

ership of more than one radio station in the same city.

Dr. Armstrong said that credit for the engineering behind the system belonged to John H. Bose, of the Marcellus Hartley Research Laboratories at Columbia, who worked with Perry Osborn, chief engineer of Dr. Armstrong's FM station, KE2XCC, at Alpine, N. J.

The heart of the system is known as multiplex radio transmission, which involves the use of a single carrier wave to transmit more than one signal. Multiplex transmission has been widely used for years in communications.

Dr. Armstrong noted, however, that multiplex had not been used for regular broadcasting because of the problem of one channel intruding on another. The system, he said, overcomes this problem.

Technically, the system can be described as "frequency modulation within frequency modulation." At the broadcasting station an FM signal is sent out with one program. This signal contains a second FM signal.

At the receiver the initial FM signal is first "demodulated"—or converted back into sound. At this point the second signal is beyond the range of human hearing and a listener cannot even tell that it is there. Then the second signal is fed into a second "demodulation" system, where, in turn, it is converted into sound independently of the first.

A third signal could be contained within either the first or second signals, Dr. Armstrong explained. He said that technically it was feasible to carry even more than three programs, but that noise became a factor as the number of programs was multiplied on the same carrier wave.

Dr. Armstrong reported that last summer during a thunderstorm signals were received fifty miles away from Alpine with equal clarity on both a first and second channel.

Neither Dr. Armstrong nor Mr. Bose would predict when the new system would be put into service, but the inventor expressed the opinion that it would materially improve the financial lot of FM broadcasters, now caught in competition with both television and standard radio, and would increase the popularity of FM.

Use of two channels to broadcast a concert, Dr. Armstrong said, would permit placement of microphones at different points in a studio or hall and transmission of the sound from a number of points. With the use of two loudspeakers in a home the concert would have a toned quality similar to what one hears through both ears if actually attending a recital. Such binaural transmission up to now, he said, has required use of either two FM stations or a combination of FM and AM.

Dr. Armstrong announced the development of FM radio in 1935. Previously he developed the regenerative, super-regenerative and superheterodyne circuits. A technical paper on his multiplex broadcasting system is scheduled for delivery before the Institute of Radio Engineers.

ON October 13, Major Armstrong, assisted by John Bose, delivered a highly significant paper on multiplex FM transmission before a joint meeting of the Radio Club of America and the Audio Engineering Society at Columbia University. This was accompanied by a striking demonstration of reception from station KE2XCC at Alpine, N. J., and tape recordings made under test conditions.

While the paper was concerned mainly with FM broadcasting of two different programs, or two channels for binaural reception, this development furnishes the means to provide new communication services.

Stated simply, it is now possible for an FM broadcast station to handle one or two voice communication channels without interfering with its regular 15,000-cycle broadcast program. Since FM transmitters are of substantially higher power than those used for communication, and have high-gain antennas of substantial height, most of them can provide solid coverage over a radius of 50 miles or more over rough terrain, and upwards of 75 miles in flat country.

This added facility is too new for the FCC to have given it any formal consideration yet. However, since it opens up the possibility of adding two communication channels at each of some 650 FM transmitters without the slightest interference with broadcast service, it is certain that the Commission will welcome this development as a means of relieving congestion in the safety and special services. Moreover, it opens up possibilities for new types of systems or services because of the enormous coverage obtainable. Such a station as WMIT, for example, can deliver solid coverage over an area of nearly 100,000 square miles.

Consider how advantageously two long-range channels could serve a manufacturing company that had plants and offices in outlying sections of a city where there is an FM station. One channel could be used for communication with company cars and trucks, while the other could be free to serve for special messages and paging.

Probably Major Armstrong used two broadcast programs for demonstration purposes because they provided the most severe test of his method of multiplexing. It is a relatively simple matter to substitute two narrow-band voice channels for the second 8,000-cycle program channel.

Under 15,000-cycle modulation on the first channel, and 8,000 cycles on the second, the signal-to-noise ratio was better than 70 db with 1 millivolt at the input of the receiver. Cross modulation in the second channel from the first was better than 60 db below the program on the second channel. The effect of the second on the first was insignificant.

FM broadcasters will surely welcome proposals to add such communication services, as a means of obtaining additional revenue. It is reasonable to expect, therefore, that Major Armstrong's latest contribution to the radio art will soon materialize in various commercial, profit-making forms.

[1]See the extensive discussion of this matter in *Communication Review*, last issue of COMMUNICATION ENGINEERING.

EQUIPMENT FOR 2-CHANNEL TRANSMISSION ON BROADCAST FM CARRIER

Communication Engineering,
November-December, 1953.

On February 1st. 1954 the Radio world and the Radio Club in particular was profoundly shocked by the death of one of its most distinguished members, Edwin Howard Armstrong. The Club and its associations were a very important part of his life and by the same token he had become an integral part of the Radio Club's very existence. It seemed impossible that we were no longer to feel his presence at meetings and other functions and listen to his sage remarks and profit by his strong conviction of sincerity and meticulous attention to detail and truth. The example that he set will never be forgotten by those who heard him and will always be cherished by those who had the good fortune to know him well. The Club had lost a great man and a good friend.

President Shepard appointed a special Armstrong Memorial Committee to see that proper recognition was forth coming. A special folio was prepared for insertion in the next issue of the Club Proceedings. It showed a picture of the Major on the front page and contained a list of all the awards and honors he had attained during his career as well as a copy of the engrossed scroll setting forth the resolution of the Board of Directors. The original scroll was signed by all the officers and Directors and presented to Mrs. Armstrong.


1890 - EDWIN HOWARD ARMSTRONG - 1954

EDWIN HOWARD ARMSTRONG

Honors and Awards

Degree of Doctor of Science — Columbia 1929
— Muhlenberg 1941
— L'Université Laval (Quebec) 1948

Medal of Honor, Institute of Radio Engineers 1917

Chevalier de la Legion d'Honneur 1919

"Armstrong Medal" established by The Radio Club of America 1935

Egleston Medal, Columbia University 1939

Holley Medal, American Society of Mechanical Engineers 1940

National "Modern Pioneer Award", National Association of Manufacturers, on the occasion of the 150th Anniversary of the American Patent System 1940

Medal of Class of 1889 — School of Mines, Columbia University 1941

Franklin Medal, The Franklin Institute 1941

John Scott Medal, awarded by Board of Directors of City Trusts, City of Philadelphia 1942

Edison Medal, American Institute of Electrical Engineers 1942

Medal for Merit (United States) with Presidential Citation 1947

Radio Club "Amstrong Medal" along with John F. Grinan, Ernest V. Amy, George E. Burghard, Minton Cronkhite, Walker P. Inman, Paul F. Godley for the first shortwave transoceanic signals (1BCG) 1950

Washington Award, founded in 1916 by John Watson Alvord, administered by The Western Society of Engineers 1951

Lion Award, awarded by the Columbia University Alumni Club of New Jersey (Essex County) 1953

Honorary membership — Institution of Radio Engineers, Australia

Honorary membership — Franklin Institute

Honorary membership — American Institute of Electrical Engineers

The Board of Directors
of
The Radio Club of America
to
Mrs. Edwin Howard Armstrong
and to all others to whom these presents may come

Greeting

Be it Known that at a meeting
of the Board of Directors of
The Radio Club of America
held February 25, 1954, in New York City,
the following resolution was unanimously adopted:

Whereas Edwin Howard Armstrong, a member of this Board and Past President, departed this life on February 1, 1954; and

Whereas Major Armstrong took an active and continuous interest in the affairs of this Club during a membership of over forty years, worked diligently and earnestly to carry out its purposes and was ever ready to give assistance and encouragement to his fellow-members; and

Whereas the members of this Board are mindful of the high principles and sterling character of Major Armstrong, his kindness and generosity, the warmth of his friendship and his untiring devotion to the Radio Art, as well as his brilliant, basic and concept-changing inventions; and

Whereas we look back with pride and honor to the meetings of our Club at which Major Armstrong disclosed his inventions: the Regenerative Circuit, the Superheterodyne and Super-Regenerative Systems, the System for Eliminating Noise by Frequency Modulation and the Concept of Using Wide Bands for Noise Reduction, and recently, the Multiplexed Transmission of Frequency Modulated Signals; and

Whereas his Honors and Awards were many and world wide, including the United States Medal of Merit with a Presidential Citation, and Chevalier of the French Legion of Honor, for his invaluable services to his Country and her Allies during two World Wars; and

Whereas The Radio Club of America has lost its most distinguished member; and

Whereas this Board is mindful of the love, sympathy, and understanding of Major Armstrong's wife Esther Marion Armstrong, who aided and encouaged him throughout their married life.

Therefore, be it

Resolved that this Board, on behalf of the members of The Radio Club of America hereby expresses to Mrs. Armstrong and to the family of Major Armstrong their deep regret at his passing and their heartfelt sympathy; and be it further

Resolved that a properly engrossed parchment copy of this Resolution be presented to

Mrs. Edwin Howard Armstrong

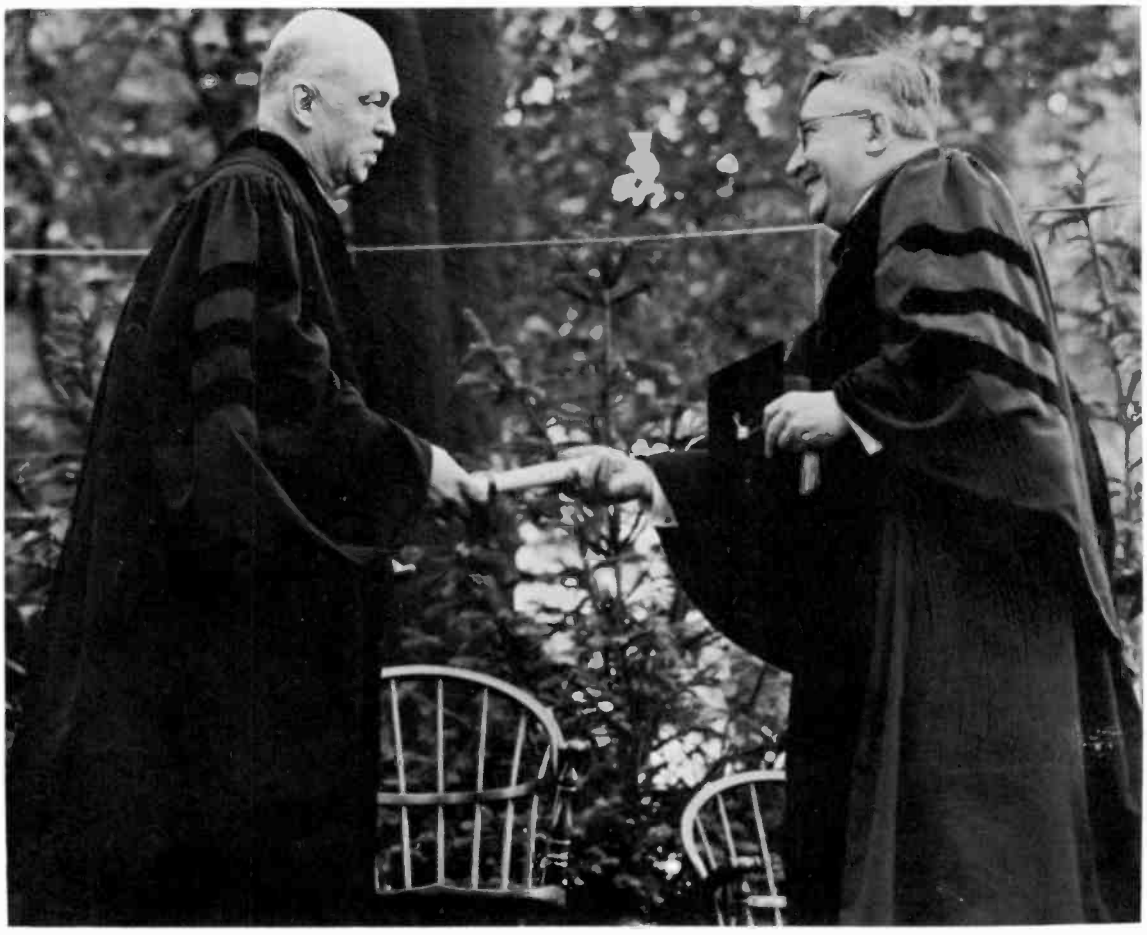
Done at New York this 25th day of February,
One thousand nine hundred and fifty-four.

Frank H. Shepard, Jr.
PRESIDENT

O. James Morelock
CORRESPONDING SECRETARY

Board of Directors

George E. Burghard, Harry Sadenwater, H. W. Houck, John H. Bose,
Alexander A. McKenzie, Ernst V. Amy, Fred Klingenschmitt, Frank A. Gunther,
Joseph Stantley, Charles F. Jacobs, W. Gordon Russell, Walter A. Knoop, Jr.,
Jerry Minter, Raymond A. Heising, Ralph Batcher



Armstrong (left) receiving the Honorary Degree of Doctor of Science from President Levering Tyson of Muhlenburg College, June 2, 1941.

Many letters of condolence were received and many articles were written about Armstrong but space will only permit the recording of a few on these pages. The following letter was sent by the Major's very old friend and Honorary member of the Radio Club Captain Henry J. Round of London.

Message to The Radio Club of America from Capt. H. J. Round

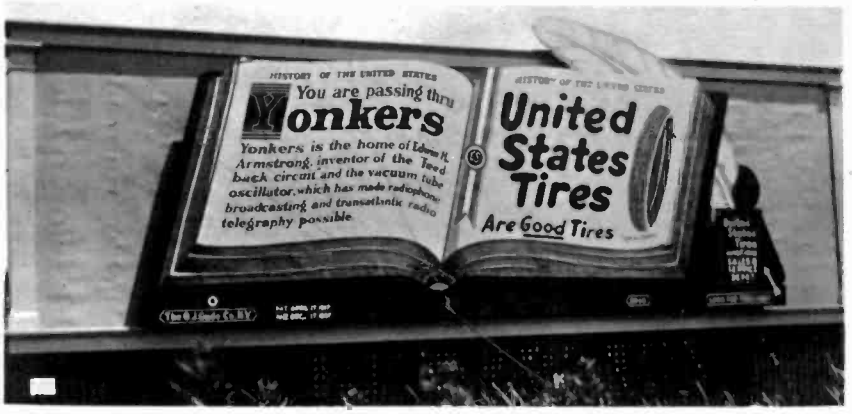
As a member of the Radio Club unable to be present with you, I would like to record my sorrow at the loss of our beloved associate, Major Edwin H. Armstrong.

Only about one year ago I renewed my personal acquaintance with Howard after twenty years interval, and I am honoured to think that he gave the citation when I was presented with your Medal named after him.

I first met Armstrong in late 1917 when he called on me at my laboratory in London, bringing with him the story of the recent U. S. developments in Wireless, and we exchanged information which was very valuable during the latter part of that War.

I met him again on several occasions and had the pleasure of being given a very early demonstration of his Superheterodyne in his Paris laboratory. Mr. Houck was present at that demonstration and has reminded me that I was rather slow at grasping what Armstrong had done.

I met him just after he had invented Superregeneration when he visited us at Marconi's in Chelmsford.



Advertising billboard on the main highway through Yonkers, New York, the birthplace of E. H. Armstrong.

At the Awards Dinner of the American Institute of Electrical Engineers in 1942 when Armstrong (right) received the Edison Medal. With him are (left to right) Gerard Swope, the Hoover Medalist, Dr. Willis Whitney, the John Fritz Medalist.

I remember very clearly his radio message to me from the ship in which he was coming to Europe:

> *"Arriving in England on Saturday with the contents of the Radio Corporation safe."*

Armstrong on that visit bought in France his Hispano Suiza car which he had for many years.

In 1929 I visited the States, partly on Marconi's business, and stayed with him for a very memorable six weeks, during which we visited Schenectady where I met Harry Sadenwater and saw the radio and scientific progress going on in the General Electric Laboratories.

I remember renewing acquaintanceship with Dr. Alexanderson and the great scientist Langmuir.

We also visited Pittsburgh and I was present at a technical meeting when the next

year's models were being tried out. There I had long talks with Conrad and other well known personalities.

Riverhead and my old friend Beverage were visited, and then the great exploration to look for old relics took place.

As I have recorded elsewhere, the site of the Babylon station was discovered and we found the old operating hut which now lies at Riverhead.

The dinner your Club gave me during my visit stands out in my memory because of the large number of well known Radio men I met there.

Since those days until December 1952 when I was present at your banquet, Armstrong and I corresponded very frequently.

He particularly kept me well supplied with the latest American receivers, lately, of course, chiefly FM models, and I am the proud possessor of that very fine R E L super FM instrument which is on my table by the side of me now in full working order.

Unfortunately, there are very few FM stations over here to listen to.

England has been unable, with war and subsequent peace recovery work, to blossom out in that direction on a large scale, but the word has just been given to go full steam ahead and when the planned FM group is finished our small island will have at least six high power FM stations, each radiating three programs at once. This will be our monument to Howard.

Armstrong in his "Spirit of Discovery" lecture said about my old chief Marconi

> "It is seldom that a man makes two basic discoveries.
> When a man makes three his attitude towards problems
> and his method of work merit close analysis and study."

I cannot help feeling that this applies equally to Armstrong himself.

Many men in the past have made discoveries but left it for those autocrats, the scientists, to theorize, the engineers to make a job of things, and the business men to give the world and themselves the benefits.

Howard tried to do it all himself and it was too much even for his great intellect and personality. However, I think that if he had left FM to others in its early stages it would not have gone anywhere near so far, and in fact I think there would have been a tendency to suppress it on the part of vested interests.

It has gone so far now that it cannot be suppressed, and I venture to prophesy that in the not too distant future radio broadcasting in the U. S. will turn largely to FM.

My short acquaintance with your radio last year showed me that you need it even more than we do in England.

Armstrong is now amongst the immortals and is surely in the history of your nation worthy to be classed with Bell, Edison and Westinghouse.

I salute the spirit of my great friend.

H. J. ROUND

WIRELESS ENGINEER

Vol. 31 MARCH 1954 No. 3

Edwin H. Armstrong

By his death on 1st February the United States lost one of the outstanding personalities of the wireless world. Edwin Howard Armstrong was born in New York on 18th December 1890. He graduated in Electrical Engineering at Columbia University in 1913 and was awarded an honorary D.Sc. in 1929. He was an assistant in the electrical engineering department for a year after graduation, and then for 21 years collaborated with Michael Pupin in research at the Marcellus Hartley Research Laboratories in Columbia University. From 1934 until his death he was a Professor of Electrical Engineering in the University. During the first world war he spent two years, first as captain and then as major, in the Signal Corps, and in 1919 was made a Chevalier of the Légion d'Honneur.

The name of Armstrong is most closely associated with four inventions, viz. the regenerative circuit, 1912; the superheterodyne system of reception, 1917-18; the superregenerative circuit, 1920; and frequency modulation, 1935. He was a lad of 16 when in 1906 Lee de Forest patented the 3-electrode valve, which became known as the audion, and it was in 1912, while still a student at Columbia, that he was experimenting with an audion when he discovered the presence of h.f. current in the anode circuit, which led to his invention of regeneration and the valve oscillator, and endless patent litigation. In 1914 he published a correct explanation of the action of a triode and disproved some of the currently-accepted ideas; in 1915 he read a paper on regeneration before the Institute of Radio Engineers, and in 1916 another paper on the heterodyne detector. The impact of these papers may be judged from the fact that in the following year the Institute of Radio Engineers awarded him the first Medal of Honour for his work on regeneration and the production of oscillations. Seventeen years later there was a somewhat tragic sequel to this award for, following the adverse decision of the U.S. Supreme Court on the question of priority of invention of these discoveries, he returned the medal to the Institute in 1934. The Board of Directors, however, unanimously declined to accept it and reaffirmed the original award.

Though naturally not entirely unbiased, some light is thrown on this long drawn-out litigation by the autobiography of Lee de Forest, published in 1950. At the same time as Armstrong was experimenting with the audion in New York, Lee de Forest and two assistants were working on somewhat similar lines at Palo Alto in California, and the fight as to who was the prior inventor went on for 20 years.

In the autumn of 1913 de Forest read a paper on "The Audion Amplifier" before the I.R.E. at Columbia University and he says: "My demonstration of the crashing sounds emitted from my loudspeaker when I dropped a handkerchief on the table before the telephone receiver serving as my 'pick-up' aroused great astonishment and applause. On that occasion young Edwin H. Armstrong, wrapped in deepest mystery, had a small carefully-concealed box in an adjoining room into which neither I nor my assistant Logwood was permitted to peek. But when he led two wires to my amplifier input to demonstrate

This article on Armstrong appeared in the Wireless Engineer of March 1954. It was written by the Technical Editor Prof. G. W. O. Howe.

the squeals and whistles and signals he was receiving from some transmitter down the Bay, we thought we had a pretty fair idea of what the young inventor had concealed in his box of mystery. So we proceeded, meekly and obediently, to amplify whatever signals came over the wires from that room".

That is the first mention of Armstrong in de Forest's autobiography, but early in 1914 de Forest demonstrated his ultra-audion oscillator at the Bureau of Standards in Washington, and he says that Professor Pupin, whom he had long known as a kindly friend, loudly demanded "What right have you to have that here? That thing is not yours. That belongs to Armstrong." He says that he was too flabbergasted to reply, but gazed upon his surprising wrath and "continued the siren sounds." He proceeds, "Then I knew for a certainty what it was that Armstrong had had in his little magic box at Columbia. And that outburst by Professor Pupin was the opening gun of the bitterly contested patent battle to be waged for years in the Patent Office interference proceedings; and thereafter for years more until at long last the U.S. Supreme Court should finally decide the historic contest." Later de Forest says: "On January 15, 1920, I read my paper on the Audion and its evolution before the Franklin Institute at Philadelphia. It was well received, except by one E. H. Armstrong, who sought to show that it was he who had invented the feed-back circuit. 'All de Forest invented was the Audion! We'll concede that', he growled. Whereupon the chairman ordered him to sit down."

The feedback patent, which, after nearly 20 years' litigation, was finally awarded to de Forest, expired in 1941. It had been in turn awarded to Armstrong, then Langmuir, then again to Armstrong, and finally to de Forest. One can appreciate the feelings that prompted Armstrong to return the medal to the Institute.

Another of Armstrong's inventions, with much happier associations, is frequency modulation. This occurred to him as the result of some experiments he and Pupin made with the idea of eliminating static interference; experiments which, he says, were unsuccessful, but which laid the foundations of his system of reducing disturbance by using frequency modulation. In an outline of the history of f.m., which he gave before a section of the I.R.E. in 1946, he said that he started looking for a static eliminator back about 1914, and that he worked a little longer than most people did. He then hit upon the idea of frequency-shift keying and from that went on to frequency modulation. It is pleasing to note that towards the end of his autobiography de Forest says: "Major E. H. Armstrong deserves the greatest credit for the development of his system of frequency-modulation—brought out in spite of the skepticism of the profession, and a reluctant Federal Communications Commission. He has given to radio broadcasting a new arm; for this I salute him."

In 1935 the Radio Club of America founded a medal to be known as the Armstrong Medal. In 1941 Armstrong was awarded the Franklin Medal by the Franklin Institute, and in 1943 the Edison Medal by the American I.E.E.; he was also awarded medals by many other institutions.

In 1947 he received a Medal of Merit and a Presidential Citation for his contributions to military radio communications.

In "Radio: Beam and Broadcast", by A. H. Morse, published in 1925, the patent litigation up to that time is discussed very fully: the author concludes by saying that, "Armstrong's work in radio is such that, had he no patented or patentable inventions—and he has many—he would still rank as one of the foremost exponents of the art". This was before the invention of frequency modulation.

Since 1948 he had been working on what he called the multiplexed transmission of frequency-modulated signals, and as recently as last October he and J. S. Bose, also of Columbia University, read a paper on the subject and gave demonstrations before the Radio Club of America. The multiplex system enables two programmes to be broadcast simultaneously within the standard f.m. band of 200 kc/s. Earlier attempts at multiplexing were not very successful because of cross-modulation between the main and the auxiliary channel and of noise transfer from one to the other, but as the result of five years of work they claimed to have overcome the difficulties, and to be able to obtain results on their second or auxiliary channel superior to those obtained by ordinary amplitude-modulated stations.

One can only regret that so much of his life was overshadowed and embittered by such protracted patent litigation, but during the last 18 years he had the great satisfaction of seeing his frequency modulation becoming more and more highly appreciated, and replacing amplitude modulation on an increasing scale. His name will ever be associated with this outstanding achievement.

G. W. O. H.

Television in Review

A Tribute to Major Armstrong, Who Was Dedicated in the Scientist's Tradition

By JACK GOULD

MAJOR EDWIN H. ARMSTRONG who leaped to his death from a window of his apartment in the River House, will rank with the great inventive geniuses in electrical engineering. With Edison, Hertz, Marconi and Lee De Forest he pioneered the art of broadcasting that today is accepted as a matter of course.

The Major, as he always preferred to be called, was an inventor almost out of a story book. He was a dedicated man in the scientist's tradition; he was often a lonely and somewhat aloof figure; in someways he was stubborn. He also was a disappointed man. Bitterness and disillusion robbed him of many of the pleasures and satisfaction of his engineering triumphs.

Yet over a cocktail the Major could be cordiality itself. In his rare moments of relaxation he could even see the humor to be found in the world of commercial practicality and expediency, a world to which he never fully could reconcile himself. At all times he was the individualist.

The vision of Major Armstrong can be illustrated by an incident of only a few months ago. He was discussing one of his foremost inventions, the modern system of frequency modulation broadcasting that freed radio from static and man-made interference.

•

From an old notebook he showed a memorandum that he had written years and years earlier. The memorandum predicted that during a thunderstorm the roar of the thunder itself would be more disturbing to radio reception than would the electrical interference caused by the lightning. He had his own dream come true.

Yet, ironically, FM was to be a personal heartbreak for the Major. He envisioned frequency modulation as supplanting the existing, or amplitude modulation, radio. Just as FM began to take a foothold, the Federal Communications Commission ordered the service moved to a new band. The F. C. C. based its decision on engineering considerations that to this day are disputed. The Major knew that he was "the father" of FM but he had to watch others decide what was best for his child.

By the time FM got settled in its new location on the dial, it was too late. The lusty infant known as television had come along and swept all before it. But in late years the Major was not without hope. He had seen the public become high-fidelity conscious to an extraordinary degree, albeit more through phonograph recordings than FM radio. It may take time, he used to say, but FM still may assume the importance he originally saw for it.

•

The Major's fights over patents were legendary in the industry; for himself they were an obsession. He had devoted much of the last four years to pretrial testimony in litigation with his old adversary, the Radio Corporation of America. The rights and wrongs of his position are beyond a layman's comprehension. Suffice that the Major was a controversial figure, with friends who thought he never claimed enough and foes who thought he claimed too much.

In addition to FM, the Major devised the regenerative and superheterodyne circuits that provided the sensitivity and amplification needed for practical long-range radio. The theory of the superheterodyne indeed is basic to the success of present-day communications.

Major Armstrong was one of the last of the active pioneer radio inventors; he read his last engineering paper only a few weeks ago. Though recognizing the accomplishments of corporate research, he never did have too much patience with the use of hordes of specialists to solve a problem. He always preferred to be the master of his own laboratory. That he was.

New York Times, February 4, 1954.

Reprinted from the JOURNAL OF ENGINEERING EDUCATION, Vol. 45, No. 2, October, 1954
Printed in U. S. A.

Creativity in Radio

Contributions of Major Edwin H. Armstrong*

By JOHN R. RAGAZZINI
Professor of Electrical Engineering, Columbia University

I

My purpose here today is to outline the contributions and to analyze some of the factors which have contributed to the creative genius of one of the great inventors of our time, Edwin Howard Armstrong. He would have been here today to speak for himself were it not for his tragic death some months ago. In discussing Major Armstrong, I may betray a certain amount of hero worship to which I freely confess for he was an heroic figure to all who knew him. In some ways, my speaking for him may give you a better picture than he would have been able to do for himself. Possessed of an innate modesty he probably would have minimized his role and personal contributions to the phenomenal series of inventions which have laid the foundations of modern radio communications. In referring to him I shall use the appellation of Major because he preferred it over others to which he was entitled.

To emphasize the importance of the contributions of Major Armstrong, I shall outline his inventions before going into his life, his times, his education and those personal characteristics which contributed to these successes. The four basic discoveries which represent his most important but by no means only creative contributions are the regenerative circuit, the superregenerative circuit, the superheterodyne receiver, and the broad-band frequency modulation system. These will be taken up in turn.

At the time of the invention of the three-element vacuum tube named the "audion" by Lee De Forest in 1906, radio communication, as we know it today, was launched. In those early days tubes were expensive and scarce and their characteristics none too favorable, so that it was imperative to increase the effectiveness of each individual tube. Setting the then accepted theories aside and embarking on an experimental approach, Major Armstrong was able in 1912 to obtain unheard of sensitivities from a single triode. While commonplace today, the concept of reinforcing a week input signal to the tube by feeding back a small portion of the output signal was revolutionary. He not only observed this phenomenon but was perceptive enough to realize its importance as an invention which he disclosed on January 31, 1913, and finally patented in 1914. The regenerative feedback circuit made possible communications across and between continents with a minimum of tubes.

Shortly after the initial disclosure of the regenerative principle for use as a sensitive receiving detector, Major Armstrong discovered that by increasing the amount of feedback it was possible to cause self-oscillations in the circuit. The tremendous importance of this property was quickly evaluated by Armstrong because a technique for producing oscillation by this means would replace the older spark or arc transmitters then in use. He filed a separate patent applica-

* Presented at the Annual Meeting of ASEE, University of Illinois, June 16, 1954.

tion for this circuit, a factor which later cost him heavily in patent litigation. De Forest was able to win an interference suit in 1924 which resulted in the issuance of patents to himself for the oscillating audion and regenerative circuit and the rejection of Armstrong's application for a patent on the oscillator circuit. Ultimately, as late as 1934 and after long and expensive litigation, the Supreme Court upheld the contention that De Forest was the inventor of the regenerative circuit and oscillator although the engineering and scientific societies, including the American Institute of Electrical Engineers, the Institute of Radio Engineers, and the Franklin Institute, generally discredited this decision by awarding medals and honors to Armstrong for his inventions including the regenerative circuit.

These brief references to Armstrong's patent litigation are cited not so much for their importance to the purpose at hand but to emphasize early in this talk a facet of his character which led him to fight tenaciously for what he considered to be right. This he did even when it cost him heavily and when he might have benefited financially by accepting an adverse decision. His lifetime will show many other instances of this characteristic.

Superheterodyne Reception

Chronologically, the second of his great discoveries was the system of superheterodyne reception. The first in the sequence of events leading to this invention was, the heterodyne principle which he studied experimentally and presented in his outstanding paper before the Institute of Radio Engineers in 1916. This paper laid the foundations for the future by rationally explaining the phenomenon of beating two high frequency inaudible signals to obtain an audible difference frequency signal. During World War I, the principle of superheterodyne reception was synthesized as a result of speculation on his part that attacking German bombers could be fired upon more accurately if they could be located by picking up the radiation from their ignition systems. The frequency content of this radiation was very high for those days and could not be picked up by then existing methods. The whole concept suddenly occurred to Armstrong that if he could reduce the frequency of the short waves to a value more manageable for amplification, receivers of much higher sensitivity could be designed. In retrospect, this seems to be a natural outgrowth of his early studies in the field of heterodyne detection. In his 1916 paper, Armstrong was dealing with the reduction of the frequency of a received signal from a high inaudible frequency, say 100 kilocycles to an audible frequency of, say 1 kilocycle, by beating with a local signal at 99 kilocycles. The principle was extended to take a very high radio frequency, say 10 megacycles and beat it down to an intermediate but inaudible frequency of say 150 kilocycles, amplifying at this frequency and then detecting the audible signal in this amplified signal. This invention was not used for its original purpose in World War I but it did become the basis for practically all radio reception including radar. It is interesting to note that the circle was completed only in World War II when radar detection of enemy aircraft came into its own using, a reception technique invented by Armstrong for the same purpose more than twenty years earlier. It can truly be said that the invention of the superheterodyne receiver represents a superb exhibition of inventive genius where one step logically led to another and a set of unrelated facts were synthesized into a useful device.

Shortly after his return from World War I, Major Armstrong became involved in the first of a series of court suits in defence of his patents. It was while carrying out an experiment at Columbia University to prove convincingly that statements made by opposing counsel were in denial of fundamental truths that he came upon the principle

of superregeneration. While testing a regenerative circuit using a miniature transmitter located across the room without an antenna, he noted strange signals coming in with unbelievable signal strengths. Numerous transmitting stations were identified and their signal strengths were far beyond those observed in previous regenerative receiver tests. Far from ignoring this effect, he tenaciously studied it and finally brought to light a new principle of regeneration. What had happened was that the regenerative detector was being triggered on and off oscillation at an inaudible rate so that on the average, the circuit was being operated at a condition of tremendous gain located near the point of incipient oscillation. It was his ability to recognize that he had found a basic and important new principle that accentuated his genius, for it must have been true that many other experimenters had noted the effect previously. As a matter of fact, Armstrong himself came upon some old notes indicating that he had produced superregeneration in his early experiments many years before but failed to recognize it. This is a lesson that he never forgot and one which made him emphasize his persistence and care in experimentation lest unusual phenomena should go by without being noticed.

Frequency Modulation

Major Armstrong's final important invention was that of static-free frequency modulation reception known as FM. Ever since his early days with Pupin at Columbia, he had dreamed of the day when static, that is natural and man-made electromagnetic disturbances, would be overcome and useful signals could be received clearly and with high fidelity at all times. The basic technique used by Armstrong to solve this problem was to employ a system of modulation in which the intelligence was applied to a carrier signal by varying its frequency. This idea was by no means new, having been considered by numerous authorities in the field and having been discarded as impractical and as having no particular advantage over the current amplitude modulation system (AM).

In particular, expert opinion of the day was that the comparison between FM and AM based on both theory and experiment indicated no particular advantages for FM. This situation would have been enough to discourage any investigator from going much further. However, Major Armstrong had other ideas. He studied some of his concepts developed as far back as 1915 which led him to believe that broad-band, not narrow-band FM was the key to the problem. In view of the fact that the energy of the random noise or disturbances admitted into a circuit is proportional to its bandwidth, his notions seemed completely contrary to accepted concepts. The only trouble was that these concepts, correct as they were, were being applied to only one form of FM and did not reckon with the basic element in the Armstrong system which included the amplitude limiter. This device clipped off all amplitude variations superposed on the signal by unwanted static and permitted only the desired frequency variations containing the intelligence to pass through. The broader the frequency swing of the desired signal, the less significant would be the undesired swings due to noise. It was simply a case of the right theory being applied to the wrong model and again Armstrong proved that he was by far a more precise mathematical thinker even though he did not indulge in the writing of mathematical relationships.

In any case, the broad-band FM system including the all-important amplitude limiter was patented in 1933. This invention made possible the reception of almost completely static-free signals even in the midst of violent thunderstorms in the immediate vicinity, and this was indeed a technological triumph. Accompanying this great advantage was that of high fidelity made possible by the broader bandwidth employed by the sys-

tem. Also, it was possible to prevent interference between adjacent stations since the Armstrong system caused the weaker station to be completely suppressed. By employing higher carrier frequencies he opened up a new large piece of the frequency spectrum to broadcasting. Finally, the cost of construction and operation of FM stations was less than that of AM stations with the same coverage.

Conflict of Interests

However, it was one thing to achieve this tremendous success and still another to bring about its acceptance by the broadcasting industry and the government. The conflict of interests between established organizations, like the Radio Corporation of America, and Major Armstrong had begun in all seriousness. The fight to bring about adoption of this, his greatest invention, consumed so much of Major Armstrong's time and energy that he was diverted from his primary activity of study and experimentation. FM proved to be the last of his great inventions and most of his activities from the issuance of the FM patent to the time of his tragic death were directed to the fight for adoption of FM. His devotion to this task proved to be so intense that his FM fight has often been referred to as his Cause. He was cast in the role of the lone inventor pitted against the array of great corporations that characterize our economy. In this task he was as dogged, as brilliant and as assured as he had ever been in ferreting out an interesting and peculiar phenomenon in the laboratory.

This recital of the most important technical achievements of Major Armstrong is by no means complete. It has been given to bring into focus the magnitude of his creativity and life-long achievement and to provide the framework into which to attempt to fit the human being that was Major Armstrong. The remainder of this discussion will be devoted to an attempt to explain the factors which contributed to his amazing record.

II

Edwin H. Armstrong was born in 1890 and spent much of his youth in the city of Yonkers, which as you probably know lies adjacent to New York City. While not wealthy, his family lived comfortably, his father being United States representative of the Oxford University Press. In view of his father's position it is not surprising that he was an avid reader of books, a factor that influenced the course of his life. That his preferred reading dealt with the lives of such great inventors as Volta, Hertz and Marconi was significant. One of his favorite idols was Faraday whose accomplishments he rivalled in later life. During his teens Armstrong filled his attic room in the Armstrong house in Yonkers with all the paraphernalia of the typical radio ham, including various wireless contraptions such as coherers, interrupters and spark coils of the day. Most of his spare time was spent listening to the dots and dashes of other radio hams in Yonkers and vicinity and occasionally picking up Naval and commercial stations both near and far. By the age of 19 Armstrong was ready to enter college and the maturing of the amateur into the professiónal had begun. It is important to note than even before entering college he had decided with typical singlemindedness to become an inventor in the field of radio and never to the day of his death did he waver from that objective. This man was no confused uncertain young teenager who had to have someone else make up his mind for him!

In 1909 Armstrong entered Columbia University to study electrical engineering and came under the influence of the great inventor and teacher, Michael Pupin, who was then Professor of Electrical Engineering. It was soon evident that, aided by formal training in electrical engineering, he had developed a knowledge of radio which far exceeded that contained

in the textbooks of the day or, for that matter, of many of his instructors. His outstanding performance in this regard led him to study the performance of the then new and revolutionary De Forest audion while still a college junior. His experimentation resulted, as noted before, in the invention of the regenerative detector in the year 1912.

Scientific Turn of Mind

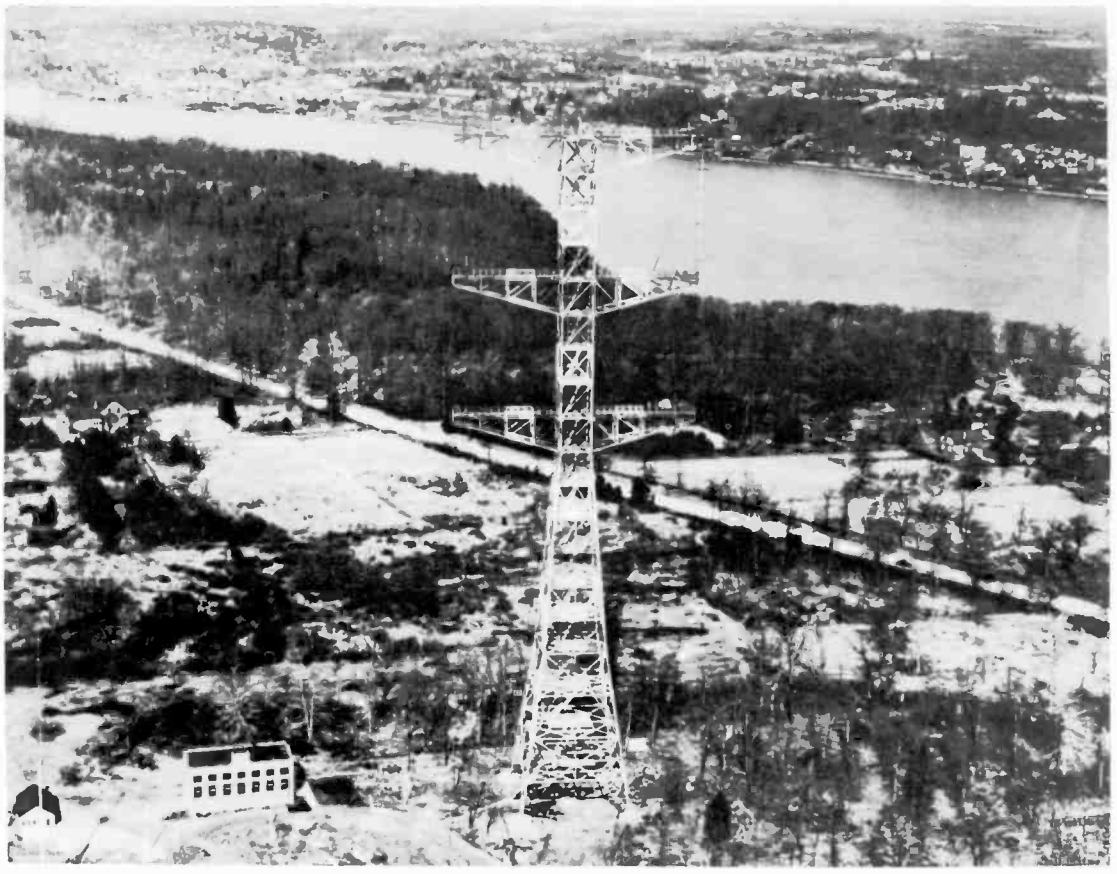
It is important to observe that a major technical contribution made by Armstrong about this time was not just the regenerative circuit itself which was an invention of first rank but also the explanation of the operation of the triode vacuum tube. Until then, it had been regarded as a trigger device, but Armstrong, with typical clarity and logic showed that its performance could be explained by the use of a characteristic curve and laid the groundwork for the vacuum tube circuit theory of today. This illustrates a scientific turn of mind possessed by very few undergraduate students today.

One might be tempted to conclude that Armstrong was a bookworm or possibly a "lab-worm" who paid little or no attention to other aspects of student life. Nothing could be further from the truth. While in college he rode, somewhat recklessly it is said, the hot-rod of his day—a red Indian motorcycle. He entered the usual freshman-sophomore contests and became a tough competitor on the tennis court. The latter sport was one of his favorites and he played well until he sustained an injury to his shoulder in later life. Nevertheless, despite these recreations, Armstrong never wavered from his primary objective, radio. By the time he was a college senior, Armstrong had a basic invention and the benefit of association with Pupin, a foremost inventor in his own right.

Because of his intense interest in his subject and because laboratory facilities would be available to him, Armstrong accepted an assistantship at Columbia University where he continued his work. His salary was quite low, only $50.00 a month, and I have often heard him relate how he used to have his one meal a day at a small restaurant on Broadway near the University because the proprietor was so foolish as to allow him all the bread he could eat with his meal. Not long after his acceptance of this post at the University, his regenerative patent issued and royalties began to pour in at the rate of about $8000 per year.

One might note here that the excellent guidance he received from Pupin and his associates on the management of his affairs as an independent inventor may have laid the seeds of much unhappiness and frustration in later years. Had he renounced all commercial advantage or financial return as his idol Faraday, his creativity might have been even greater because much of the energy he diverted to court actions and litigation would have been available for scientific work. But such was not to be, and much of Major Armstrong's life was spent in the defence of his rights as he saw them. It is interesting to note, however, Armstrong never relinquished his interest in or association with Columbia University and its freedom of thought and investigation, taking over and holding until his death Pupin's chair in electrical engineering. He was always the serious-minded, thorough, experimental scientist.

World War I found Armstrong in uniform as a captain in the Signal Corps. Whoever was responsible for assignment of personnel at that time should be congratulated for having placed Captain Armstrong in a position where he could help solve the problems of communications from ground to aircraft and many other similar problems in which he was a foremost expert. It was in this service that the inspiration for the superheterodyne receiver came to him. Discharged as a Major, he returned to Columbia to resume his life as a scientist and inventor.



RADIO AND TELEVISION

By JOHN CROSBY

The End of KE2XCC

Radio station KE2XCC closed down on Saturday. And that ends an era. KE2XCC at Alpine, N. J. (hereinafter referred to as the Alpine station), was the first frequency modulation station in this country.

John Crosby

When Maj. Edwin H. Armstrong erected it in 1938, it sent cold shivers down a lot of spines. Television was still a gleam in David Sarnoff's eye. Frequency modulation threatened the peace of mind of every broadcaster who was making plenty of money out of amplitude modulation broadcasting (which is ordinary radio broadcasting, as we know it). FM was not only free of static but it reproduced sounds with a fidelity never dreamed of before.

* * *

Of course, these days, when we have Hi-Fi and FM sound transmission on every television set, this is all old hat. But it wasn't old hat in 1938 when this belligerent genius built the Alpine station. I remember a demonstration Ed Armstrong ran at Alpine in those days. He invited a lot of newspaper men out and lined them up face to the wall. Then he poured a tumbler of water from one glass to the other. A second or two later the Alpine station broadcast the sound of a tumbler of water being poured from one glass to the other.

Armstrong defied the newspaper men to tell one sound from the other—the broadcast from the real. Now there is conceivably no more delicate sound on earth than the plash of water passing from one glass to another. But the difference was undetectable. Yet, to my knowledge, not a word appeared in any newspaper about this spectacular demonstration.

* * *

Armstrong was forever scaring people with his magnificent and terrible inventiveness. When he was in the Signal Corps in the first world war, he invented the superheterodyne, without which modern radio wouldn't be possible. He sold this and another invention and bought RCA stock which made him rich.

But he was forever quarreling with RCA over the use of his inventions, and forever suing them, so he sold his stock for several tons of money because he felt that it put him in a funny position. He was one inventor who did not live in a garret. Or, anyway, it was a terribly luxurious garret. He used to live in River House which, before it was remodeled, was one of the citadels of the very, very rich and the only apartment building I know with its own yacht basin.

He took me on a tour once years ago through what seemed like an acre of corridors in this apartment. But where you expected to find libraries or guest rooms, every chamber was piled with electronic equipment that he was forever fiddling with.

* * *

Alpine spent about $1,000,000 broadcasting good music, which was relished by many residents in and around metropolitan New York. But it wasn't the music that interested Ed Armstrong. Alpine started and ended its days as an experimental station. The station and Ed Armstrong endlessly experimented with new transmitters, new uses of FM (it was at Alpine that the Army—and later the Navy and the Marines—decided to adopt FM for mobile communications), for the propagation of ultra-short waves, new ways of relaying radio signals, and, most recently, the transmission of two programs on the same channel.

His was a restless genius, Armstrong's, perennially dissatisfied with things as they are. And when he plunged to his death Feb. 1, the world lost one of the great theoretical minds of our generation.

New York Herald Tribune.

Airview of station KE2XCC at Alpine, New Jersey (opposite page, top). It was originally W2XMN on 43.1 megacycles, built and operated by Major Armstrong in 1938 to demonstrate the merits of his FM system. The 300-foot tower, which is a landmark, the buildings, maintenance, and operation cost him over $1,000,000. From here he maintained high fidelity FM broadcasts for music lovers to show the effectiveness of his new system. The station was closed down on March 6, 1954.

Armstrong on the top of the Alpine tower in mid-winter, trying to clear away the huge amount of ice from the antenna.

Court Clashes

Once back, Armstrong entered into the first of his many court clashes in defence of his patents. The whole question of the regenerative circuit and oscillator against De Forest came up and during the proceedings, Armstrong was made an offer of $335,000 by Westinghouse Company for his regenerative and superheterodyne patent rights. In the meantime, he returned to his work on static elimination with Pupin and accidentally discovered, as described previously, the principle of superregeneration. Concurrently, he participated in the series of tests in 1921 sponsored by the American Radio Relay League which resulted in the successful communication between the United States and England on so called short wave transmissions at a wavelength of about 200 meters. It is significant to note that his colleague, Paul Godley, who picked up the signal in Scotland, used a superheterodyne receiver. Shortly after these tests his superregenerative patent issued, and by 1922 he negotiated with the Radio Corporation of America who wished to buy the rights. Negotiations were completed resulting in the payment to Armstrong of $200,000 in cash and 60,000 shares of RCA stock. This block of stock, combined with 20,000 additional shares for later services, made Armstrong one of the largest stockholders of the growing company. Financially, Armstrong was a multi-millionaire but this made little or no difference to his devotion to radio and his quest for static-free reception.

As a result of many visits to David Sarnoff's office at RCA, he met and courted Sarnoff's secretary, Miss Mac Innes. During this period he lost no opportunity to impress her with feats that were often quite daring and which reflected a bold and boyish personality. The most memorable of these was his hand-over-hand climb of the 400 foot tower of radio station WJZ. When he reached the top he stopped to pose for photographers. Whether or not this had any significant effect on his courtship is hard to say. At any rate, he and Miss Mac Innes were married in 1923.

Shortly after his marriage, Armstrong resumed his series of experiments at Columbia, which culminated in the invention of wide-band FM in 1932 with the patent issuing a year later. It was the fight for adoption of FM which constituted his most bitter series of disappointments. Armstrong tried to interest RCA in his new invention but for reasons which can only be speculative, but which involved the problems of existing investments, the coming of television and possibly personal relationships, he was rebuffed in a manner which offended Armstrong's sense of fair play. At any rate, it may be said that he declared war on RCA to the extent of turning down in 1940 an offer of 1 million dollars for a royalty-free license. The concurrent fight for broadcasting allocations was carried to the Federal Communications Commission where Armstrong finally obtained the allotment of a band in the 40 megacycle range for FM broadcasting. After the war, despite the fact that 500,000 sets were thereby rendered obsolete, the FCC moved the FM band up to its present 100 Megacycle range. This dealt a hard blow to FM, but still it flourished so that by 1949 there were 600 stations on the air. Throughout this latter period, however, RCA was waging war on Armstrong's patent position and most set makers were not paying royalties to Armstrong but were using the so-called ratio detector based on patents held by RCA. Armstrong claimed that this was an infringement and brought suit. The suit was at the stage of pre-trial hearings at the time of his death.

Armstrong fought the battle for FM with the same tenacity he used when attacking his technical problems. Above all, he was outraged at what he considered unfair treatment by RCA, and this may have affected his better judgment so far as personal advantage was concerned. His wife and his colleagues

would have wished him to retire and enjoy his remaining years surrounded by loyal friends and revered as elder statesman of radio. The fact that he continued his fight was characteristic of the dogged tenacity which was so essential to his success.

III

Let us try now to review the important characteristics which may have contributed to Major Armstrong's creativeness in research. First, and foremost, he possessed a genius and character which was God-given. Placed in exactly the same circumstances, only a very few human beings would have had the capacity to achieve a fraction of what Armstrong accomplished. He was single-minded in his objective in life. He was thorough, very hard-working and indefatigable. When asked how Armstrong managed to achieve what he did, one of his assistants stated that he was willing to spend 23 out of 24 hours of his day concentrating on radio. If ever there was an example which illustrated the cliche that creative research is only slightly inspiration and mostly perspiration, he was it. He would repeat an experiment over and over again with little or no regard of the hour until every peculiar effect was fully explained.

The second important factor in his life was the professional education which he received. While he no doubt benefited greatly from his amateur radio activities before entering college, it was his formal education which matured him professionally. In addition, he came under the influence of a foremost teacher, inventor, and scientist in Professor Pupin who earned the reverence of young Armstrong. By making laboratory facilities available to Armstrong, Pupin greatly furthered his productivity.

The third important factor was the timing of his career. The time was ripe for the exploitation of the vacuum tube. Great research organizations sponsored both by industry and government were not in existence and the individual inventor had a good chance to do significant work. The type of work done by Armstrong as an individual in the early decades of the twentieth century is done now by whole organizations of engineers and scientists. It is correct to state that Armstrong is probably the last as well as possibly the greatest individual American inventor.

Fantastic Capacity To Think In Physical Terms

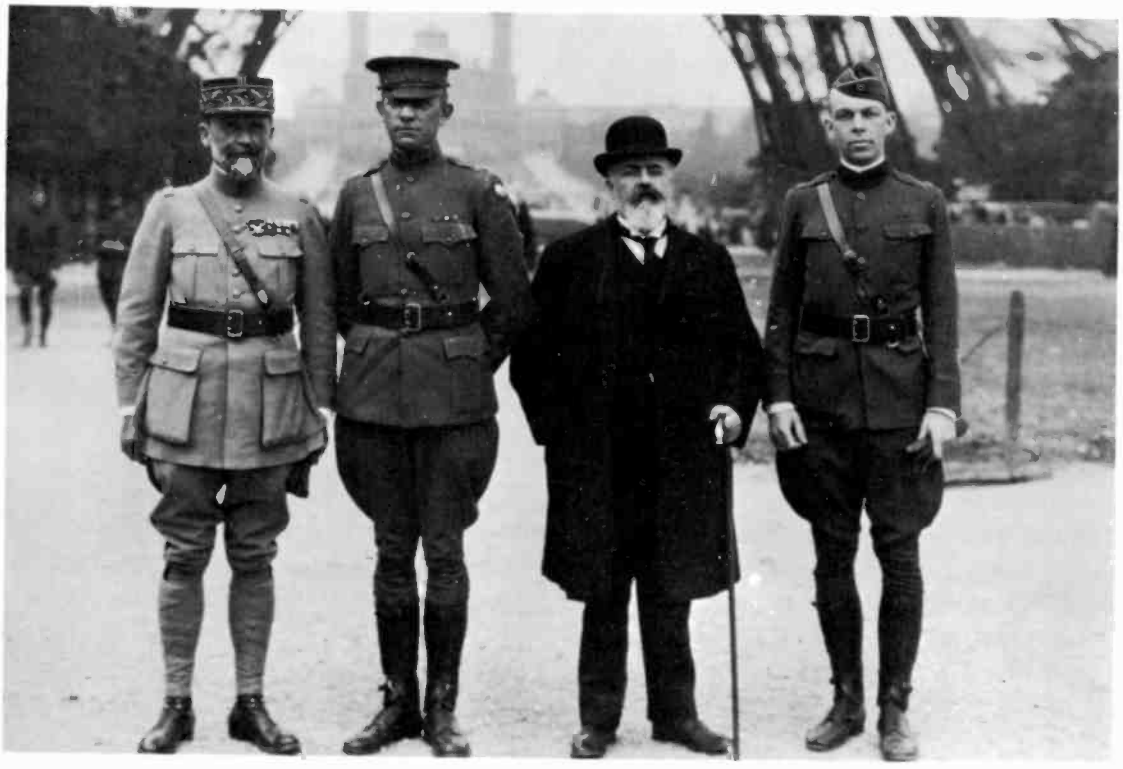
The fourth factor was Armstrong's fantastic capacity to think in physical terms. It is often said that he was a non-mathematical thinker, but such a statement would have been challenged by Pupin. If by mathematics one means simply the formal writing of symbolic mathematical relationships between quantities, he was indeed non-mathematical. A striking characteristic of his papers is that they are generally devoid of any equations. However, if one means by mathematics the exact science of rigorously following one step of logic with another to describe the whole, not necessarily using symbolism, then Armstrong was a foremost applied mathematician. It has been said that he disdained and distrusted the mathematical approach. However, from personal experience I know that he had the highest regard and respect for those who used the mathematical approach. What he objected to was the use of mathematics for its own sake or the application of erudite mathematics to an incorrect physical model resulting in the prediction of an incorrect performance. He demonstrated this devastatingly with his invention of broadband FM. As an experimenter, Armstrong had the uncanny faculty of observing effects and then assembling them into a logical whole thereby producing a clear concise and correct picture of a particular phenomenon. He demonstrated this over and over again starting with his early description of the performance of the triode, explaining the phenomenon of heterodyne and finally pre-

Etching of E. H. Armstrong

EDWIN HOWARD ARMSTRONG (1890–1954) is portrayed in the latest of the series of etchings published by the International Telecommunications Union. Born in the city of New York, he was educated at Columbia University with which he was closely associated until his death.

Major Armstrong contributed four outstanding inventions. His regenerative circuit of 1913 supplied a much-needed increase in sensitivity and selectivity to the early vacuum-tube detector. In 1918, he produced the superheterodyne that is the basis of practically all modern radio receivers. It allows unlimited increases in selectivity and sensitivity without impracticable multiplicity of controls or instability. It makes the noises developed in the circuits preceding the amplifier the real limitation on over-all gain. Two years later, superregeneration promised to supplant all other methods of reception, particularly at the higher frequences, but some inherent limitations restricted its applications severely. In 1933, his method of wide-band frequency modulation provided the first practical system of eliminating the effects of static; it makes the acoustical output of thunder more damaging to reception of music during a local thunderstorm than the electrical disturbances of the lightning that produces the thunder.

The etching of Armstrong is the twentieth in the series that was started in 1935. On a good grade of paper measuring 9 by $6\frac{5}{8}$ inches (23 by 17 centimeters) including margins, these etchings are available at 3 Swiss francs each from Secrétariat général de l'Union internationale des Télécommunications, Palais Wilson, 52, rue des Pâquis, Genève, Suisse. The entire series is comprised of etchings of Ampere, Armstrong, Baudot, Bell, Erlang, Faraday, Ferrié, Gauss and Weber, Heaviside, Hertz, Hughes, Kelvin, Lorentz, Marconi, Maxwell, Morse, Popov, Pupin, Siemens, and Tesla.



Major Armstrong shown in the attic room of his family residence on Warburton Ave. in Yonkers N. Y. where he made some of his greatest discoveries. The picture was taken about 1950.

Armstrong standing on top of the ball on the antenna tower of RCA Broadcasting Station WJZ, Aeolian Hall, 42nd Street, N. Y. C., 400 feet above the street, in May 1923. WJZ was the first broadcasting station in New York City proper and the pictures were taken just before the opening ceremonies began. As a result of this stunt Gen. Mgr. Sarnoff declared the roof permanently "off limits" for Armstrong.

Opposite page, bottom. Armstrong (right) in Paris during World War I where he invented the Superheterodyne. Left to right: General Ferrier and Prof. Abraham of the Sorbonne.

dicting the effect of broadband FM on noise reduction.

The fifth factor of importance was his ability to inspire loyalty among his colleagues and assistants. Armstrong was recognized by all as an important figure. Yet he retained a modesty and self-effacing character which made all who knew him or worked for him respect and like him. I asked him on at least two occasions to tell me what it was that was responsible for his enormous productivity and success. The question embarrassed him and he evaded a direct answer by reciting certain factual occurrences in his professional life. Never did he play up in any way his personal role. Probably he did not really know exactly what it was that made him the great man he was. His generosity and loyalty towards those whom he felt dealt honestly with him was renowned. At the same time his tenacious opposition to those he felt did not was equally well known.

Youthfulness of Outlook

Lastly, a factor which undoubtedly contributed to Armstrong's productivity was a youthfulness of outlook, a boyish enthusiasm which is hard to define. It was brought out tangibly in a number of his more daring feats such as the memorable climb to the top of the WJZ tower, or his swinging at the top of his Alpine tower in a boatswain's chair to adjust the antenna feed for his FM station. More intangibly, it shone in his eyes when he talked about his work. I shall never forget my last meeting with the Major, some two months before he died. The occasion was dinner at his apartment to which I had been invited to meet a business acquaintance of his who had a research and development proposal which he thought might be of interest to me. The Major was in a good mood. Only occasionally did he show a few flashes of the loneliness which lifelong concentration on his work brought upon him. At the end of a most enjoyable evening, his other guest and I bade him good night in the foyer of his apartment. I clearly remember him as I shook his hand. He was tall, powerfully built, one shoulder drooping slightly, his head bald, smiling his typical crooked smile, and looking a bit tired. But the most striking thing of all was the characteristic twinkle in his eye which belied his age and was like that found in a young man looking forward to another exciting day. Perhaps this was the most important asset of them all.

Major Armstrong died on February 1st of this year. At the time of his death he was in the midst of his greatest battle for FM. Regardless of the rights or wrongs of this or any of his other conflicts, opponents as well as partisans will probably agree that Major Armstrong was the most important creative thinker and inventor of all time in the field of radio and that his passing marks not just the end of the life of a great man but also the end of an era.

The monument as it now looks with the names of the six staff members and that of Paul Godley inscribed below "1BCG."

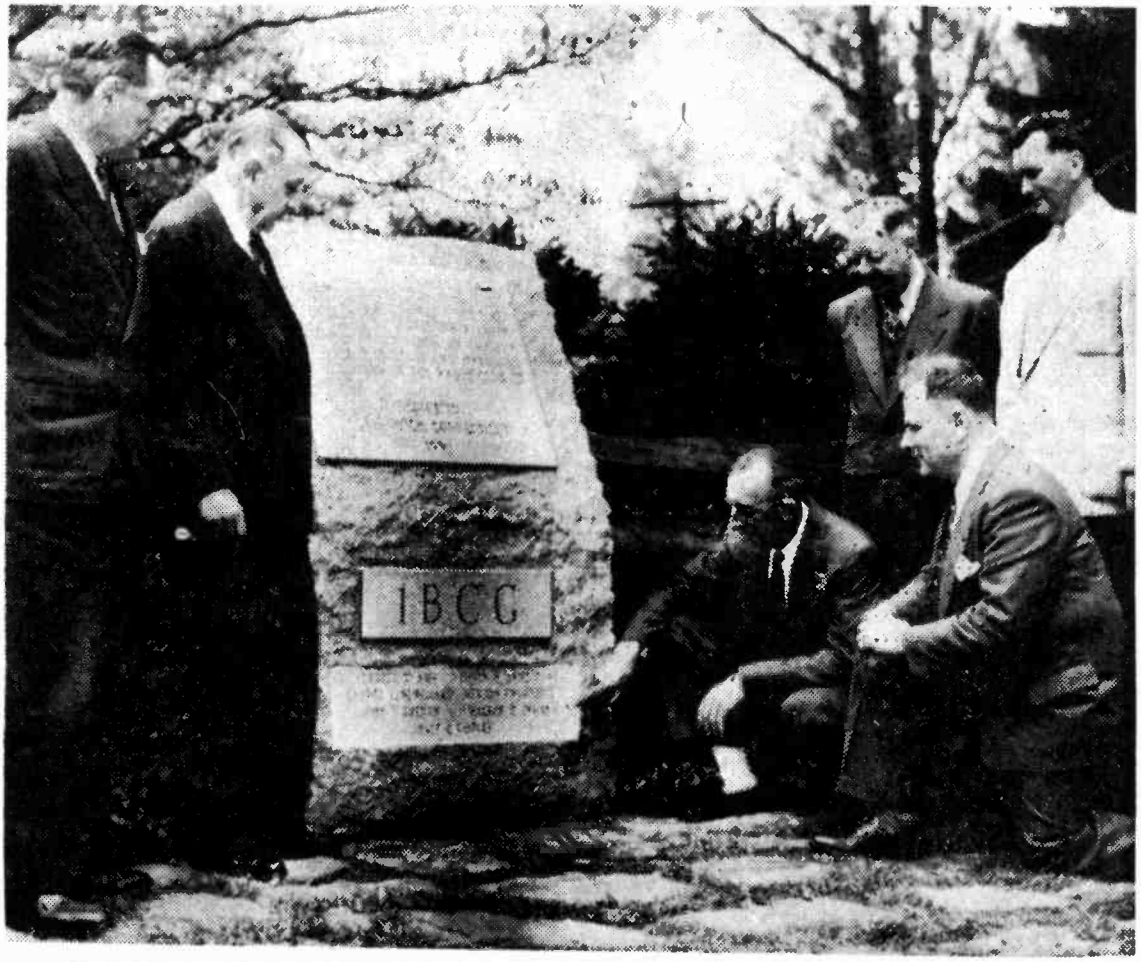
The Board of Directors had originally intended to inscribe the names of the staff of station 1BCG on the monument at Greenwich when it was first erected, but Armstrong had always objected saying that they are all still alive and you just don't put a living man's name on a monument. The Board therefore felt that as an additional tribute to Armstrong the names should now be inscribed. This was done and at a small ceremony at Greenwich on May 11th. 1954 the work was consummated.

As a further tribute to Armstrong a group of his old friends and associates together with the Radio Club and the Engineering Council of Columbia University formed the ARMSTRONG MEMORIAL RESEARCH FOUNDATION Inc. on November 21st. 1955. The original Charter members and Directors were:

Ernest V. Amy, Harold H. Beverage, George E. Burghard, George J. Eltz, John V. L. Hogan, Harry W. Houck, Walter S. Lemmon, Alfred McCormack, Harry Sadenwater, Joseph Stantley, Thomas J. Styles, Dana M. Raymond, Robert W. Byerly, John R. Dunning, C. R. Runyon Jr., James R. Day, Frank A. Gunther, John H. Bose, Raymond A. Heising, Frank H. Shepard Jr., Evan B. Lloyd, Edward L. Bowles.

Officers: George Burghard, President; Harry Houck Vice President, Thomas Styles, Sec-

Historic Event Commemorated At Gathering



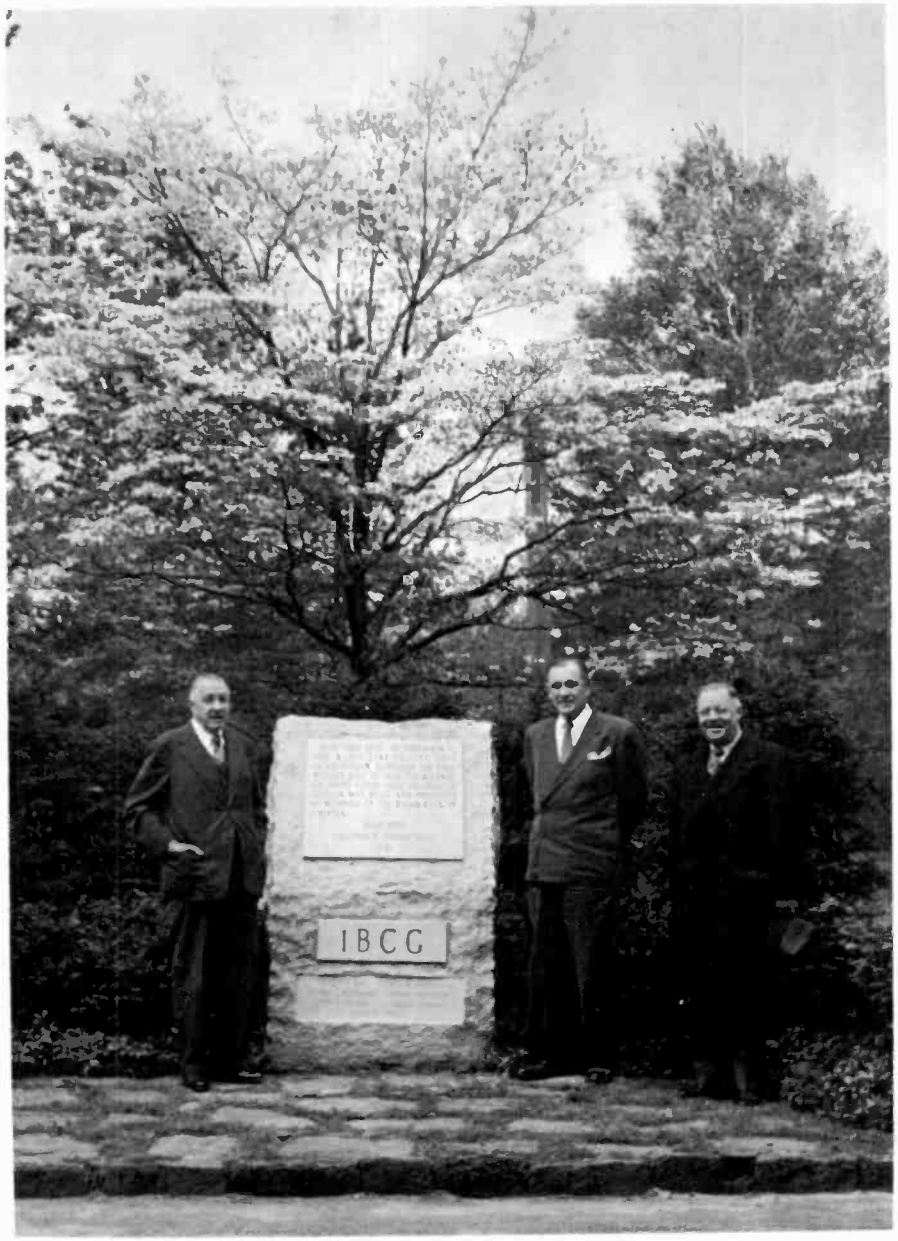
Members of the Radio Club of America met yesterday noon at the monument located at the intersection of North St. and Clapboard Ridge Rd., site of Amatur Radio Station 1BCG, which on Dec. 11, 1921 sent the vrst message ever to span the Atlantic on short waves. It was recei ed at Androssan, Scotland. The club members commemorated the event with addition of names of original senders of the message to inscription on the monument. Kneeling above are Francis Fahey. pointing, who inscribed the names, and Frank H. Shepard, president of the Radio Club of America. Standing, left to right: Ernest V. Amy and George E. Burghard two of the original senders; Harry Sadenwater and Greenwich Superintendent of Parks and Trees Joseph A. Dietrich. —Staff photo by Verderosa.

Greenwich Times, Wednesday, May 12, 1954.

retary and Joseph Stantley, Treasurer. The purposes of the Foundation are set forth in the Charter and We quote:

> "(a) to honor the memory of the late Professor Edwin Howard Armstrong by helping to perpetuate the principles that guided him in a life devoted to basic research in electronics;
>
> (b) to aid voluntarily in the continuation of the basic research that was carried on by Armstrong at the Marcellus Hartley Laboratory at Columbia University in the City of New York; and
>
> (c) to contribute voluntarily to the education and training of engineers and scientists capable of doing basic applied research in electronics and related fields of science."

The Foundation now numbers some one hundred members in its four classes of membership ie. Founding, Sustaining, Contributing and Associate, and has succeeded in collecting



Left to right: Burghard, Amy and Sadenwater standing before the monument with tree in full bloom as background, after ceremonies, on May 11th. 1954.

over $60,000.00 from dues and contributions. $40,000.00 of this has been pledged to build and equip the Armstrong Physical Electronics Research Laboratory in the new Engineering Center at Columbia University and with a bright future in view it is hoped that other projects such as scholarships etc. will be forthcoming.

In 1956 the Armstrong Medal was awarded to one of Radio's real old timers, Melville Eastham founder of the Clapp-Eastham Co. one of the pioneer manufacturers of radio measuring apparatus and equipment. The presentation was made at the 47th. Anniversary banquet held at the Columbia University Club.

Frank Gunther, President of the Radio Club, (left) presenting the Armstrong Medal to Melville Eastham at the 47th. Anniversary Banquet on December 14, 1956.

CITATION ON THE OCCASION
OF THE
AWARD OF THE ARMSTRONG MEDAL
TO
MELVILLE EASTHAM
December 14, 1956

* * * *

The award of the ARMSTRONG MEDAL of The Radio Club of America to Melville Eastham is in recognition of his outstanding contributions to the art of precision measurements in the radio and electronic field.

For fifty years a design engineer, Mr. Eastham's effort made available to many workers in the electronic art reliable test equipment of a standardized nature which previously did not exist or had to be specially assembled as a laboratory setup.

Beside his many technical contributions, Mr. Eastham was a leader in recognizing the importance of good employee relations, and assisted and encouraged his associates in continuing their technical education and in making contributions to technical literature. His thorough, practical approach to design problems and his enlightened management practices should be an inspiration to younger men.

Forty-seventh Anniversary Banquet held at the Columbia University Club December 15, 1956. The Armitrong Medal was presented to Melville Eastham, and the Guest Speaker was Dr. Kenneth L. Franklin.

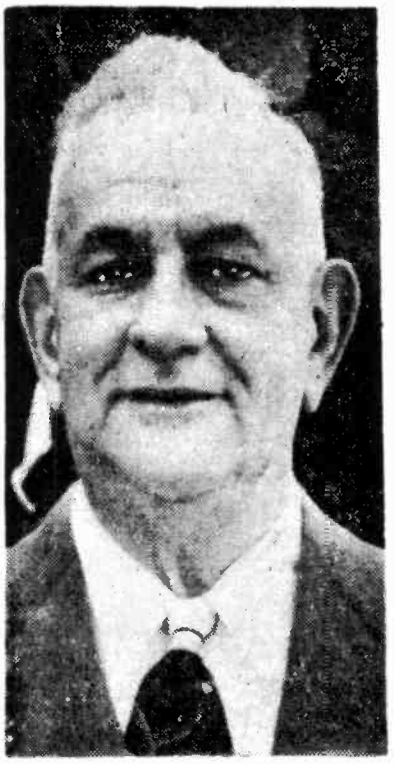
John F. Grinan. 1894–1955.

The Radio Club suffered another great loss in 1957 by the untimely passing of one of its earliest members John F. Grinan on May 22nd. "Johnny," as he was called by most everyone, was indeed one of nature's noblemen and beloved by all who knew him. He started in Radio as an amateur in 1909 and became the world's most famous amateur operator. He was the first to send direct transcontinental signals, he sent the first transcontinental relay message, he sent the first transcontinental message and the first transatlantic short wave message from station 1BCG in 1921. His own station 2PM in New York City was known to every amateur and local commercial operator before World War I. He was born in Cuba but moved to Jamaica B.W.I. where his family owned and operated sugar plantations. In Jamaica in the thirties he set up station NJ2PZ and later VP5PZ thru which he communicated regularly with his friends in the states and all over the world. This station became even more famous than old 2PM. In later years he came to St. Petersburg, Florida where he died of a heart attack in his sixty-first year.

As we now face the present and look to the future we cannot lose sight of the fact that the club is actually in the second generation and fast running into the third. The sons of the old timers are now taking over and we mention with pride the accomplishments of such fine radio men as Renville H. McMann 3rd., C. R. Runyon 3rd., Joseph Stantley Jr., John S. Di Blasi, Alfred H. Grebe, M. B. Cronkhite, W. G. F. Cronkhite and Paul Sadenwater, and there are many more to come. Yes these younger men are taking over the reins and will carry on in the true tradition of the Radio Club of America making all the necessary adjustments of policy to keep up with the times. This does not mean that the old timers have lost interest. In fact quite the contrary is true. Several of them still operate and have continuously operated their own amateur stations, with the very latest equipment either on CW or single side band telephone. Although the radio telephone both AM and SSB is perhaps the most universal system at present because of the great improvement in DX communication, there is nevertheless still a large group who prefer pounding the brass and most any morning early one can hear W2AG Randy Runyon, W2FG Clarence Pfeifer and WIZE Irving Vermilya and the gang batting it out in the old American Morse code which is the mark of a true old timer. Also active on both CW and Phone are Frank Gunther W2ALS. George Eltz W2ZL, George Burghard W2GEC, John Di Blasi W2 FX the President of the Quarter Century Wireless Assn. and our present President Walter Knoop W2PXR who is a keen CW operator. There are a great many more

Radio Pioneer Wins Medal

The Edwin H. Armstrong Medal has been awarded to Mr. John F. Grinan, chairman of the Board of the Grinan Estates Ltd., the man who gave ZQI to the Government of Jamaica. He has been awarded the medal for the leading part he played in transmitting the first wireless message



The Man

across the Atlantic on December 11, 1921, over the amateur transmitter IBCG at Greenwich, Connecticut.

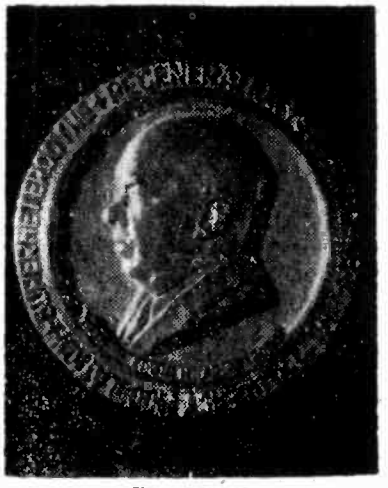
Mr. Grinan has been in radio all his life and is one of the leading amateurs in the world. He holds three world records: for sending the first relayed trans-continental message across America, for sending the first signals across the continent, and for sending the first wireless message (professional or amateur) across the Atlantic from America to Ardrossan, Scotland.

Mr. Grinan has been associated for many years with Professor Edwin H. Armstrong, discoverer of regeneration, super-regeneration and inventor of the super-heterodyne and frequency modulation. The medal, awarded by the Radio Club of America, was cast in honour of Professor Armstrong one of the greatest radio scientists in the world. Professor Armstrong is head of the Hartley Research Laboratory, Columbia University.

It is interesting to note that in a report Mr. Grinan did jointly with the late T. J. Guilfoyle in connection with radio in Jamaica, Mr. Grinan had recommended that the Government adopt frequency modulation as a more modern and effective method of broadcasting than is amplitude modulation, the system now used.

In a letter congratulating Mr. Grinan, Professor Armstrong said:

"I know I am late in writing to congratulate you on being an Armstrong medalist .... You will be interested to know that the British have officially got round to setting up a high power FM station (25 kw) and are testing it out with an equal power AM transmitter. FM won



The Medal

hands down .... It looks as though the first of the year will see an FM service in England and of course, the Germans are putting it in everywhere in the western Zone.

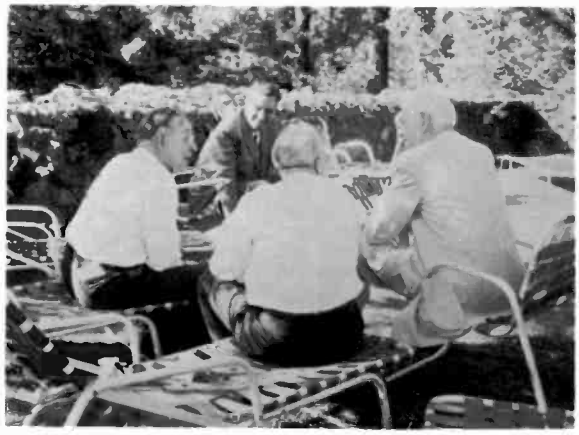
"When the results become known throughout the world, the colonies, particularly those in the tropics, will probably wake up to the fact that what you and I have been telling them for years is true. Meanwhile they have lost ten years; their own fault."

Mr. Grinan was born in Kingston in 1894, and as one of the earliest radio amateurs, he has operated an experimental radio station since 1906. He was for many years vice president of Continental Radio Corporation, wholesale distributors for RCA-Victor. He was formerly a member of the Government Wireless Board, Broadcasting Board and Electricity Board.

A monument has been erected in

reenwich, Connecticut marking the ·ot where on December 11, 1921, adio station 1BCG sent to Ardros·an, Scotland, the first message ever to span the Atlantic on short waves.

This article appeared in the Daily Gleaner, Kingston, Jamaica, B.W.I. on March 3, 1951 and refers to the 1BCG ceremonies at Greenwich.



Frank Shepard's party for the Directors at his home in Summit, N. J., June 18, 1955. (Top) The group on the terrace. (Center) Jim Morelock helping Frank pour while Al Toth and Frank Gunther (right background) look on. (Bottom) Harry Houck (left, standing) and Frank Shepard get things organized.

The Walter Knoop party, June 14, 1958. (Top) The boys and girls getting together on the lawn. (Center) Harry Houck and Grace Sadenwater in an unguarded moment. (Bottom) Left to right, Ralph Batcher, Fred Klingenschmitt, and Harry Houck talking things over.




The meeting on Jim Morelock's Farm June 20th. 1959.

(Top left) The group in a real rustic setting. (Top right) Harry Sadenwater telling about the big one that got away. (Left to right) Mrs. Batcher, Ralph and Walter Knoop. (Bottom left) In the middle of a story. Morelock, Shepard, Burghard, Osbourne. (Bottom right) Contentment: Mrs. Burghard, George, and Walter Knoop.

members thruout the country who are still active and it is a great pleasure and brings back fond memories when we can contact one of them and have a real old rag chew. We have purposely omitted the showing of any fotos of amateur stations in the latter sections of this history because of space for one thing and also because times have changed and the home rig is really a thing of the past. This was the most interesting phase to the reader while pictures of the modern factory built really commercial rigs of the amateur today can be found in any magazine. We cannot stress too greatly the importance of keeping up the spirit of the Club and several innovations have been injected into the Club life in recent years which bear mentioning here.

In 1955 President Frank Shepard instituted the practice of holding the last Directors meeting of the year at the home of the chief executive. The first one was hosted by Frank and his gracious wife at their home in Summit New Jersey. It consisted of as little meeting as possible and then a real get together with all the trimmings including the wives or girl friends. The party proved so successful that it now has become standard practice and similar meetings were held in 1956 and 1957 at the home of Frank Gunther on Staten Island and at the home of Walter Knoop, in Essex Falls N. J. in 1958 and Jim Morelock was the host at Millington N. J. in this year of 1959. A very good time was had by all and we sincerely hope that there will be many more to come.

Under the able leadership of Walter Knoop as President and Ren McMann Jr., as Chairman of the Papers and Meetings Committee the old but excellent practice of having field trips has been revived. One was made in June of 1958 to Fort Monmouth Signal Laboratories and the last in June of 1959 to Idelwild Airport. Both were most interesting and added greatly to the prestige of the Club. Keep up the good work.

The Radio Club of America, Inc.

FIELD TRIP

SATELLITE OBSERVATION CENTER

U. S. ARMY SIGNAL RESEARCH & DEVELOPMENT LABORATORY

DEAL TEST AREA, FORT MONMOUTH, N. J.

SATURDAY, JUNE 21, 1958 AT 2:30 P.M.

Mr. Robert Kulinyi and Mr. Lloyd H. Manamon will give a short talk describing the operation of the Center. If the orbital positions of the satellites are favorable, we will be able to observe the Center during an actual intercept. If conditions are unfavorable, recordings of past intercepts of unusual interest will be played.

Attendance must be limited to United States citizens only.

WALTER A. KNOOP	**R. H. McMANN, Jr.,** Chairman	**JAMES MORELOCK**
President	Paper & Meetings Committee	Corresponding Sec'y

How to get there —

Go south on Garden State Parkway, turning left at Exit 105 (Eatontown), just south of Hexagon Building which will be seen on the left about 3½ miles south of Red Bank Exit. Then proceed east toward Long Branch and turn right (south) on Route 35 at the traffic circle. At second traffic signal, turn left on Deal Road. Then take first left on Whale Pound Road. Tracking Station is on left (north). Turn left through first opening in fence and proceed to guard house at inner fence. Follow signs to parking area and Building #3, from which the Club members will be escorted to the Satellite Center.

1909 1959

The Radio Club of America, Inc.

Anniversary Year Field Trip

IDLEWILD INTERNATIONAL AIRPORT

SATURDAY, JUNE 27, 1959, 2:00 P. M.

Second Floor Conference Room, Federal Building

SPEAKER — TIMOTHY HARTNETT, Chief of Communications Section, F.A.A. Idlewild International Airport

SUBJECT — COMMUNICATIONS AND THE JET AGE

The rapidly increasing use of air transportation, coupled with the higher speed involved in jet operations, has placed stringent demands upon the supporting communication system. Mr. Hartnett will give us the latest information on the F.A.A. world wide communication system, with particular emphasis on the installation at Idlewild. At the conclusion of the talk, there will be a conducted tour of the Idlewild communication and radar facilities.

WALTER A. KNOOP
President

R. H. McMANN, Jr., Chairman
Papers & Meetings Committee

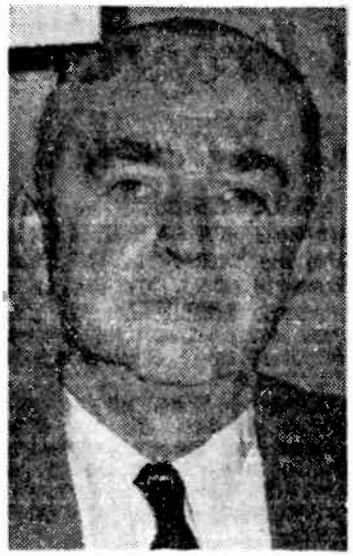
JAMES MORELOCK
Corresponding Sec'y

On May 14th. 1958 the Club lost its first founding member with the death of George J. Eltz Jr. He was indeed a Radio Pioneer having started as an amateur in 1907, was the first Vice President of the Junior Wireless Club Ltd. in 1909 and President of the Radio Club of America in 1915. Many of his radio exploits can be found elsewhere in the pages of this history. A suitable resolution was passed by the Board of Directors and presented to his widow.

George was a very able engineer and tireless experimenter, which coupled with a great sense of humor and a scintilating personality made his loss irreparable. The following letter was sent to his wife by W. Preston Corderman the Commanding general at Fort Monmouth where he had served as civilian Director of Engineering Facilities Division of the Signal Research Laboratory since 1941.

George J. Eltz, Radio Pioneer

AVON—George J. Eltz, 65, of 225 Lincoln Ave., died this morning in Fitkin Hospital, Neptune. He was born in New York, son of the late Mr. and Mrs. George J. Eltz. Mr. Eltz attended Stevens



GEORGE J. ELTZ

Institute of Technology, and was a graduate of Columbia University.

He had been employed at Ft. Monmouth since 1941 as an electrical engineer. He was the director of Engineering Facilities Division of the U.S. Army Signal Research and Development Laboratory at the time of his death. For several years previously he was chief engineer at the Evans Signal Laboratories.

Mr. Eltz was a director and founding member of the Armstrong Memorial Research Foundation Inc.

Mr. Eltz was among the early radio hams. He became interested in radio at the age of seven. When he was 12 years of age he was building his own sets.

George J. Eltz, Jr.
1893–1958.

He had the call letters W2ZL for many years. He was one of the founders in 1909 of the Radio Club of America, when it was known as the Junior Wireless Club.

Surviving are his wife, Mrs. Marie Doody Eltz; two daughters, Mrs. George Chapman, Manasquan; Mrs. Eugene VanCleve, Middletown Township; seven grandchildren, and three sisters, Mrs. Byron T. Davey and Mrs. James Kerans, both of New York City, and Mrs. Frances P. Motzenbecker, Short Hills.

The Bodine Funeral Home, Asbury Park, is in charge of arrangements.

Asbury Park Press,
May 15, 1958.

HEADQUARTERS
FORT MONMOUTH, NEW JERSEY

OFFICE OF THE COMMANDING GENERAL

Mrs. Marie Eltz
225 Lincoln Avenue
Avon, New Jersey

19 May 1958

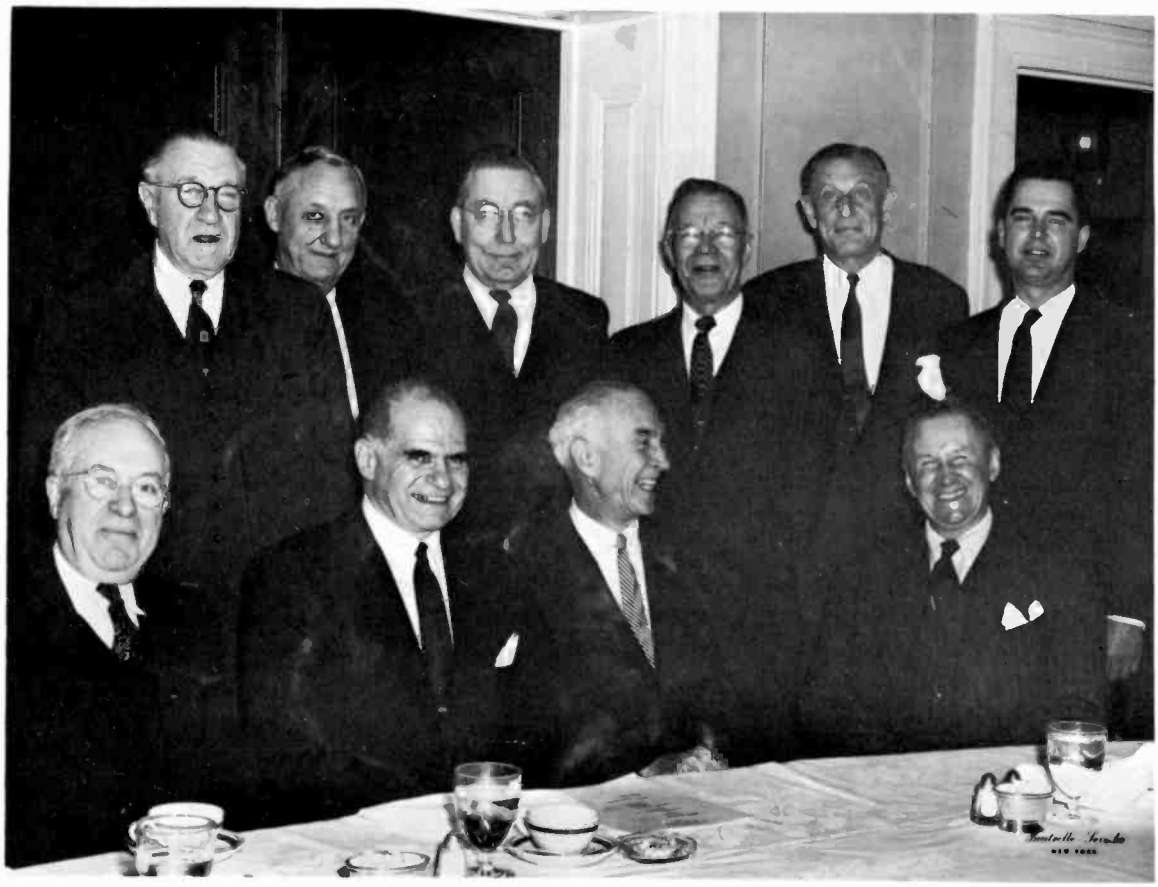
Dear Mrs. Eltz:

I wish to express to you my deepest sympathy in the loss of your husband.

During the critical years of World War II, Mr. Eltz contributed his untiring energies and technical knowledge to the fulfillment of the Signal Corps mission. In 1945, as Chief Engineer of the Evans Signal Laboratory, he aided immeasurably in adjusting the program and facilities of the Laboratory to the peace-time research and development needs of the Army. During the Korean War and the period of technological change that followed, Mr. Eltz, as Director of the Engineering Facilities Division, provided the leadership and devotion to duty greatly needed to keep our nation's scientific progress abreast of those who would seek to destroy the ideas and institutions we believe in. The respect and esteem with which Mr. Eltz was regarded by his associates and the fine building which now houses the U. S. Army Signal Research and Development Laboratory, and which is to a great measure due to his planning and effort, will be a lasting monument to his memory.

Words are ineffective in easing the grief caused by your recent loss. Nevertheless, personally and for the military and civilian employees of this installation, my sincere condolence is extended to you and to the other members of your family in your bereavement. May this thought help to comfort and sustain you. Within a few days a representative of this headquarters will communicate with you to advise you of certain provisions of the Civil Service and Department of the Army Regulations for beneficiaries of deceased civilian employees.

Sincerely,
(Signed) *W. Preston Corderman*
W. Preston Corderman
Major General, USA
Commanding



Fiftieth Anniversary Committee of the Radio Club of America. Left to right, seated: Harry Houck, Pierre Boucheron, Frank King, W. E. D. Stokes Jr., Standing: George Burghard, C. R. Runyon Jr., Ralph Batcher, Harry Sadenwater, Ernest Amy, Walter Knoop. Not present: Frank Gunther, Frank Shepard, and George Washington Jr.

The present administration of the Club is very much aware of the effect of the great change in our way of life on the future of the club. Accordingly President Knoop has recently appointed a special committee to search into every phase of this complex situation and come up with recommendations as to the proper procedure to insure the future welfare of the oldest Radio Club in continuous existence in the World.

President Frank Gunther in 1957 appointed a special 50th. Anniversary Committee to make proper arrangements for the Golden Jubilee celebration in 1959. This Committee has been hard at work ever since. The plans are, to publish a Golden Year Book along the same lines as the 25th. Anniversary Silver Book, and to hold a grand Banquet on December 4th. 1959 to which, for the first time in Radio Club history the ladies will be invited. It should be a very festive affair indeed and well under way by the time these lines are printed and the Golden Year Book is ready for distribution.

This brings our story to an end. Again we must express our regrets that due to lack of space it has been impossible to write about the many excellent contributions of the Radio Club of America members to the Radio Art. If you will take the time, however to carefully read the other sections of this Book we feel sure that their magnitude will become increasingly apparent. Now that our first fifty years have been successfully accomplished we sincerely hope that the Club will live for many years to come in the same spirit and with the same high ideals upon which it was founded.

THE PROCEEDINGS

OF THE

RADIO CLUB OF AMERICA, INC.

FOREWORD

The Radio Club of America is a club, not a society.

It is fortunate in having among its members, old timers from whom have come practically every basic concept upon which the radio communications, broadcast, AM, FM, and Television industries are based. Many of these basic contributions to the art had their first public announcement in our meetings and proceedings. Its younger members are active in all fields of electronics, computers, data processing, military electronics, process control, etc.

As a club, there are no barriers between members because of position, title, or age.

The younger members mix and are inspired by the wisdom and experience of the old timers, the old timers are in turn kept on their toes by the enthusiasm, energy and new problems of the youngsters.

This Fiftieth Anniversary we pause momentarily in the pages of this book to look back with a feeling of pride and thanks for the Radio Club of America. We will sally forth with renewed inspiration and hope for the future.

FRANCIS H. SHEPARD JR.

THE PROCEEDINGS
OF THE
RADIO CLUB OF AMERICA, INC.

Prior to 1913:

Date	*Title of Paper*	*Author*
	A Square Law Condenser (Straight Line Capacity)	George J. Eltz, Jr.
	Thermionic Vacuum Tube	Ernest V. Amy
	A Telephone Relay Amplifier (an original loud speaker designed by him)	Dr. Walter G. Hudson
	Radio Arc Telephony	George J. Eltz, Jr. and Frank King
	Directional Radio Transmission	Frank King
	Selenium as a Photoelectric Element	George Burghard

1913 to 1934:

May	1913	Theory of Tuned Circuits.	Edwin H. Armstrong
Dec.	1913	Theory of Tuned Circuits.	Edwin H. Armstrong
Feb.	1914	A Device for Minimizing Interference.	Walter S. Lemmon
Mar.	1914	The Construction of a Sensitive Galvanometer.	George J. Eltz, Jr.
Apr.	1914	Working Principles of a Wavemeter.	Louis Gerard Pacent
May	1914	(1) Telegraphone (2) An Audio-Frequency Amplifier	Charles V. Logwood
Nov.	1914	The Heterodyne Receiving System.	John V. L. Hogan, Jr.
Nov.	1914	The Development of the Hudson Audion Filament.	Dr. Walter G. Hudson
Dec.	1914	The Kolster Direct-Reading Decrement and Wavemeter.	Robert H. Marriott
Feb.	1915	Distributed Capacity and Dead End Effect	Harry Sadenwater
Apr.	1915	The Regenerative Circuit.	E. H. Armstrong
May	1915	Foreign Radio Apparatus.	Dr. A. N. Goldsmith
Oct.	1915	Quenched Spark Sets.	Fritz Lowenstein
Nov.	1915	Discussed expert testimony tending to show that Marconi's was a genuine invention and not merely a development of Hertzian waves.	Emil J. Simon
Dec.	1915	The Development of Radio Sets for Aeroplanes.	L. J. Lesh
Jan.	1916	Portable Aeroplane and Trench Radio Sets.	William Dubilier
Mar.	1916	The Efficiency of Radio Sets.	Fritz Lowenstein
May	1916	Fundamental Considerations in Oscillating and Resonance Circuits.	Dr. John Stone
June	1916	Applications of the Audion.	Paul F. Godley
Sept.	1916	A Modern Experimental Radio Telegraph and Telephone Station.	Alfred H. Grebe
Dec.	1916	Radio Laboratory Measurements and the Elimination of Radio Losses.	L. W. Stevens
Jan.	1917	Inductance and Capacity Phenomena.	Prof. J. H. Morecroft
Feb.	1917	Losses and Capacity of Multi-Layer Coils.	Louis A. Hazeltine
Mar.	1917	Motional Impedance Circle of the Telephone Receiver.	Hawley O. Taylor
Apr.	1917	Army and Navy Signaling Systems.	David S. Brown and Walter S. Lemmon

Date	Title of Paper	Author
May 1917	This represents the period of the World War, and no record exists of any papers read before the Club.	Nov. 1919
Dec. 1919	A New Method of Receiving Weak Signals for Short Waves.	Edwin H. Armstrong
Jan. 1920	The Vacuum Tube as a Detector and Amplifier.	L. M. Clement
Feb. 1920	Recent Development of Radio Telephones.	Walter S. Lemmon
Mar. 1920	Navy Receiving Equipment.	L. C. F. Horle
Apr. 1920	Bulb Oscillators for Radio Transmission.	Louis A. Hazeltine
May 1920	2ZM's Radiophone and C. W. Transmitter.	L. Spangenberg
Sept. 1920	The Bureau of Standards—A.R.R.L. Tests of Short Wave Radio Signal Fading.	S. Kruse
Oct. 1920	Determination of Resistance, Inductance and Capacity by the Wheatstone Bridge Method.	Julius G. Aceves
Nov. 1920	The Resonant Convertor.	Walter S. Lemmon
Dec. 1920	Amateur C. W. Set at 2ZL.	J. O. Smith
Jan. 1921	Design of Loop Antenna.	David S. Brown
Feb. 1921	Modulation in Radio Telephony.	R. A. Heising
Mar. 1921	Some Operating Notes on the Larger Sizes of Transmitting Tubes.	William C. White
Apr. 1921	Notes on Design of Vacuum Tube Transmitters.	A. W. Kishpaugh
May 1921	Commercial Radio Telephony.	Francis M. Ryan
Sept. 1921	Description of Radio Station 8XK.	Frank Conrad
Oct. 1921	Audio and Radio Frequency Amplification.	George J. Eltz, Jr.
Nov. 1921	Methods of Modulation in Radio Telephones.	L. C. F. Horle
Dec. 1921	Station 1BCG.	George E. Burghard
Jan. 1922	Radio Central.	Pierre Boucheron
Feb. 1922	Trans-Atlantic Reception.	Paul Godley
Mar. 1922	The S-Tube Rectifier.	Howard J. Tyzzer
Apr. 1922	Multi-Stage Amplifiers.	M. C. Batsel
June 1922	The Super-Regenerative Circuit.	Edwin H. Armstrong
Oct. 1922	The Armstrong Super-Regenerative Circuit: its Operation and Construction.	George J. Eltz, Jr.
Dec. 1922	Vacuum Tube Amplification.	S. E. Anderson
Mar. 1923	Tuned Radio Frequency Amplification with Neutralization of Capacity Coupling.	Louis A. Hazeltine
Apr. 1923	Eighteen Years of Amateur Radio.	George Burghard
May 1923	The Thoriated Tungsten Filament.	William C. White
June 1923	How to Build a Super-Heterodyne Receiver.	George J. Eltz, Jr.
Sept. 1923	The Fundamentals of Loud Speaker Construction.	A. Nyman
Nov. 1923	Why No Receiver Can Eliminate Spark Interference.	Louis A. Hazeltine
Jan. 1924	A New Method of Radio Frequency Amplification.	C. L. Farrand
Feb. 1924	The Story of the Super-Heterodyne.	Edwin H. Armstrong
Apr. 1924	Solving the Problems of the Neutrodyne.	John F. Dreyer, Jr.
Oct. 1924	A Single Control Receiver.	C. L. Farrand
Dec. 1924	An Induction Loud Speaker.	Dr. C. W. Hewlett
Feb. 1925	Anti-Radiation Devices.	R. A. Weagant
May 1925	Influence of Wiring in Resonant Circuit Design.	Oscar C. Roos
Dec. 1925	Modern Radio Reproduction.	Arthur Van Dyck
Jan. 1926	Loud Speakers.	C. L. Farrand
Feb. 1926	Electrical Instruments and Their Adaption to Radio.	A. F. Corby
Mar. 1926	Tendencies in Modern Radio Receivers.	Julius G. Aceves
Apr. 1926	Transformer Coupled Amplifiers for Radio Receivers.	A. W. Saunders
May 1926	Problems of Three Broadcasting Stations.	Harry Sadenwater
June 1926	A Short-Wave Superheterodyne Receiver.	George J. Eltz, Jr.

Date	*Title of Paper*	*Author*
Sept. 1926	A New System of A. C. Power Supply and its Application to a Commercial Broadcast Receiver.	B. F. Miessner
Oct. 1926	The Theory and Application of the Constant-Coupled, Non-Reactive Plate Circuit Radio-Frequency Amplifier.	S. Young White and E. H. Loftin.
Nov. 1926	Development, Design and Operation of an S. W. Receiver in which Regeneration is Practically Constant.	W. R. Diehl and F. B. Ostman
Dec. 1926	A Fundamental Analysis of Loud Speakers.	J. F. Nielsen
Jan. 1927	A Combination Power Amplifier and "B" Eliminator.	Daniel E. Harnett
Feb. 1927	Tubes and Methods of Measurement.	Keith Henney
Mar. 1927	Description of Radio Station 2AG.	C. R. Runyon, Jr.
Apr. 1927	Use of Tubes having High Amplification Factor.	Arthur V. Loughren
May 1927	Three-Element Vacuum Tube.	B. F. Miessner
June 1927	Factors Governing the Service Area of the Broadcast Transmitting Station.	Lloyd Espenschied
Sept. 1927	Characteristics and Performance of Rectifier Tubes.	Roger M. Wise
Oct. 1927	Amplifier Circuits.	G. C. Crom, Jr.
Dec. 1927	Experiences of a Radio Engineer.	Robert H. Marriott
Jan. 1928	Life Test Data on Paper Condensers.	A. A. Leonard
Feb. 1928	Application of the Four-Electrode Receiving Tube.	Alan C. Rockwood and B. J. Thompson
Mar. 1928	Acoustics and Microphone Placing in Broadcasting Studios.	Carl Dreher
Apr. 1928	Practical Design of Direct Coupled Amplifiers and Detector-Amplifiers.	E. H. Loftin and S. Young White
May 1928	Overall Measurements on Broadcast Receivers.	Lewis M. Hull
June 1928	Overall Measurements on Broadcast Receivers.	Lewis M. Hull
Oct. 1928	Radiotron UX250—A High Power Output Tube.	K. S. Weaver
Dec. 1928	High Frequency Experiments in Aircraft.	F. H. Schnell
Jan. 1929	Seasonal Variations in Short Wave Transmission.	H. E. Hallborg
Feb. 1929	The Description of an Automatic Voltage Regulator.	Claude F. Cairns
Mar. 1929	Servicing Radio Receivers.	Julius G. Aceves
Apr. 1929	The Characteristics of Audio Frequency Transformers as Modified by Design and Operating Conditions.	Prof. H. M. Turner
May 1929	The Grid Suppressor Circuit.	Sylvan Harris
June 1929	A New Type of Precision Modulation Meter.	Dr. E. H. Greibach
Sept. 1929	Circuit Combinations that Provide Substantially Uniform Signal Selection.	E. A. Uehling
Nov. 1929	Sensitivity Measurements and Performance Test on Radio Receivers in Production.	N. E. Wunderlich
Dec. 1929	The Application of Shielded Grid Tubes to Audio Frequency Amplifiers.	J. Glauber
Jan. 1930	The Pentode Tube, Theory and Possibilities.	Keith Henney and Howard E. Rhodes
Feb. 1930	A Study of Disc Recordings.	C. F. Goudy and Prof. W. P. Powers
Mar. 1930	A Practical Television System.	D. E. Replogle
Apr. 1930	Automobile Radio Receivers.	Arthur V. Nichol
May 1930	The Development of the Equipotential Indirectly Heated Cathode as Applied to Receiving Tubes.	V. O. Allen
June 1930	Design and Application of Adjustable Tone Compensating Circuits for the Improvement of Audio Amplifiers.	Julius G. Aceves
Sept. 1930	Broadcast Program Protection.	W. A. R. Brown
Oct. 1930	Kinematic Type Remote Control.	James Millen and M. B. Sleeper

Date	*Title of Paper*	*Author*
Nov. 1930	The Stenode Radio Receiver.	Dr. James Robinson
Dec. 1930	Engineering Aspects of the Broadcast Antenna.	H. E. Hallborg
Jan. 1931	Development in the Art of Telegraphy.	R. B. Steele
Feb. 1931	The Multicoupler Antenna System for Apartment Buildings.	J. G. Aceves
Mar. 1931	The Design and Construction of Standard Signal Generators.	C. J. Franks
Apr. 1931	Design of a Complete Television System. Practical Operation of a Complete Television System.	C. E. Huffman and Allen DuMont
May 1931	Test Methods and Equipment.	William F. Diehl
June 1931	The Synchronization of Westinghouse Radio Stations WBZ and WBZA.	S. D. Gregory
Sept. 1931	Condensers Past and Present.	R. A. Lane
Oct. 1931	The Problem of Continuity Testing during Radio Service Week.	J. F. Rider
Nov. 1931	Sound Absorption Balance in the Acoustics of Auditoriums.	V. A. Schlenger
Dec. 1931	Selectivity Limitations in Modern Radio Receivers Due to Modulation Distortion at the Transmitter.	David Grimes
Jan. 1932	Radio Communication on the International Air Lines of the United States.	H. C. Leuteritz
Feb. 1932	Recent Development in Radio Frequency Control Practice.	D. E. Replogle
Mar. 1932	The Application of Permeability Tuning to Broadcast Receivers.	Ralph H. Langley
Apr. 1932	Man and His Contracts.	G. Willard Rich
May 1932	Notes on Receiver Design.	Lincoln Walsh
June 1932	Remote Pickup Equipment for Broadcast Service.	R. S. Lyon
Sept. 1932	Recent Development in Direct Sound Recording.	S. Young White
Oct. 1932	Measurement of Resistance as the Basis of Service Analysis.	John F. Rider
Nov. 1932	Short Wave Transoceanic Telephone Receiving Equipment.	F. A. Polkinghorn
Dec. 1932	Antenna Transmission Line Systems for Radio Reception.	C. E. Grigham
Jan. 1933	Recent Developments in Cathode Ray Tubes and Associated Apparatus.	Allen B. DuMont
Feb. 1933	Development of Air Transportation.	P. R. Bassett
Mar. 1933	The Emission Valve Modulator for Superheterodynes.	Harold A. Wheeler
Apr. 1933	Radio, Electrons and Stars.	Orestes H. Caldwell
May 1933	The Problems of Economic Reconstruction.	Prof. W. Rautenstrauch
May 1933	The Design of instruments for Radio Testing and Servicing.	John H. Miller
June 1933	Inter-Channel Noise Suppression in Sensitive AVC Receivers.	Wm. S. Barden
Sept. 1933	The Micro-Ray System of the I. T. & T. Corp.	W. J. Cahill
Oct. 1933	The Correlation of Practical and Theoretical Data in the Operation of R. F. Amplifiers.	W. J. Cahill and R. J. Davis
Nov. 1933	Recent Development in the Guidance of Aircraft by Radio.	Harry Diamond
Dec. 1933	The Application of Electronics to the Piano.	Benjamin F. Miessner
Jan. 1934	Behavior of Gaseous Discharge Television Lamps at High Frequencies.	H. J. Brown
Feb. 1934	The Design of Resistance Attenuators for Radio Frequency Measurements.	Malcom Ferris
Mar. 1934	Symposium on Remote Controlled Radio Receivers.	J. T. Filgate
Apr. 1934	Symposium on Remote Controlled Radio Receivers.	Virgil Graham, Lee McCanne and C. J. Franks
May 1934	The Photronic Photo-Electric Cell and Photronic Control.	R. T. Pierce

Date	*Title of Paper*	*Author*
June 1934	Multiple Address Radio Printer Systems.	W. G. H. Finch
Sept. 1934	The Importance and Technique of Performance Measurements on Radio Telephone Transmitters.	W. C. Lent
Oct. 1934	All-Wave Receiver Problems.	Murray G. Clay
Nov. 1934	The Broadcasting Antenna.	A. B. Chamberlain and W. B. Lodge
Dec. 1934	Broadcast Antennae and Transmission Lines as used by the Crosley Stations, WLW, WSAI and W8XAL.	J. A. Chambers

1935 to 1958

Date	*Vol.*	*No.*	*Title of Paper*	*Author*
June, 1935	12	1	Miscellaneous Applications of Vacuum Tubes	F. H. Shepard, Jr.
Sept.	12	2	An Analysis of Coupled Tuned Circuits at Radio Frequencies	L. A. Kelley
Oct.	12	3	The Cathode Ray Tube in Television Reception	I. G. Maloff
Nov.	12	4	Problems of All-Wave Noise Reducing Antenna Design	J. G. Aceves
Feb., 1936	13	1	Soundproofing Apartment Houses for Radio	Vesper A. Schlenker
July	13	2	Cosmic Cycles and Radio Transmission	Harlan True Stetson, Ph.D.
Oct.	13	3	Ignition Disturbances	Leslie F. Curtis
Nov.	13	4	Some Aspects of Interference and Noise Reduction in Communication Type Receivers	James J. Lamb
			Radio Interference	Allen W. Hawkins
Mar., 1937	14	1	Factors Relating to Faithful Reproduction	C. M. Sinnett
			High Fidelity Radio Reception	Lincoln Walsh
Aug.	14	2	The Surface Wave in Radio Propagation	Charles R. Burrows
			Experiments in Generation, Detection and Measurement at one Meter Wavelengths	Paul Zottu
Dec.	14	3	The Application of the Broad Band Crystal Filter to Broadcast Receivers	Alexis Guerbilsky
Feb., 1938	15	1	A New Inductance Tuning System	Paul Ware
Feb.	15	2	The Application of the Automatic Radio Direction Finder to Aerial Navigation	H. Busignies
Mar.	15	3	The Present State of Development of Radio Instrument Airplane Landing Systems in this Country and Abroad	E. N. Wendell
May	15	4	An Analysis of All-Wave Receiving Antenna Systems	J. G. Aceves
			New Paths to Guide Centimeter Radio Waves	G. C. Southworth
			Television and the Radio Engineer	Albert F. Murray
Sept.	15	5	Unbending the Ginks	J. N. Whitaker
			The Finch System of Home Facsimile	Described by R. H. Marriott
Dec.	15	6	Push-Button Tuning	Garrard Mountjoy
			Organization of Plant in a Central Radio Telegraph Office	R. E. Mathes
Apr., 1939	16	1	An Automatic Spectral-Sensitivity Curve Tracer	T. B. Perkins
			Transmitter Circuit Design for Frequencies above 100 Megacycles	O. E. Dow
July	16	2	Frequency Modulation in Radio Broadcasting	
			A New Armstrong Frequency-Modulated-Wave Receiver	G. W. Fyler and J. A. Worcester

Date	*Vol.*	*No.*	*Title of Paper*	*Author*
July	16	2	Comparative Field Tests of Frequency Modulation and Amplitude Modulation Transmitters	Irwin R. Weir
			Electrical Wave Analyzers	H. H. Scott
Sept.	16	3	Ultra-High-Frequency Propagation	M. Katzin
Feb., 1940	17	1	Recent Progress in Television Technique	Donald G. Fink
Mar.	17	2	Intercontinent Telegraphy via Long Ocean Cables	A. E. Frost
Apr., 1940	17	3	Motorboat Ship-Shore Radio-communication System	H. B. Martin
May	17	4	High-Q Coils at Audio Frequencies	J. B. Schaefer
June	17	5	The Television Picture Tube	R. C. Hergenrother
July	17	6	Recent Improvements in Master Antenna Systems	J. G. Aceves
Oct.	17	7	Bibliography on Radio Equipment in Aviation	F. X. Rettenmyer
			FM and its Economic Advantages	J. R. Poppele
			New Transmitter Circuit for FM	J. F. Morrison
			Audio Facilities for FM	E. J. Content
			Studio Acoustics for High Fidelity	J. P. Maxfield
Jan., 1941	18	1	Extending the Range of Acoustic Reproducers	Harry F. Olson
Feb.	18	2	Signal-Measuring Devices	Jerry Minter
Apr.	18	3	Crystal Cutter and Channel for Lateral Recording	Frank W. Stellwagen
Aug.	18	4	Measurement of Carrier Deviation and Average Value in Frequency-Modulation Transmitters	Henry P. Thomas
			The Orbital-Beam Multiplier Tube for 500-Megacycle Amplification	W. R. Ferris H. M. Wagner
			Applications of the Inductive Output Tube	O. E. Dow
Dec.	18	5	Communication Circuits of the Federal Airways	J. H. Nicholson
			Radio Teletype Transmission to Ground Stations and Aircraft	P. Deforrest McKeel
Apr., 1942	19	1	Impedance Measurements Over a Wide Frequency Range	L. E. Packard
Dec.	19	2	Wire Transmission of News Pictures	James R. Hancock Frank T. Turner
Dec., 1943	20	1	Taming the High Frequency Signal Generator	J. M. Van Beuren Jerry B. Minter
Jan., 1944	21	1	Television Broadcast Coverage	Allen B. DuMont Thomas T. Goldsmith, Jr.
Dec.	21	2	Sun, Earth, and Short-Wave Propagation	Henry E. Hallborg
Nov., 1945	22	1	Application Techniques for Cathode Ray Tubes	Dr. P. S. Christaldi I. E. Lempert
Dec.	22	2	Fluctuation Voltages in Receiver Input Circuits	John R. Ragazzini
Jan., 1946	23	1	Audio Distortion in Radio Reception	Jerry Minter
Feb.	23	2	Controlled and Uncontrolled Multivibrators	Eugene R. Shenk
Mar.	23	2	The Radio Proximity Fuze	Dr. L. Grant Hector
			Radio Countermeasures: The Science of Immobilizing Enemy Radar	Oswald G. Villard, Jr.
Apr.	23	4	Frequency Deviation Reception	D. A. Griffin
May	23	5	Color Television	Dr. P. C. Goldmark
			Projection Television	Dr. I. G. Maloff
			Inductive Tuning System for FM-Television Receivers	Paul Ware
Oct.	23	6	Guided Missiles in World War II	Dr. Harner Selvidge
Jan., 1947	24	1	Top-Loaded Antennas	Thurlow M. Gordon, Jr.
			Summary of:	A. H. Stillman
			Facsimile Communications	
			Measurements on FM Receivers	Jerry Minter

Date	*Vol.*	*No.*	*Title of Paper*	*Author*
Feb.	24	2	Hazeltine Lanac System of Navigation and Collision Prevention	Knox McIlwain
Mar.	24	3	The Megacycle Meter	Jerry B. Minter
			Summary of:	Fred C. Wallace
			Pulse Time Modulation	
			A Radio Man's Scenic Moments	Joseph A. Waldschmitt
1948	25	1	Laboratory Antenna Distribution System	Frank Mural
	25	2	Cost vs Quality in Audio	John M. Van Beuren
	25	3	A Study of the Operating Characteristics of the Ratio Detector and its Place in Radio History	Dr. Edwin H. Armstrong
1949	26	1	The Serrasoid FM Modulator	James R. Day
	26	2	Germanium Crystal Diode and Triode Developments	Dr. Stuart T. Martin Harold Heins
1950	27	1	Direct Drive Horizontal Scan System	Robert R. Thalner
	27	2	Traffic Handling Capacity of 100 Channel Distance-Measuring-Equipment (DME) Standardized by RTCA SC-40 and ICAO	Charles J. Hirsch
			Summary of:	David C. Kleckner
			Television Receiving Antennas	A. E. Joust
	27	3	Saturable Reactor Considerations	F. H. Shepard, Jr.
Oct.	1BCG issue		"The Story of the First Transatlantic Short Wave Message"	
1951	28	1	Half-Tone Cuts Produced Electronically	George Washington, Jr.
			Summary of:	W. B. Whalley
			The Simplification of Television Receivers	
			The Attic Inventor	Charles F. Jacobs
	28	2	Survey of Radio-Frequency Transmission Lines and Wave Guides	E. S. Winlund
			Summary of Loudspeakers	H. C. Hardy
1952	29	1	Fault Location Techniques for Transmission Lines and Cables	Martial A. Honnell
	29	2	Negative Feedback	W. O. Baldwin
	29	3	Submerged Telegraph Repeaters Current Developments and Applications	C. H. Cramer P. H. Wells
	29	4	Practical Aspects of the R-J Speaker Enclosure	W. Joseph F. Robbins
1953	30	1	The World's Sources of Energy	Lloyd V. Berkner
	30	2	Transistor Circuit Considerations	J. G. Weissman
	30	3	Some Recent Developments in the Multiplexed Transmission of Frequency Modulated Broadcast Signals	Dr. Edwin H. Armstrong John H. Bose
1954	31	1	Applications of High Frequency Saturable Reactors	Carl G. Sontheimer
1955	32	1	Air Navigational Facilities	H. S. Christensen
Dec.	32	2	Desk Size Electronic Computer for General Purpose Use	James L. Rogers
1956	33	1	E. H. Armstrong: The Hero as Inventor	Carl Dreher
Mar., 1958	34	1	A Compatible Single-Sideband Modulation System	L. R. Kahn
			A Discussion of L. P. Lessing's Unusual Biography "Man of High Fidelity: Edwin Howard Armstrong"	Capt. P. Boucheron
Sept.	34	2	Accurate Time Measurement	Dr. Frederic A. Fua

AFTER 50 YEARS OF HISTORY—WHAT ABOUT THE FUTURE?

The Club from its beginning has shown itself capable of coping with changing times. It has had few certainties for guidance. In its early years, it had little more than hopes and limited opportunities, but these it has met nobly and with distinction.

History may be defined as the past revealing itself to the present. In a subtle way, it tells about the future too, for the inevitable changes that lie ahead always grow out of the things that were accomplished and the motivating spirit of the years gone by. If we do not clearly understand its past, we cannot wisely guide its future.

The past is an accomplished span of history to be looked at and studied, while the future remains a task to be solved, which will call for continued undismayed wisdom to pilot its course in the uncharted future that lies ahead.

Let us understand the Club's history and be guided by the voice and spirit of our past. At times some of us may have a tendency to become chronically undecided about how to view the future.

The voice of our past is simply the record of what our wise officers and members did for the Club, and who they were and still are, down through the past 50 years of its history. Its future can be assured by carrying on that undaunted spirit and wise leadership that is so basic to our heritage.

Let the Club continue to distinguish itself from the purely scientific and technical societies by its freedom of speech and less commercial atmosphere in the interchange of ideas, with a sustained effort to provide social rallying opportunities for its members with suitable recognition or awards from time to time to those whose achievements entitle them to special distinction in the ever expanding science of radio and its allied fields.

ERNEST V. AMY

PAST PRESIDENTS

OF THE

RADIO CLUB OF AMERICA, Inc.

W. E. D. Stokes Jr.
1909–1911*

Frank King
1911–1914

George J. Eltz, Jr.
1915

Edwin H. Armstrong
1916–1920

George E. Burghard
1921–1925

Ernest V. Amy
1926–1928

*President, Junior Wireless Club, Ltd.

Lewis M. Clement
1929

Louis G. Pacent
1930

Harry Sadenwater
1931

Lawrence C. F. Horle
1932

Charles W. Horn
1933

Harry W. Houck
1934

Ralph H. Langley
1935–1936

John H. Miller
1937–1938

Paul F. Godley
1939

Keith Henney
1940

John L. Callahan
1941

Paul Ware
1942–1943

Fred Klingenschmitt
1944–1945

Louis Alan Hazeltine
1946–1947

Jerry B. Minter
1948–1949

O. James Morelock
1950–1951

John H. Bose
1952–1953

Francis H. Shepard Jr.
1954–55

Frank A. Gunther
1956–57

Walter A. Knoop
1958–59

PAST VICE PRESIDENTS

George J. Eltz, Jr.	1909–14 (J.W.C.)
Theophilus Johnson, Jr.	1916–18
Louis G. Pacent	1915 & 1920
Davis S. Brown, Jr.	1919
Lawrence C. F. Horle	1921 & 1931
Ernest V. Amy	1922
Paul F. Godley	1923–1925
John DiBlasi	1926
C. Randolph Runyon, Jr.	1927
Lewis M. Clement	1928
Carl Dreher	1929
Charles E. Maps	1933
Harry W. Houck	1934
F. X. Rettenmeyer	1935
John H. Miller	1936
John F. Farrington	1937
Fred A. Klingenschmitt	1938
Keith Henney	1939
John L. Callahan	1940
Paul Ware	1941
Charles E. Dean	1942–43
James O. Morelock	1944–45–46–47
Robert M. Akin, Jr.	1948
George C. Connor	1949
John H. Bose	1950
Ralph R. Batcher	1951–52–53
Frank A. Gunther	1954–55
Walter A. Knoop, Jr.	1956–57
Renville H. McMann, Jr.	1958–59

PAST RECORDING SECRETARIES

W. Faitoute Munn	1909–11 (J.W.C.)
George E. Burghard	1911–13
Louis G. Pacent	1914
Theophilus Johnson, Jr.	1915
Thomas J. Styles	1916
Walter S. Lemmon	1917–20
Lewis M. Clement	1921
Lawrence C. F. Horle	1922
Pierre Boucheron	1923
Arthur H. Lynch	1924–26
Davis S. Brown, Jr.	1927
William T. Russell	1928
Charles E. Maps	1929
Harry W. Houck	1930–32
F. X. Rettenmeyer	1934–38
Charles E. Dean	1939
Carl F. Goudy	1940
Elmar H. Lewis	1941
Lucius E. Packard	1942–43
John H. Bose	1944–48
Perce B. Collison	1949
Bernard D. Loughlin	1950
Frank H. Shepard, Jr.	1951
Virgil M. Graham	1952–53
William G. Russell	1954
Albert F. Toth	1955
John H. Bose	1956
John H. Bose	1957
C. R. Runyon, III	1958–59

PAST TREASURERS

Frederick Seymour	1909–10 (J.W.C.)
Ernest V. Amy	1911–20
John DiBlasi	1921–25
C. Randolph Runyon, Jr.	1926
Joseph J. Stantley	1927 to Date

PAST CORRESPONDING SECRETARIES

Frank King	1909–1911 (J.W.C.)
David S. Brown, Jr.	1912–1916
Thomas J. Styles	1917–20 & 1925–27
Renville H. McMann	1921–24
J. L. Bernard	1928
Wille K. Wing	1929–32
R. H. Langley	1933
Fred A. Klingenschmitt	1934–35–36–37
Fred Muller	1938
John L. Callahan	1939
Charles E. Dean	1940
Lincoln Walsh	1941
James O. Morelock	1942–43
Milton B. Sleeper	1944–45
Harry Sadenwater	1946–47
George C. Connor	1948
John H. Bose	1949
Ralph R. Batcher	1950
Bernard D. Loughlin	1951
Francis H. Shepard, Jr.	1952–53
O. James Morelock	1954–to date

WHO'S WHO
IN THE
RADIO CLUB OF AMERICA, INC.

HONORARY MEMBERS

DR. ALFRED N. GOLDSMITH
JOHN V. L. HOGAN
ROBERT H. MARRIOTT*
PROF. MICHAEL I. PUPIN*
HENRY J. ROUND
BRIGD. GEN. DAVID SARNOFF
JOHN STONE STONE*
PROF. JONATHAN ZENNECK*

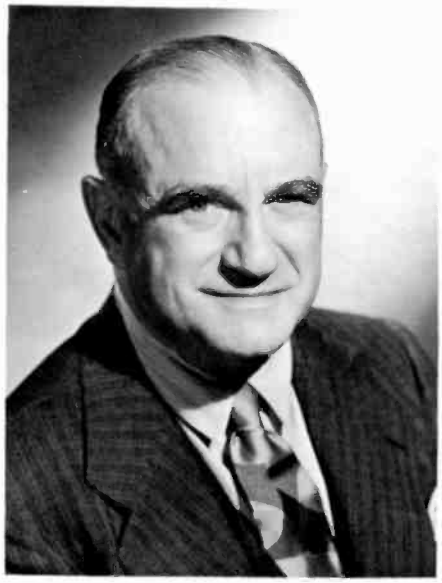
*Denotes Deceased

Editor's Note: It is our extreme pleasure to present the following articles by four of our Honorary Members, and we wish officially to thank them for their generous and splendid contribution toward the success of this our Golden Anniversary Year Book.

Robert H. Marriott
Honorary Member 1915

Michael I. Pupin
Honorary Member 1926

John Stone Stone
Honorary Member 1915



Radio is More Fun Than Ever

Alfred N. Goldsmith
Honorary Member 1915

If you—my readers—are expecting a serious, analytic, highly technical, and ultra-scientific article, please turn quickly to the next article in this Golden Year Book. My purpose, in addressing you, has been to re-live the days of old, to enjoy the present, and to taste the thrilling challenge of the future. What I write is a young man's reaction to radio—then, now, and in the years to come.

Radio was always a young man's game. There was no room in it for anyone but the vigorous, the determined, and the energetic. And those who were not resourceful, enthusiastic, and creative people soon knew that radio was not for them. They left our field and doubtless became worthy but stodgy citizens in some other more prosaic activity.

In the earliest days of radio, the favorite indoor sports were jumping over hurdles, crawling under obstacles, and rubbing bruised places. Every known difficulty was experienced almost every day. We had limited knowledge, or even no knowledge at all, of the underlying laws and the basic facts. There were few suitable materials available for our equipment. Most of these materials were borrowed from the earlier electrical art. And they usually were not too appropriate for the new purposes. There was an almost complete lack of dependable components. There was no guarantee that equipment that worked yesterday would work today. And there was every doubt that it would work tomorrow. And when it did work, it usually had plenty of bugs. Most of these little creatures were only imperfectly understood. And we continuously bucked a Secrecy Curtain which was just about as high, thick, and tough as the present Iron Curtain. Most people "in the know" in those days, particularly among the professional engineers, knew how to keep silent in seven languages. But we did get quite a bit of rumor, hearsay, and even misinformation. All of this added to the excitement of life as well as the difficulties.

Radio then was great sport for many reasons. We were often not sure what had happened. We never knew what would happen next. But each of us had equally adventurous companions and colleagues. And each of us was a member of a very special club. We were the people who could handle the mysteries of radio. And the rest of humanity could only look on and wonder.

Our lives were full of all sorts of interesting things. Many of these are now forgotten. Others have been the foundation stones of new arts. We had rotary gaps and synchronous gaps. We had quenched spark gaps. And we knew that pounding brass had nothing to do with making ornaments for sale in antique shops. We had coherers, barreters, magnetic detectors, and perikon detectors. We had pleasantly blue-glowing "soft" tubes and we fought balky and intermittent contacts. We ranged from litzendraht to high-frequency alternators. We admired huge wave atennas for low-frequency transoceanic work. And we were nibbling at transoceanic high-frequency circuits.

Some of these things, and many others, are now pure "museum pieces." Others have very modern successors with which everyone is familiar. You can trace the ancestors from the old days of the transmit-receive switching of radar, of tape transmitters, of transistors which are the dignified and grown up grandchildren of crystal detectors, the miniature tubes which are the tiny descendants of the old audions, and the multiplex high-frequency circuits which have replaced the rather chancey hf channels of those days.

So you see our good radio art is a continuously growing thing. Everything depends on what came before. And vigor and ingenuity are just as necessary as they ever were.

Very fortunately, the real age of a man cannot be measured only by the calendar. So practically all of us are the same young enthusiasts as we were in those far off days. And we have every reason to remain youthful because we are playing with a new family of equipment and methods which grew directly out of our work of long ago. Everything we have and do is akin to what we had and did.

Anyone who examines the very interesting things which we now can enjoy making and using will understand at once why radio is as much fun as ever. We have all-wave receivers and panoramic receivers. We have detectors that must be frozen at the lowest temperatures, and we have tubes that operate only red hot. We have computers and data processing, and we have electronic "magic brains." Our whole course through space must be charted by electronic navigators. We have traveling-wave tubes and we have parametric amplifiers. And our radars, which used to work for tens of miles on hundreds of watts, now span thousands of miles with many megawatts. We use facsimile. And we use the moon as a free reflector for our radio messages. And we have very respectably dependable high-frequency dx. Fine continuous-wave radiophone transmitters are available for business or pleasure. Rotary beams send our messages where we desire, and rhombics pick up the faint whisper of a distant call. Microwave relays link our coasts, and color television is a part of daily life. And radiophone communication to ships, automobiles, airplanes, and even the individual is now at our behest.

All that we do is so new, so remarkable, and so challenging that it keeps us on our toes. And yet our present jobs are thoroughly in keeping with our life-long tradition. No wonder we can hardly believe that we are so lucky as to be active and happy in a field that has proven that it can remain young despite the parade of the years.

And so—greetings to you, my Radio Club of America colleagues. And long may we all flourish!

The Radio Club of America— Fifty Years of Service

John V. L. Hogan
Honorary Member 1915

The Radio Club of America and the Wireless Institute were both founded in New York City during 1909. The organization meeting of the Wireless Institute was held on March 10, 1909. I do not seem to have a record of the meeting date on which the Radio Club of America was established, and so I will leave for further study the question of which is the senior group. The Society of Wireless Telegraph Engineers was formed in Boston on February 25, 1907, and so may have been the first group in the United States, if not in the world, to get together in the interest of developing radio communication. But of these three societies, the Radio Club of America is the only one which has continued its established basis for these past fifty years. The Wireless Institute and the Society of Wireless Telegraph Engineers consolidated to form the Institute of Radio Engineers on May 13, 1912, and so then passed out of the picture. But the Radio Club of America has continued intact from its inception, and I am happy to have been associated with it since its relatively early years.

I was away from New York, at school, when the Radio Club of America began its activities. Otherwise I might have been one of its Charter Members, for when living in this city (up to 1906 or thereabout) I had an amateur station in operation. Those were the days when no station or operators' licenses were required, perhaps because those of us who could make interference were quite conscientious. I remember exchanging messages with the old U.S.S. Colorado during intervals when no Navy business had to be handled, and I think the Naval operator with whom I worked most frequently was named Burkhart. That is not so far from the name of our present Anniversary Chairman!

When I moved back to New York, along with the Fessenden staff, in 1911, I learned more than I had known about the Radio Club of America and the Wireless Institute. Although the Radio Club derived from amateurs and the Institute from so-called professionals (generally defined as people who get paid for their work in the field), I could see no difference in their common objective. That objective was principally to improve the state of the radio art by the interchange of technical information, and to that end both groups held meetings (usually at Columbia University) nearly every month except during the vacation period. I thought that the papers presented at these meetings were informative and helpful, and, in fact, I could not see any great difference in the calibre of those presented by one or the other organization.

So I joined the Radio Club of America, and began (with Bob Marriott and Alfred Goldsmith) to try to help the Wireless Institute out of some of its problems. I have never regretted either move, and I am flattered to have been named as an Honorary Member of the Radio Club.

Let me close this informal and somewhat rambling discourse by congratulating the Radio Club, and its past and present officers and committees, on what I regard as a substantial advance in the science of radio. Let me also offer my best wishes and hopes for an equally rewarding future.

Things Past, and Things to Come

Henry J. Round
Honorary Member 1952

I have had the great good fortune to live through a period of acceleration of human knowledge, the like of which may not be seen again.

Furthermore, I have had the luck to be an observer standing fairly near the center of this terrific activity. Seventy years ago, the foundation of electrical and magnetic science had not long been laid. It was a new invisible and magic world outside the ordinary world of matter and force. It was then I started to read about these wonderful things and worship at the shrine of such great ones as Edison.

The thrill I got when my first wet battery made some sparks and then rang my first electric bell. The electrophorus and its dancing figures, and finally a dry pile which produced a thousand volts or so, gave me many hours of pleasure. And then tumbling over themselves came the big discoveries.

First in that line were X-Rays, and many and varied were the theories as to what they were.

The great Clerk Maxwell had a decade or so before established on paper that light was an electrical wave. I think he must have had a moment of great exaltation when he found that the ratio of electrostatic and electromagnetic systems of units was the velocity of light, probably only equalled by Newton's thrill when he found the moon behaved just like an apple.

Maxwell's work was only on paper but then along came Hertz who made the first man-made electrical waves and really founded our great art. The work had not long been done when I began to take a real interest in things and every week I heard of something new, and that is when I first heard of Wireless Telegraphy.

Just at first little sensational bits of news in the morning papers: "Guglielmo Marconi sends messages without wires over three miles." Then "Marconi wireless is sent to help in the South African war." The "Ships to have wireless sets and talk to one another and to the land."

The scientists (professors at colleges mostly) were still buried in their ammeters, voltmeters, motors and dynamos and only condescended occasionally to step aside and explain things. They rather looked down on wireless and considered Marconi as a bit of a charlatan.

After a normal college career, in which I have often wondered since what I learned, I had the great luck to join the Marconi people in England. My own professors were very disgusted, and it was suggested by one of them, a very great engineer by the way, that I would do much better as an electricity station engineer, as electric lighting was the coming thing. But my instincts were right, and from the inside I started to see and help in the development of one of the most important arts in the world, and one which seems to open out into new fields every year. We have established now world communication, not quite perfect perhaps but magical in its action and its effect on the human race.

Innumerable are the side shows which have arrived due to basic radio research from which came that great physical tool the electronic valve.

Millions of valves are now working night and day for man's benefit. It is not necessary to say where we stand now. Every member of The Radio Club of America knows without my telling, but what of the endless future which personally we will not enjoy.

I can perhaps guess in one direction.

A vast spectrum of electrical waves is now known and part of the way upwards we can produce these waves in an organized CW way. But the greater part of the spectrum is in the longer wavelengths used for communication in the old spark days. Heat and light waves come out of our apparatus in a disorganized way as an irregular series of blobs. Bit by bit these waves will yield to production by methods similar to those we use for our megacycles and the possibilities seem tremendous. We now make these magacycles and radiate them from arrays in concentrated beams.

What are the possibilities if we could do the same with heat and light?

Even the Wellsian dream of a heat ray might be possible but interspatial communication could become a reality.

There seems to be little attenuation for light and heat in space, and the only barrier for carrying our signals to other worlds is energy spread.

If we could really beam a sodium wave and get the effect of an array of many thousands of wavelengths, the energy required to get to Alpha Centauri might only be a kilowatt or so. And other worlds are where there may well be other beings like ourselves.

To come back from dreamland to the apparently solid mass of protons, neutrons and electrons, I am greatly pleased that I am an Honorary Member of The Radio Club of America. I have only visited and been feted by your Club twice, once in 1929 and once in 1952. Of each time I have vivid memories, particularly of Armstrong whose unfortunate end, after a staggeringly successful career, came as a great shock to me as well as to you all. His technical monuments will remain for all time. Perhaps from the ranks of The Radio Club of America others will become equally famous in its next Golden period.

Good luck to your celebrations.

It All Began With Radio

David Sarnoff
Honorary Member 1926

The adventurous men who founded the Radio Club of America were, in a very real sense, pioneers in a new age—the Electronic Age.

It all began with radio—with spark coils and slide wire tuners. Over the years, the principles of radio were applied to an ever widening area until, today, electronics permeates virtually every aspect of our daily lives.

It has profoundly transformed our concepts of defense, communications, transportation, entertainment, business and industrial operations, and has had a significant impact on our living.

During the past half-century, the Radio Club of America and its members have contributed importantly to the vast evolution from radio to electronics. This evolution has manifested itself in five broad phases.

The *first phase* involved the application of radio principles to communications. This began with wireless telegraphy, and in later years grew into radio-telephone and telegraph communications by long wave, short wave and microwave.

The *second phase* of electronic development brought radio broadcasting as a service to the public. Over the years, this medium grew from an exciting novelty to a durable force possessing immense cultural and economic impact.

The *third phase* saw electronics turned with remarkable effect to military uses in World War II. Radar, sonar, loran, shoran and the infrared "sniperscope" were but a few of the devices that figured prominently in the Allied victory.

The *fourth phase* of electronic development brought television—first in black-and-white and now in brilliant color—to broaden and brighten the human horizon.

The *fifth phase* of electronics is only just beginning, yet it seems likely to exercise the most profound influence upon our lives. This phase is perhaps most dramatically symbolized by the computer which monitors space explorations, guides missiles, operates automated factories and speeds up accounting and office work.

The crude attic radio devices have long since given way to highly complex and sophisticated instrumentation. But one thing has not changed over the past fifty years. The thrill of experimentation and the excitement of discovery that motivated the founders of the Radio Club of America are as fresh and vibrant today as ever.

It is this perennially youthful spirit of high adventure, and the new knowledge and the new tools with which we can work, which convince me that radio, television and electronics will make vastly greater progress in the next fifty years than they have in the last fifty.

Jonathan Zenneck
Honorary Member 1916

Editor's Note: Dr. Zenneck was to have sent us an article for the Year Book but unfortunately and to the great regret of the Radio World he died in April 1959. In lieu of the article we print below a copy of his last letter to the Radio Club in 1948. It will no doubt prove of interest to our members, particularly the early pioneers whose studies always included Dr. Zenneck's famous book, "Electromagnetic Oscillations and Wireless Telegraphy," published in 1906.

The RADIO CLUB OF AMERICA
11 West 42nd Street
NEW YORK CITY

June 17, 1948.

Gentlemen,

Thank you very much for the YEAR BOOK of the RADIO CLUB of America which you kindly sent me.

I was much impressed by the list of papers read before the club since 1913 and of their authors. The high standard of scientific activity of the club could not be better demonstrated than by this list.

The list of the deceased members of the club contains quite a number of scientists and engineers I have known personally or by their publications. I am especially sorry to see from the list that John Stone died. I used to know him very well and appreciated him very much. Up to the beginning of the last war I was in intermittent correspondence with him. He certainly was an outstanding pioneer during the early time of radio telegraphy.

Sincerely yours

(Signed) *J. Zenneck*
Prof. Dr. J. Zenneck
Allhegenberg 67
Uber Mering (13b)
Bayern Deutschland
U. S. Zone

MEMBERSHIP
OF
THE RADIO CLUB OF AMERICA, INC.

ADAMS, ROBERT H. 111 (M) 1956 - Field Engineer, Electronic Instrumentation Manufacturers Rep.; education, B.S. Psychology, Rutgers University; Military Service USAF Auto Missile Tracting Officer, 1st. Lt. USAF; amateur call letters K2BTC, 6 yrs; hobbies, amateur radio, flying, res. 7 Standish Ct., Tenafly, N. J. b. Feb. 4, 1950, N.Y.C.

ADELMAN, LEON L. (F) 1950 - Sales Representative, Leon L. Adelman Co., 25 Chittenden Ave., N.Y.C. 33; b. Russia, August 19th, 1903; married; ed. Syracuse Central High School, Brooklyn Polytech 1 year, Cooper Union 1 year; Amateur since 1917; W2AFS since 1923; Charter Member - Syracuse Radio Amateur Club, 1917; Syracuse Central High Radio Club, 1921; Bronx Radio Club 1921; F.A.D. Andrea 1922/1923; Radio Editor "Science and Invention" "The Experimenter"; Technical Editor "Radio News", Associate Editor "Amateur Radio", "Radio World" 1923/1926, Assistant Advertising Manager of Chas. Freshman Co. 1926/1927; Sales Manager for A. M. Flechtheim & Co. 1927/1932, Sales Manager Cornell-Dubilier Corp. 1934/1944; Manufactured "Supreme AF-100" All-band AM-FM Transmitters 1946/1948; Member Planning Committee for "Hugo Gernsback Testimonial Trophy" at Chicago, May 17th, 1953.

AKIN, ROBERT M., JR. (F) 1925 - President, Hudson Wire Co., Ossining, N. Y.; res. Evergreen Way, North Tarrytown, N. Y.; ed. Morristown Preparatory; interested in radio since 1918; b. Ossining, N. Y., June 26, 1904; Professional Experience - Westchester Radio Laboratories 1923/1929, Director of Research, Hudson Wire Co. 1934; Radio Club of America Vice President 1948.

ALBERTSON, FRED (WOODWARD) (M) Munsey Bldg., Washington 4, D. C.; American lawyer and engineer; radio and communications legal counsel for radio, television, telegraph, telephone and broadcasting companies and stations since 1935; partner in Dow, Lohnes & Albertson (specializing in communications, radio and air law), Washington, D. C., and N.Y.C., since 1944 engaged in research on Dualex communications systems and products since 1948; Licensed radio operator since 1924; b. 1908; educ. University of Michigan (A.B. 1931; LL.B. 1934); m. 1942, Catherine Frances Dolan; s. Fred Woodward, Jr.; dau. Helen Dolan. Engineered construction and operation of several radio broadcast and radio telegraph stations 1925/27; radio equipped and handled communications with several remote meteorological expeditions and stations for University of Michigan 1927/34; Admitted to Michigan Bar 1934, District of Columbia Bar 1935, and Supreme Court of the United States 1940; member, Board of Trustees and Director of Delta Theta Phi Foundation 1945/46; Registered Professional Electrical-Communications Engineer in the District of Columbia; Senior Member, Institute of Radio Engineers (Chairman, Washington, D. C., Section 1946/47; Board of Editors of Proceedings of I.R.E. 1946/54); member, American Institute of Electrical Engineers and The Radio Pioneers; President, American Federal Communications Bar Assn. 1953/54; Fellow, American Bar Foundation; member, House of Delegates of the American Bar Association 1953/54; Chmn., Standing Cttee. on Communications of the American Bar Association 1957—; member, District of Columbia Bar Association, The American Judicature Society, Delta Theta Phi Law Fraternity; Past Vice-President and Treasurer, Engineers Club of Washington; Past President, Washington Radio Club; co-founder and Past President, University of Michigan Radio Club; member, Congressional Country Club and The Capitol Hill Club (Washington, D. C.); Licensee amateur radio station W3FMC and W4FMC. Address: Munsey Building, Washington 4, D. C., and 3512 One Wall Street, New York City 5, and (home) 3753 Jenifer Street, N.W., Washington 15, D. C.

ALEXANDER, JAY R. (M) res. 29-01 Borden Ave., Long Island City, N. Y.

ALEXANDER, LOUIS (F) 1924 - Sales Engineer, Cornell Dubilier Elec. Corporation, South Plainfield, N. J.; res. 322 West 72nd St., New York 23, N. Y.; b. New York City, February 1, 1900; married; ed. High School of Commerce, evening courses at Cooper Union and CCNY; Purchasing Agent for DeForest Radio 1918/1921; Sales Engineer Dubilier Condenser Co. 1921/1926; Sales Engineer for Aerovox Corp. 1926/1946 and Sales Engineer for Cornell Dubilier Elec. Corp. 1946 to date; Member IRE and Elmwood Country Club, Elmsford, N. Y.

AMERMAN, EDWARD ANDREW (F) - Electronic Design Engineer, Kay Electric Company, 14 Maple Ave., Pine Brook, N. J.; res 59 Harrison Ave., Roseland, N. J.; b September 16, 1908 at Newark, N. J.; ed. Grammar School Miller Street, Newark; High School East Side Commercial and Manual Training, Newark; Two terms Newark College of Engineering; U. S. Army Signal School, Fort Monmouth, N. J. Graduate U. S. Army Armor Officers Communication School, Fort Knox, Ky.; U. S. Army and New Jersey National Guard since 22nd December 1926, Present status Chief Warrant Officer, Communications Advisor on the Staff of Combat Command "C", 50th Armored Division (Jersey Blues) at Paterson Armory; Married, two Sons; Sports - Hiking, Hunting, Fishing and Base Ball; Hobbies - Rifle and Hand Gun Shooting, Radio and mechanics; Societies - Member of Radio Club of America since 1938, National Guard Association of the U. S., U. S. Army Armor Association, Military Amateur Radio Society, Armed Forces Communication and Electronic Association, National Rifle Association, Roseland Rifle and Pistol Club, Communication Officers Club, Army and Navy Union of the U. S., National Guard Radio Amateurs Association, Past Post Commander, Post #4 Legion of Guardsman.

AMY, ERNEST V. (CM, LM, F) 1910 - President, Amy, Aceves & King, Inc., Consulting Engineers, organized 1928, 11 West 42nd St., N.Y.C.; res. 61 Bay Blvd., At-

lantic Beach, N. Y.; b. N.Y.C., February 11, 1892; married; ed. E.E. Degree Columbia University 1917; U. S. Army, 1st Lieut. Eng. Corps, 77th Div., Overseas Service 1917; Engineer, Test Dept., New York Edison Co. 1918/1920; Marconi Wireless Telegraph Co. 1920/1922; Radio Corporation of America, Engineer in Charge of Radio Relay Station, Belfast, Maine, 1923/1925, Antenna and Transmitter Design Section 1926/1928; Amy, Aceves & King, Inc. 1928 to date. Inventor and co-inventor of many radio and electronic devices; granted over 30 U. S. Patents, others pending. Member AIEE, IRE, Society of American Military Engineers, Armstrong Memorial Research Foundation - Charter Member 1955, Director to date. Treasurer Radio Club of America, Inc. 1911/1920, Director 1921, Vice President 1922, President 1926/1928, Director 1929 to date. Recipient Armstrong Medal 1950 for IBCG activities 1921.

ANDERSON, NORMAN J. (M) 1951 - Consulting Radio Engineer; res. 152 Fairview Ave., Boonton, N. J.; b. Brooklyn, N. Y. April 24, 1916; ed. RCA Institute, Stevens Institute Graduate School; member IRE, ARRL.

ANDREWS, RAYMOND W. (M) 1946 - Manager, Finished Goods Planning and Tube Industry Sales, Electronic Tube Division, Westinghouse Electric Corp., Elmira, N. Y. res. Pine City, N. Y.; b. September 15, 1907 at Buffalo, N. Y. married; ed. Nichols Prep. School, Buffalo - Lehigh University, University of Buffalo, George Washington University; 8CMF in 1925, W8OLB in 1935; W3OLB in 1946; K2KZJ currently. Employed since 1930 in various phases of Retail Wholesale and Manufacturing as technician, supervisor and manager. Coordinated design, production, marketing. 1942/1944 in charge allocating and distributing all Navy fire control radar. 1944/1945 in command of activity assembling and testing combat guided missile control units and other electronic programs. Currently Captain USNR, member ARRL, IRE, Naval Reserve Assn., American Ordnance Assn.

ARNOLD, JOHN WILLIAM (F) 1929 - res. 37 Washington Square, New York 11; b. Paulding, Ohio on September 13, 1899; married; ed. AB 1921, AM 1923, University of Illinois; radio since 1915; Engineer, Western Union Telegraph Company, 1923/1941, Artillery and Signal Corps Officer, Army of U. S. 1941/1946; Engineer, International Telephone and Telegraph Corporation 1946/1950, retired 1951. Senior member Institute of Radio Engineers.

ATWOOD, HORACE, JR., (M) 1956 -President and Chief Engineer, Industrial Television, Inc., Clifton, N. J., 12 yrs., prior Chief TV Engineer, Allen B. DuMont Labs., Inc., res. Valhalla Rd., Montville, N. J.; b. Morgantown, W. Va., April 22, 1918; ed. B.S. and M.S. Physics, West Virginia University, Amateur Call Letters, Present WASXW, prior W8RFP, W8TNC, since 1937; hobbies, etc., active in Civil Defense Communications and Rad-Chem.

AULL, WILSON, JR. (F) 1920 - Hogan Laboratories, Inc., 155 Perry St., New York 14, N. Y.; Research and Development Engineer 1929 to present.

AVLLONE, ALFONSO (M) res., 882 First Ave., Franklin Square, N. Y.

BAILEY, GEORGE W. (F) 1948 - Executive Secretary, Institute of Radio Engineers, res. 61 East 66 St., N.Y.C.; b. May 14, 1887 at Quincy, Mass.; ed. A.B. 1907 Harvard; SC D. 1958 Lawrence College (Hon radio since 1923, Director NE Div., ARRL 7 yrs, Vice Pres. ARRL 4 yrs, Pres. ARRL 12 yrs, Pres. Int'l. Am. Radio Un., 12 yrs., Amateur Stat. W2KH; Pres. Certificate of Merit, Honorary Member, Veteran Wireless Operators Assoc., Marconi Medal of VWOA, QCWA, AFCEA National Pres. 1954/56, AFCA N.Y.R.C., State Dept. 1957, Consultant on Telecommunications to Undersec'y. Dillon, Cosmos Club of Washington, D. C.

BAILEY, ARNOLD BROWN, (M) 1954 - M.I.T. Staff Lincoln Lab., Arnold B. Bailey Corp., Bell Telephone Lab., M.I.T. Dept. Engineering Adm., amateur call letters ImB 1919/1925, 2UQ 1926-1930, W2GYF 1931/1940, Patents, Books, First Basic Omni-Directional Range Patent, First Basic Coaxial Antenna Patents Book: TV & Other Receiving Antennas (1950), Hobbies, American Rocket Society, Photographic Circle of Confusion, N.Y.C., Music, violin, Consultant to U. S. Navy on Shipboard Antenna Coordination, Trustee, Francestown (N. H.) Library, Deacon, Unitarian Church, Francestown, N. H., School Board Chairman, Francestown, N. H.; b. July 12, 1903, Providence, R. I., res. Francestown, N. H.

BAKER, WALTER R. G., (F) 1930 - Vice Pres. for Research Syracuse University, Pres. Syracuse University Research Corporation, Chairman of the Bd. Syracuse Univer. Research Institute; prior vice-president, Electronics Dept. G. E. Co., Syracuse, N. Y.; education, B.E., M.E.E. and Honorary Doctorate Union College, Syracuse University & Brooklyn Polytechnic Institute; b. Lockport, N. Y., November 30, 1892; res. 601 Scott Ave., Syracuse 3, N. Y.; Married.

BARBER, ALFRED W. (M) 1951 (F) 1958 - Chief Engineer, Alfred W. Barber Laboratories, 32-44 Francis Lewis Blvd., Flushing, N. Y.; b. Portsmouth, N. H., July 24, 1906; ed. B.S. in Communication Engineering, Harvard Engineering School 1928; interested in radio for 40 years; Browning Drake Corp., Radio Frequency Laboratories, Hazeltine Corporation, Electrical Research Products, Inc., own business from 1936; married; registered Patent Attorney with over 15 U. S. Patents in communications field; about 20 magazine articles and Rider's "Vacuum Tube Voltmeters"; Hobbies - Photography and Golf.

BARCLAY, ROBERT HAMILTON (F) 1921 - Consulting Engineer, 80 Broad St., N.Y.C.; res. 95 Christopher St., New York 14, N. Y.; b. St. Louis, Mo. August 10, 1887; ed. E.E. Washington Univ., St. Louis, Mo. 1906, 1908 and continued E.E. Studies at Washington Univ. 1911/1912; interested in radio for 50 yrs. and member of Radio Club of America since 1919; Amateur Station 2BHR 1922 and 1923; Professional experience primarily in the fields of design and construction of electric utility and industrial properties, including power plants, transmission lines and distribution systems; Hobby - photography, Fellow A.I.E.E., member American Inst. Consulting Engineers, Institution of Electrical Engineers (Great Britain) Honorary Secretary in the U.S.A., National Society of Professional Engineers, Society American Military Engineers; Licensed Professional Engineer New York, Maine, Mich., Fla., Mo., Tex.; Theta Xi Fraternity, Engineers Club, N. Y.; City-Midday Club, N. Y., Dr. Radio Club of America, Inc., 1933/1934, Washington Univ. Club, N. Y.; married.

BARONE, SALVATORE A. (F) 1926 - res. Foot of Clocks Blvd., Amityville, L.I., N. Y.; Radio Club of America Director 1950.

BATCHER, RALPH R. (F) 1943 - Electronic Consultant, Product Design and Automatic processes. 240-02 42nd Ave., Douglaston (63) N. Y. b. Iowa 1897; ed. E.E. Iowa State College; started in radio 1909, amateur stations 9IT and 9YI from 1911 to 1917. Inspector (radio) Dept. of Commerce, 1918; circuit engineer automatic switching 1920/24. Receiver Design Engineer, A. H. Grebe & Co.,

1924/28; Director of Engineering A. D. Cardwell Corp., till 1944; Editorial Consultant, Electronic Industries, 1944/48. Chief Engineer Electronic Industries Assn. (then RETMA) 1950/54; Professional Engineer N. Y. State; Fellow I.R.E.; Chairman of Board, National Electronics Conference 1955; Director Radio Club of America 1944 to date; Past Pres. Instrument Society, New York Sec., Several patents and author "Prepared Radio Measurements", "Cathode Ray Oscillography" "Electronic Engineering Handbook", "Electronic Control Handbook" and several hundred for technical publications.

BAUM, ELMER (M) 1950 - Electrical Engineer, ITT Labs. 500 Washington Ave., Nutley, N. J.; res. 375 Fifth Ave., River Edge, N. J.; b. Brooklyn, N. Y., Nov. 7, 1917; ed. B.E.E. Polytechnic Institute of Brooklyn, B.S. EM Fairleigh Dickenson Unit; interested in radio for 28 yrs.; professional experience RCA, Radio Wire Television Co., Signal Corps Labs. and ITT Labs.; married.

BAUNACH, EDWARD L. (M) 1927 - Photoengraver with News Syndicate Co., Inc., 220 East 42nd St., New York 17, N. Y.; res. 2 Westminster St., Massapequa, Long Island, N. Y.; b. New York City, June 19, 1907; ed. 8 years grade school, 4 years high school, 2 years college; interested in radio 35 years; Amateur station W2AZV since 1926; married.

BEAN, L. P. R. (F) 1935 - Managing Director, Stromberg-Carlson (Australasia) Ltd., Box 3971 GPO Sydney, Australia; b. Melbourne, Australia, May 7, 1884 ed. E.E. Melbourne Technical College, University of Perth, Australia; professional experience - manufacturing Radio Receivers, Television and Telephone Apparatus.

BEHR, JOSEPH (F) 1948 - Vice President, Radio Engineering Lab's. Inc., 29-01 Borden Ave., Long Island City 1, N. Y.; res. 118-44 223 St., Cambria Heights, N. Y.; b. N.Y.C., August 22, 1908; ed. Primary and High School graduate, Stuyvesant High School, 1925; radio ten years; Associate member Institute of Radio Engineers; Member Armed Forces Communications and Electronics Assn.

BEIN, ALFRED A., (M) 1957, Buyer - Ladies Coats, Arnold Constable, 13 yrs., Amateur 6 yrs., Sports, hobbies, etc. weight lifting, music, dancing, ALFCE and SSBARA, ed., New York University, b. July 6, 1910, The Bronx, N.Y.C.; res. 26 Lenox Ave., Clifton, N. J.

BERNARD, HERBERT S. (F) 1941 - Engr. Ware Marine Products 6763 SW 81 St., Miami, Fla. res. 6321 SW 80 St., Miami, Fla. (Automatic Pilot for marine use) President of Ware Marine Prod. b. N.Y.C., July 26, 1900; radio since 1912; amateur 1929 to 1947; Air Force, World War I; Hobby - Flying; Patents 2,521,564 and 2,520,749; married.

BERNSTEIN, ROBERT I. (M) res. 632 W. 125th St., New York 27, N. Y.

BEVERAGE, HAROLD HENRY (F) 1920 - Director, Radio Research Laboratory, Radio Corporation of America, RCA Laboratories Division, 66 Broad St., New York 4, N. Y.; 1942/1957 Chief Technical Advisor, Communications, 1957/1958. Retired 1958, retained as consultant RCA Lab., Rocky Point, N. Y. Res., Quaker Path, Stony Brook, Long Island, N. Y.; b. North Haven, Maine, October 14, 1893; ed. B.S.E.E. University of Maine, 1915. Honorary Degree, Doctor of Engineering, University of Maine, 1938; interest in radio since 1908; Amateur license in First District 1911/1915, W2BML 1919/1922; General Electric Company 1915/1920, Radio Corporation of America 1920 to date engaged in radio research and development; Institute of Radio Engineers (President 1937), American Institute of Electrical Engineers, American Association for the Advancement of Science, International Geophysical Union, American Radio Relay League; Hobbies - Amateur photography, sound re-recording; Eight published papers; Forty one U. S. Patents; married.

BIGGS, J. ALLEN (M) 1949 - Sales Engineer, J. Alan Biggs Co., Doylestown, Pa., b. Indianapolis, Ind., January 9, 1911; res. Gardenville, Pa.; ed. State School of Mines, Rapid City, South Dakota; interested in radio thirty years; amateur 28 years; W8BXK, W9EH, W8LO, W2ZW, W1ZX, W3ZP; RCA International Division; Lulu Shrine, Philadelphia; Private Pilot, Huntington Valley Hunt Club, QCWA, Farmer.

BINNS, JOHN ROBINSON (F) 1916 - Honorary Chairman, Hazeltine Corporation, 58-25 Little Neck Parkway, Little Neck, N. Y.; res. 220 Central Park South, New York 19, N. Y.; b. Lincolnshire, England; ed. Grade Schools and School of Arts and Sciences, Colchester, England; interested in radio since 1904; Marconi Operator 1904/1912 on German, British and U. S. Ships, Operator S/S Republic 1909; with Hazeltine Corporation 1924 to date; Adventurers Club, I.R.E., New York Athletic Club; Society of the Silurians; married.

BOGHOLTZ, RICHARD, JR. (M) res. 5811 Liebig Ave., Bronx 71, N. Y.

BOHMAN, ALBERT KASPER (F) 1926 - Staff Assn. to Manager Ground Operation, Pan American Airways, International Airport, Miami, Fla.; res. 11705 N.E. 7th Ave., Miami 38, Fla.; b. Long Island City, N. Y. on August 9, 1900; ed. Grade and High School, N.Y.C., Brooklyn Polytechnic Institute, Brooklyn, N. Y.; interested in radio forty years; Engineering Department, Radio Corporation at Marion, Mass., New Brunswick, N. J. and 66 Broad St., N.Y.C. from 1920 to February 1929, Communications Department of Pan American Airways from February, 1929 to September, 1957 Ground Operation September, 1957 to date; Served in U. S. Naval Reserve from September 1917 to 1921, Active Service during World War I, September 1917 to August 1919; married.

BOLIN, RAY E. (M) res. 26 Twin Springe La., St. Louis 17, Mo.

BORDEN, CLIFFORD C. (M) 1950 - Electrical Engineering, Stratocon Corp. Box 10, Morristown, N. J.; res. New Providence, N. J.; b. Sloatsburg, N. Y. on February 22, 1903; ed. Rensselaer Polytechnical 1927, N.C.E. 1928 (EE); interested in radio 39 years; amateur since 1919 last license W2APK; electrical and electronic design engineer since 1928; duties with Stratocon include design and research on computers; magnetic amplifiers and devices; electronic instruments; radio and radar devices; sixteen patents in electrical instrument and conduit fitting fields; member I.R.E. and A.I.E.E., Secy. Board of Trustees of New Providence, N. J.; Methodist Church, Member Executive Board, American Cancer Society; married.

BORST, JOHN M. (F) 1934 - Radio Engineer, Haskins Laboratories, 305 East 43rd St., N.Y.C.; res. 765 United Nations Plaza, New York 17, N. Y.; b. Lienden, Province of Gelderland, Netherlands; ed. Technical University at Delft, Netherlands; interested in radio since 1914; Ship's radio operator 1922/1927, Broadcast station engineer 1926/1927, Technical Editor Radio News 1931/1937, Engineer Aerovox Corporation 1937/1938, Recording Engineer 1941, Engineer and Writer, John F. Rider 1941/1944, Engineer Halstead Traffic Communications Corporation 1944, Hammerlund Manufacturing Corporation

1944/1946, Haskins Laboratories 1946 to date; I.R.E. and Audio Engineering Society; single.

BOSE, JOHN H. (F) 1938 - Senior Lab. Supervisor, Electronics Research Lab., 632 W. 125th St. N.Y.C., Columbia University; res. 549 W. 123rd St., N. Y. 27; b. N. Y., March 26, 1912; ed. B.S. 1934, E.E. 1935, Columbia Sch. of Eng., Gano Dunn Fellowship, Columbia 1934/1935; interested in radio from boyhood hobby; Ass't. in Dept. of E.E. 1935/1937, 1937 to 1954; Engineer for E. H. Armstrong, Development in FM Transmitter, CW Radar, FM Multiplex Transmitters and Receivers; 1954 to date at Columbia Univ. Electronics Research Labs - Development of Long Range Radar - appointed Associate Prof. of Engineering 1957; Tau Beta Pi, Sigma Xi, Epsilon Chi, I.R.E. Sr. Member 1933, Audio Engineering Soc., Radio Club of America, Pres. 1952/1953, Cor. Secretary 1949, Rec. Secretary 1944/1948; married.

BOUCHERON, PIERRE (F) 1920 - Sales Manager Grimson Color Inc., New York 16, N. Y.; res. 2813 Bellaire Dr., Fort Wayne, Ind.; b. Paris, France on August 22, 1889; ed. Schools in France and U. S., Journalism, Radio, Naval Science plus residence and correspondence courses during adult years in radio, literature; radio amateur in N.Y.C. 1908/1912, ship wireless operator Marconi Co. 1912/1916, U.S. Navy 1917/1919, then editor of the original Radio News magazine 1919/1920, then Public Relations Director for RCA 1920/1928, then Sales Manager, Promotion Manager for RCA 1928/1932, then Merchandising Manager for Remington Arms 1933/1938, then General Sales Manager for Farnsworth Television Corporation, U.S. Navy 1941/1946, then retired as Captain (Permanent Grade) 1950; Senior Member I.R.E.; Life Member Veterans Wireless Operators Association, Army and Navy Club, Washington; Explorers Club; Numerous U.S. and Foreign decorations including French Legion of Honor.

BRADLEY, WILLIAM D. (F) 1941 - Monmouth Radio Supply Co., 404 Shrewsbury Ave., Red Bank, N. J.; res. R. D. #1, Freehold, N. J.; b. November 18, 1908 at Lyons, N. Y.; ed. High School; interested in radio for 32 years; married; P. P. Red Bank Lions Club, P. P. MCBC of the Methodist Church, P. P. Red Bank Community Chamber of Commerce, P.C. JOUAM, Mystic Lodge #21, Tall Cedars, BPOE #233, Radio Old Timers; Radio Club about 10 years; Member of Navy League of United States; Crescent Temple A.A.O.N.M.S. of Trenton, N. J.; Ancient Scottish Rite Valley of Trenton, N. J.; President of Atlantic Township Fire Co., Colts Neck, N. J.

BREMMER, LEROY (M) 1954 - Owner, General Manager, Chief Engineer Radio Station WLDB Senator Hotel, Atlantic City, N. J.; res. 610 Victory Blvd., Staten Island, N. Y.; b. May 23, 1900 in Iowa Falls, Iowa; married; ed. Public Schools through High School, Graduate Dodge's Radio Engineering Institute, U.S.M.S. Radar and Electronics School, Business and Management Courses; interested in radio since 1917; amateur 1917/1927; Professional experience: 1918/1921 Radio Operator (Shipboard) for Marconi and RCA; 1921/1924 Construction Engineer for RCA; 1924/1925 Construction Engineer for Inter-City Radio and Tel. Co.; 1941/1946 Lieutenant Commander USMS, Radar and Communications Officer, Combat Areas 33 Invasions; eight citations including Presidential citation, 1949/1950 National Schools of Los Angeles; wrote Radio and Television course; Built KERB at Kermit, Texas acting as General Manager and Chief Engineer; DuMont TV Network 1951, 1951/1953 Sales Engineer Langevin Mfg. Corporation, N.Y.C., Senior Member, Institute of Radio Engineers Member, Veteran Wireless Operators Assn Member, DeForest Pioneers Member, Broadcast Pioneers Member, Armed Forces Communications Assn.

BRIDGELAND, CHARLES J. (M) - Canadian National Telegraphs, Radio Engineer, 347 Bay St., Toronto, Ontario; res. 191 Riverside Dr., Toronto 3, Ontario, Canada; b. December 1908 at Barrie, Ontario; ed. M.A. Sc. in radio engineering University of Toronto; interested in radio for thirty years; National Research Council, Ottawa, Research Enterprises, Ltd., Toronto on Propagation and Antenna Design for Radar - Canadian National Telegraphs on application of point to point and mobile radio for systems operation; Senior Member of IRE, Associate Member of Institute of Electrical Engineers; married; Hobbies - High Fidelity Sound.

BROCINER, VICTOR (F) 1941 - Owner - Brociner Electronics Laboratory, 324 East 32 St., N.Y.C.; res. 310 East 75th St., New York, N. Y.; b. May 9, 1910 at New York, N. Y.; ed. Columbia A.B. 1929, B.S. 1930, M.E. 1931; interested in radio 30 years, amateur experience constructing radios; Owner Luxtrol Co., industrial electronic control and measuring equipment to 1937, Vice President for Engineering, Philharmonic Radio Corporation to 1946; Phi Beta Kappa, Tau Beta Pi, member IRE and Audio Engineering Society; married.

BROWN, REYNOLDS D. Jr. (F) 1930 - Radio Engineer, Philadelphia Storage Battery Co., C and Ontario Sts., Philadelphia, Pa.; res. 8208 Seminol Ave., Chestnut Hill, Philadelphia, Pa.; b. Philadelphia, Pa., November 14, 1903; ed. University of Pennsylvania, 1924 - associated with Dr. A. N. Lucian, University of Pennsylvania, radio tube development, 1925, Engineering Dept., Music Master Corp., 1925/1926 operated Philadelphia Radio Manufacturing Co., Vacuum tubes; 1926 to date Engineering and patent work, Philadelphia Storage Battery Co.

BRUNET, MEADE (F) 1928 - Vice President, Radio Corporation of America, 30 Rockefeller Plaza, N. Y. 20, N. Y.; res. Millsdale Farm, Mendham, N. J.; b. Petersburgh, Va., June 21, 1894; ed. B. E. Union College, 1916; Sigma Phi, Sigma Xi; interested in radio since 1919; G.E. Co. and R.C.A.; Served as 1st Lieut., Co. A, 56th Engrs. World War I, military combat service with French 8th Army and First Am. Army A.E.F.; member IRE, Acad. of Polit. Science, American Soc. of Naval Engineers, Director of Far-East America Council of Commerce & Industry, Vice Chairman of Bd. of Trustees of Union College, Chairman of Business Council for International Understanding; Clubs - University (N. Y.), Army & Navy (Wash., D.C.), Somerset Hills (Bernardsville, N. J.) Radio Pioneers; Author; History of the 56th Engineers in First World War; married; Director of RCA Victor Argentina, SAIC; RCA of Australia Proprietary Ltd.; RCA Victor Company Ltd. (Canada); Photophone Equipments Private Ltd. (India); RCA Victor Mexicana, S.A. de C.V.; National Foreign Trade Council, Inc.; Dir. of American Electronic Enterprises, Ltd. (Japan); Trustee, Union College, Schenectady, N. Y.; U. S. Inter-American Council; Governor of Union University, Albany, N. Y.

BURGHARD, GEORGE E. (CM, LM, F) 1910 - Executive, Continental Sales Co. Inc., 521 Bloomfield Ave., Newark, N. J.; res. 240 Central Park South, New York 19, N. Y.; b. January 23, 1895, N.Y.C.; ed. Columbia College A.B. 1916, Law School 1918; married; Amateur Radio experience, owned and operated transmitting station since 1908, call letters, E B, 2 S S, W 2 G E C . , Commercial Telegraph and Telephone operators license 1916 to date; President Continental Radio Corporation 1920 to 1934; President Continental Sales Co. 1938 to 1949, Vice Pres-

ident to date; Ensign Radio in charge of Naval Radio Compass School 1917 to 1919; Senior Member IRE, Member: Old Old Timer's Club, Veteran Wireless Operators Assn., Quarter Century Wireless Assn., ARRL, Single Side Band Amateur Radio Assn., Founder, President and Director, Armstrong Memorial Research Foundation; Member Junior Wireless Club Ltd. 1910. Radio Club of America Recording Secretary 1911/1913, President 1921/1925, Director 1920, 1926-to date. Charter Member; Awards, Armstrong Medal 1950 1 B C G, First Translantic Short Wave Message Dec. 11th. 1921.

BUTTNER, HAROLD H. (F) 1928 - Director Hewlett Packard Co., Palo Alto; res. Belmont Ave., Rye, N. Y.; b. November 3, 1892 at Port Costa, Cal.; ed. B.S. in Electrical Engineering, University of California; interested in radio 43 years; amateur 1910/1915; Bay Counties Radio Club; 1915/1917 U.S. Navy Radio Development and Installation Mare Island Navy Yard and American Samoa; 1918/1920 U.S. Navy Installation Lafayette, France; 1921/1924, member of the staff of Western Electric Company and Bell Laboratories; 1926/1946 International Telephone and Telegraph Corporation; 1946/1951 President Federal Telecommunication Laboratories; 1951 to 1957 Retired; Vice President in charge research and development, International Telephone and Telegraph Corporation; Decoration - Commendatore dell 'Ordine della Corona d'Italia; married; Westchester Country Club, Downtown Athletic Club, University Club, San Francisco.

CALLAHAN, JOHN L. (F) 1921 - Research Administrator, Radio Research Laboratory, RCA Laboratories, Radio Corporation of America, Rocky Point, N. Y.; res. 67 Nassau Ave., Malverne, Long Island, N. Y.; b. Minneapolis, Minn. - December 9, 1898; married; ed. High School, Army Signal Training, Sorbonne University, Paris, France, New York University; interested in radio since 1912; amateur crystal receiver and straight gap transmitter experiments 1912/1917; Signal Corps Laboratories, Little Silver, N. J. 1919/1920; Radio Corporation 1920 to date; research and development on marine shore station receivers and antennas; long distant point to point radiotelegraph, telephone and radiophoto receivers and antennas; aircraft beacon receivers; terminal facilities radiophoto, time division multiplex, teleprinters, etc.; Research Administrator IRE and American Institute of Electrical Engineers; Three published papers; six U.S. Patents; Sports, tennis; Hobby - gardening; Radio Club of America President 1941; Vice President 1940; Director 1935/1948.

CANAVACIOL, FRANK E. (F) 1934 - Professor of Electrical Engineering Polytechnic Institute of Brooklyn, 99 Livingston Street, Brooklyn 2, N. Y.; res. 7119 Juno St., Forest Hills 75, New York; b. January 16, 1896 in N.Y.C.; ed. Polytechnic Institute of Brooklyn, E.E. 1918; married; interested in radio about 40 years; Professional experience in consulting and teaching fields; co-author "Radiophone Receiving" and Swope's Lessons in Electricity," Fellow AIEE, SM IRE, Member AAUP Member ASEE.

CANO, JOHN R., (M) 1956 - res. Southland Dr., Glen Cove, L.I., N. Y., b. November 12, 1925, Bronxville, N. Y., ed. Clarkson College of Tech., Potsdam, N. Y.; Research Eng., Photo Circuits Corp., 31 Sea Cliff Ave., Glen Cove, L. I., N. Y., Military Serv., U. S. Army, Amateur Call Letters EX K2 MAK; U. S. Power Squadron, U. S. Coast Guard Aux., IRE, Etched Ckt. Society.

CARINI, LOUIS F. B. (F) 1930 - Engineering Manager, Apparatus Development Co. Inc., Wethersfield, Conn.; res. 246 Wolcott Hill Rd., Wethersfield 9, Conn.; b. Salisbury, Conn. June 21, 1911; ed. Hillyer Junior College, Conn. Teachers College, Temple Bar College, Ph.D.; amateur station 1-BOC in 1928. Served as technical field rep. for E. H. Scott Radio Labs.; training supervisor Underwood Elliott Fisher Co.; plant supt. Hershey Products Co. etc. U. S. Coast Guard 1943/1946 as instructor, laboratory research, and engineering writer at Coast Guard Headquarters, Communications Engineering Section, Washington. Project engineer, LaPointe Plascomold Corp.; Ass't chief engineer and research director for LaPointe Electronics Inc., Since 1955 Engineering Manager of Apparatus Development Co.; Author of "Drafting For Electronics," "How To Do Your Own Electrical Servicing," "All About FM Antennae And Their Installation" and numerous technical articles published in electronic and hi-fi magazines. Hobby, sports cars and collecting antique vacuum tubes.

CARLEBACH, WALTER M. (M) 1939 - Retired; res. 47 East 64 St., N.Y.C.; Electrical Engineer; Columbia University.

CERULLI, FRANK J. (M) res. 871 Mountain Ave., Berkeley Heights, N. J.

CERVANTES, HOWARD T. (F) 1939 - President Electronicraft, Inc., Mt. Kisco, N. Y.; res. 190 Croton Ave., Mt. Kisco, N. Y.; b. December 15, 1902 in N.Y.C.; married; ed. N.Y.C. Grade and High Schools and N.Y.U.; Amateur 1920 to date with present call W2DB; Lieutenant Commander U. S. Navy Communications Officer 6 1/2 years World War II.

CHALFIN, NORMAN LEONARD (M) 1948 - Sub. Group Hd. Member of Technical Staff, Hughes Aircraft Co. Ground Systems, Fullerton, Cal.; res. 11128 Wagner St., Culver City, Cal.; b. Philadelphia, Pa. October 16, 1913; married, son, Gregory b. October 15, 1942; ed. B.S. University of Georgia 1936; Graduate studies Columbia Univer. 1936/1941; presently studying law at Southwestern Univ. Law School; professional experience - instructor, electrical engineer, chief engineer; technical editor and writer; W. E. Co. 1942; Crystal RES Lab 1943; Recordograph Patents 2,477,160 and 2,632,811; Registered Patent Agent. Many articles in Radio and TV News, Radio Electronics, Pop. Science, Pop. Mechanics, Electronics, Televisor, Radio and TV Maintenance, Radio Service Dealer and Tele-Tech., Hi-Fi column in local newspapers Southern Cal. area, 1957, Treas. Los Angeles Section, Audio Engineering Society; 1958, Vice Chairman Section, AES, 1959, Chairman, Section, AES, Member Los Angeles Patent Law Ass'n.; Papers before AES 1956, 1957, 1958, 1959; Member, International Ass'n. for the Protection of Industrial Property; Dir., Bd. of Dir. Los Angeles Science Center Founding Com.

CHAMBERLIN, RUDOLPHUS M. (M) 1952 - Owner Radio Station WGGG, Alochua County Broadcasting Co.; res. 123 N.W. 20th Dr., Gainesville, Fla.; b. August 15, 1910, Micanopy, Fla.; married; interested in radio 33 years; amateur station W4DOD; Bell Telephone Labs engineer; member IRE; Vice President Duval Broadcasters, Inc. at Jacksonville, Fla.

CHAMBERS, ALBERT B. (M) 1949 - P.O. Box 185, Wyckoff, N. J.; b. Jersey City, N. J. August 18, 1896; ed. Pace Institute 1917/1919; member American Television Society. Empire State T.V. Guild; Sons of American Revolution; Institute of Radio Engineers; Licensed Real Estate Broker-New Jersey-New York.

CHIANG, WILLIAM (M) res. 325 Riverside Dr., New York 25, N. Y.

CHITTICK, K. A. (F) 1941 - Electronics Engineer, RCA Camden, N. J.; res. 1194 Washington Ave., Haddonfield, N. J.; b. Old Bridge, N. J. November 6, 1903; married; ed. B.S.E.E. Rutgers University; amateur pre World War I; General Electric Company 1925/1930; RCA 1930 to date; Ten patents; several papers; Fellow IRE; Franklin Institute Electronics Club; Many committees RTMA; Hobbies - Golf, fishing and baseball.

CHRISTALDI, P. SAMUEL (F) 1940 - Product Manager, Electronics Div., Curtiss-Wright Corp., Carlstadt, N. J., Prior, Div. Mgr., Technical Products, Div., Instrument Div. Allen B. DuMont Laboratories, Inc.; res. 132 Squire Hill Rd., Upper Montclair, N. J., b. November 26, 1914 in Philadelphia, Pa.; e. Rensselaer Polytechnic Institute; E.E. 1935 Ph.D (Physics) 1938; interested in radio since about 1931; amateur since 1931, W3BHT, W3AWZ, W2ZZBH, W2DMH, W2ZZDJ, W2ENY; presently active on 50 mc; Professional experience DuMont, engineer on cathode ray tubes and oscillographs from 1938, 1941/1947 Chief Engineer CRO, oscillographs, TV receivers, transmitters; 1947/1952 Engineering Manager, Instrument Division; numerous U. S. and Foreign Patents and applications; electronics; numerous lectures and papers in technical journals; hobbies, ham radio, scouting (committeeman); Montclair Society of Engineers (President 1953/1954).

CIMORELLI, JOSEPH T. (F) 1956 (M) 1950 - Manager, Manufacturing, Receiving Tube Operations, Electron Tube Division, Radio Corporation of America, Harrison, N. J.; Res. 10 Cromwell Dr., Morristown, N. J.; b. March 18, 1912 in Catskill, N. Y.; ed. St. Patrick's Academy, Catskill, N. Y., Massachusetts Institute of Technology B.S. 1932, M.S. 1933; Professional Experience, Tube Department RCA Victor Division, Harrison, N. J. Laboratory 4 years, Field Engineer 6 years, Manager Application Engineering Laboratory 8 years, Assistant to Vice-President and Director of Engineering, Radio Corporation of America, Camden, N. J. 3 years; Manager, Engineering, Receiving Tube Operations, Electron Tube Division, Radio Corporation of America, 2 years; IRE, Secretary-Treasurer of New York Section, Chairman, New York Section; Various IRE Section Committees; Charter member of Vatican Philatelic Society.

CLARK, LOUIS E. (M) 1939 - res. 298 Highwood Ave., Glen Rock, N. J.; b. Jersey City, N. J. August 9, 1898; member IRE, Curtiss-Wright Corp., Prop. Division, Caldwell, N. J., since 1940 to date.

CLEMENT, LEWIS M. (F) 1919 - Consultant, 3124 P St., N.W., Washington 7, D. C.; b. Oakland, Calif. January 25, 1892; married; University of California B.S. in E.E. 1914; Amateur 1905/1914 at Oakland, Calif.; Professional experience 1914/1959, radio operator summer 1911 and 1912. Marconi Wireless Tel. Co. of America, Kahuku, Oahu, T. H., and Bolinas, Calif., Western Electric Co. and Bell Tel. Laboratories; FADA RADIO; KOLSTER RADIO; Federal Telegraph and European I.T.T. Companies; RCA Mfg. Co., Camden, N. J. and Crosley and Avco Mfg. Corp., Crosley Div. Many patents and Technical Articles; Chairman Advisory Group Reliability of Electronic Equipment Dept. of Defense; Fellow IRE; Member British Institution of Radio Engrs.; Member Cosmos Club, Washington, D. C.; Member American Ordnance Assn.; member Armed Forces Communications and Electronic Assn.; Awards: Modern Pioneer Award, February 1940; National Assn. of Mfgrs.; Naval Ordnance Dev. Award; Bureau of Ordnance-U.S. Navy, December 10, 1945; Pioneer in the Field of Aircraft; Electronic Dev., May 4, 1950; Dayton Section I.R.E.; Contribution to Creation of Color Television Standards, June 17, 1954; RETMA-Placque Presented to Lewis M. Clement for Distinguished Service to Industry and Government in the Field of Reliability, October 18, 1959; RETMA AND IRE, A Pioneer Award, presented by The Professional Group on Aeronautical and Navigational Electronics to Lewis Mason Clement by IRE 1951; Radio Club Director 1920/1930; Recording Secretary 1921; Vice Pres. 1928 and President 1929.

COBB, HOWARD L. (F) 1934 - Engineer, Aircraft Radio Corporation, Boonton, N. J.; res. 250 Rockaway Ave., Boonton, N. J.; b. July 17, 1896 at Salina, Colo.; married; ed. MIT 1923 S.B. Electrochemical Engineering; interested in radio since 1910; professional experience Radio Laboratory Philadelphia Navy Yard; RCA; Benjamin Elect.; Fansteel Products Co.; Ballantine Laboratories; Aircraft Radio Corporation; School Board; P.P. of A.E.S. Newark Branch; member A.S.M.; Mason.

COCKADAY, LAURENCE M. (F) 1915 - P.O. Box 902, Annapolis, Md.; ed. St. Johns School Physics and Engineering; b. Greenville, N. J. June 18, 1894; Amateur station "LC" 1910, 20G 1912/1913, 2AAK 1916, W2XK 1919/1923; Editor Radio News 1934; Lecturer New York University.

COHN, HUGO (F) 1939 - Consulting Eng., 221 W. 57 St., New York, N. Y.; Formerly President Radio Receptor Co. Inc., 84 North 9 St., Brooklyn, N. Y.; res. 905 West End Ave., N.Y.C.; b. November 26, 1887 in N.Y.C.; married; ed. E.E. Columbia University, 1909; interested in radio 36 years; professional experience engineering and management with Radio Receptor Co., Inc. 1922 to date.

COLLISON, PERCE BRAWN (F) 1934, Retired (1958) res. 9 Lorraine Dr., Tuckahoe, N. Y.; b. Brooklyn, N. Y., June 15, 1891; married; e. High School followed by various special courses in Physics, Electrical Engineering, Television, interested in radio since 1906, 2KN with rotary spark gap until World War I; Vice Pres. New York Radio Club, Amateur (K2DZ) "Extra Grade" Lic. Charter Member "Quarter Century Wireless Assn." Member "Westchester Amateur Radio Assn.", President Hammond Organ Society of Westchester; Professional experience, United Wireless Co. installer, Marconi Co. shipboard inspector and superintendent of construction, Lieutenant Commander U. S. Naval Reserve set up Radio Material School for Navy Radio, Radar, Sonar, and Visual Signalling. Charter Member IRE, Wireless Institute, Wireless Assn. of America; Member ARRL, Armed Forces Communications Assn., Military Order of World Wars, Naval Order of the U. S.; Radio Club Recording Secretary 1949, Membership Com. Chairman 1950/1953.

CONNOR, GEORGE C. (F) 1936 - Vice President, Sylvania Electric Products, Inc., 1740 Broadway, N.Y.C.; res. 100 Valley Rd., Larchmont, N. Y.; b. Hoquiam, Washington May 28, 1903; married; ed. University of Wisconsin; interested in radio 40 years; Amateur 9CEK Chicago, Ill.; Radio Engineer with Brunswick Electronic Radio and Sylvania Electric; Member AAAS, IRE, NYAC, Director PMDA; Radio Club Vice President 1949.

COOK, LAWRENCE (M 1939 - F 1957) Engineer, Boonton Radio Corporation, Boonton, N. J.; res. 610 William St., Boonton, N. J.; b. Bryan, Ohio October 4th, 1908; ed. Bliss Electrical School; member IRE.

COOPER, CHARLES B. (F) 1924 - Retired; res. 131 Lexington St., Westbury, L.I., N. Y.; b. Bracebridge, Ontario, Canada May 1?, 1882; married; professional experience 1903 Wireless Operator Dr. Lee DeForest Toronto, Canada; 1904 Buffalo, Cleveland and St. Louis

Worlds Fair with first paid message service between St. Louis and Springfield; 1905/1906 DeForest Superintendent of Construction for several stations in Colorado and Texas for point to point service but static licked us - 1907 Transferred to Seattle, Wash. and built "PA" and "PC" at Astoria; 1908/1915 Various executive positions with United Wireless and Marconi in Construction and expansion of Ship to Shore communications; 1915 Radio Superintendent Alaska Steamship Co.; 1916/1917 Organized the Ship Owners Radio Service, Inc. for Kilbourne and Clark; 1918 Opened New York Office for Kilbourne and Clark's Navy transmitter business; 1919/1921 Reorganized Ship Owner's Radio Service for Kilbourne and Clark on service contract for Shipping Board vessels; 1932/1933 Factory representative for Crosley Radio and other receivers and parts manufacturers; 1931 Changed firm name from C. B. Cooper Co. to Cooper-DiBlasi which continues to date; Retired from firm in Fall of 1952; Life Member Veteran Wireless Operators Association; Charter Member DeForest Pioneers; F. and A. M. Lodge No. 856 Bay Ridge, Brooklyn; Marconi Memorial Wireless Pioneers Medal Awarded for efforts in early days of radio, 1903 to 1954.

CORYELL, ROBERT L. (M) res. 90 Wykalyl Terrace, New Rochelle, N. Y.

CORZO, GUILLERMO ANDREU (M) res. 5a Avenida No. 5-20, Zona 2 Guatemala, C. A.

COUNTESS, JULIUS (M) res. 64-04 217th St., Bayside 64, N. Y.

CRAMER, BRUCE G. (M) 1955 - Electronics Engineer, Research Division, Philco Corp.; res. P.O. Box 945, Harrisburg, Pa.; b. November 22, 1930 in Harrisburg, Pa.; ed. Pennsylvania State University, BSEE, 1952, current graduate study, University of Pennsylvania, previously with Bendix Aviation Corp. 1952/54; Military Service, Signal Corp. 1954/1956.

CRAWFORD, JOHN D. (F) 1939 - res. 16 Lodge Rd., Great Neck, N. Y.; b. Barberton, Ohio April 30, 1904; Senior Publication Engineer, Hazeltine Corp. 59-27 Little Neck Parkway, Little Neck 62, N. Y.

CRAWFORD, ROBERT V. (F) 1940 - Electrical Engineer - General Electric Company, Schenectady, N. Y. 1928 to 1930; Bell Telephone Laboratories, Inc., Murray Hill, N. J. 1930 to date; Residence 11 Crest Circle, Murray Hill, N. J.; Education Rensselaer Polytechnic Institute; New York University, B.S. in E.E. - Senior Member Institute of Radio Engineers; Member of Professional Group on Vehicular Communications; Member of various Special Committees of Radio Technical Commission for Marine Services (R.T.C.M.); Member of U. S. Study Group XIII of International Radio Consultative Committee (C.C.I.R.).

CRONKHITE, MINTON (F) 1919 - Radio Club Corresponding Secretary 1920; Director 1921/1922; Armstrong Medal 1950; IBCG Group. P.O. Box 805, Rancho Sante Fe, Calif.; President Liberty Electric Co. 1928 at Stanford, Conn.; Radio Club of America Armstrong Medal 1950 - IBCG.

CRONKHITE, WILLIAM GORDON FELLOWS, (M) 1955, Industrial Management, res. 1718 Grevelia St., S. Pasadena, Calif., e. Univ. of Southern California; Military Service U. S. Navy 1951/1955, Amateur Call Letters K6QQN, 4 yrs.

CRONKHITE, M. B. (M) res. P.O. Box 805, Paucho Sante Fe, Calif.

CROSBY, MURRAY G. (F) 1939 - President and Research Director, Crosby Laboratories, Inc., 299 Robbins Lane, Syosset, N. Y.; res. 93 Muttontown Rd., Syosset, N. Y.; b. Elroy, Wisc. September 1903; married; ed. University of Wisconsin 1927 B.S.E.E.; amateur W2CSY formerly 9AOX; professional experience RCA Laboratories 1927/1944; Press Wireless 1944/1945; Paul Godley Co. 1945/1948; Crosby Laboratories, Inc. 1948 to present; Approximately 180 U. S. Patents; 20 Technical Publications in Proceedings IRE, RCA Review, QST and others.

CUNNIFF, LEO C., (M) 1958 - Vice Pres. (Eng.) for manufacture of electronic test equipment and analytical equipment for chemical industry, Industrial Instruments, Inc., Cedar Grove, N. J., (17 yrs.), Military Service U. S. Navy 1944/1946 Radar Maintenance on U.S.S. Princeton CV-37; Amateur Call Letters W2OEH, 1940, Patents, Books, etc. (Basics of Radio Control - Air Trails Model Annual 1953 - Street & Smith); (Plug-In 27 Mc. Radio Equipment - Air Trails June 1950) (Instruments - World War I to date, The Hudson Engineering Jr. October 1952) Sports and Hobbies, Skiing, Flying, Skin Diving, Photoggraphy, Music.

CURTIS, PAUL EVART (M) 1952 - Area electronics technician, U. S. Weather Bureau, 311 N. Terminal Dr., San Antonio 12, Texas; res. 128 W. Terra Alta Rd., San Antonio 9, Texas; b. December 14, 1907 Chelsea, Mich.; married; ed. Wayne, Michigan High School 1924; one year of engineering at Georgia Tech.; amateur 8DLZ in 1923; 4VD in 1924; W5IOJ in 1940; now W5VE; professional experience 2 yrs. seagoing (Telefunken, Simon & Indewirtel spark); operator CPC-CPV-CPY-CPS (Standard Oil of Bolivia) 1930/1933; Chief operator XENT 1935/1936; Eastern Air Lines 1937/1951; presently install & maintain radar, rawinsonde, automatic weather observing stations & general meteorological electronic & electro-mechanical equipment.

DARRELL, ROBERT D. (M) 1946 - Music Critic, freelance, res. Balmoral, the Vly, Stone Ridge, N. Y.; b. December 13, 1903 Newton, Mass.; single (div.); ed. Newton Public Schs., New England Conservatory of Music; interested in radio; amateur audio amplifiers and testing since 1942; professional experience Instruction Book Editor (IFF) Hazeltine Electronics Corp. 1943/1946; Magazine articles (Electronics, Saturday Review, Audiocraft, etc. and lectures on audio subjects, Audio Engineering Society, IRE, Music Librarians Assoc., etc.) Books, Good Listening (Knopf 1953, Mentor reprint 1955; Schirmer's Guide to Books on Music and Musicians (1951, Supplement in prep. 1959); Gramophone Shop Encyclopedia of Recorded Music (1936); onetime Editor of Phonograph Monthly Review, Review of Recorded Music, Music Lover's Guide; since 1956 Contributing Ed. High Fidelity Magazine; many articles and reviews (mostly on recorded music); Guggenheim Fellowship 1939; Societies AES (CM); IRE (A); Acoustical Society of America (A).

DAVIS, E. STUART (M) res. 244 Elmwood Ave., Union, N. J.

DAY, HOWARD BLOOD GOOD (F) 1912 - Electrical Engineer Pennsylvania Power & Light Co., 901 Hamilton, Allentown, Pa., (scheduled for retirement January 1, 1960); res. 27 N. Jefferson, Allentown, Pa.; b. November 2, 1894 at N.Y.C.; married; ed. Westfield, N. J. Public Schools and University of Illinois, B.S.E.E. 1922; interested in radio since 1908; Amateur station "HDF" Westfield in 1908/1918 and licensed as 2KK 1913/1917; Commercial First Grade Radio Operator License No. 2488 in 1913; Chief Operator U. S. Ambulance Ship "Surf" in 1917 with Atlantic Fleet; Member AIEE; Registered Pro-

fessional Engineer in Pennsylvania; Lehigh Valley Engineers' Club and The Pennsylvania German Folklore Society which is a hobby or side study as is photography and TV circuitry; founding member of the Armstrong Memorial Foundation.

DAY, JAMES R. (F) 1938 - Vice President, Radio Engineering Laboratories, Inc., 29-01 Borden Ave., Long Island City 1, N. Y.; res. 39 Gramercy Park, New York 10, N. Y.; b. July 21, 1910, N.Y.C.; married; grade and high school (Stuyvesant) in New York City, B.S. 1931 M.I.T.; professional experience E. H. Armstrong Laboratories - OSRD * RCA Laboratories, Press Wireless, Radio Engineering Laboratories; patents, several in FM and related fields.

DEAN, CHARLES EARLE (F) 1930 - Consulting Engineer, Hazeltine Research Corporation 5925, Little Neck Parkway, Little Neck, N. Y.; res. 260-21 Pembroke Ave., Great Neck, N. Y.; b. May 23, 1898, Pickens County, S. C.; interested in radio since about 1921; professional experience 1921/1924 Bell Telephone Laboratories; 1924/1927 Dept. of Otology, Johns Hopkins Medical School; 1927/1929 American Telephone and Telegraph Co.; 1929 to date Hazeltine Corporation and Associated Firms; Licensed Professional Engineer, New York State, 1934; Apprentice Seaman, U. S. Naval Reserve, World War 1; Awarded Navy Certificate of Commendation for Civilian Work, World War II; Editor "Color Television Receiver Practices," 1955, co-editor, "Principles of Color Television," 1956; Fellow AIEE, senior member IRE; Society for Ethical Culture, N.Y.C.

DEAN, FRANK C., (M) 1955 - Western Electric Co., Military Engineering Service, Winston-Salem, N. C. Permanent location: Bell Telephone Laboratories, Murray Hill, N. J. (Dev. Engr.) res. West Main St., Brookside, N. J., ed. Morristown High School (rech.), Morris County Junior College 1933/1936 (Engr.), Military Service U. S. Maritime Service, September 1944/September 1945 (Radio Officer), Amateur Call Letters W2CKN, September 1932 to present time, F.C.C. Radio Telegraph 2nd. 1944/1949; Sports, Hobbies, etc., Electronics, sports.

DiBLASI, JOHN (F) - Electronic Sales, Cooper-DiBlasi, 90 Main St., Port Washington, L.I., N. Y.; res. 155 Bayview Rd., Plandome, N. Y.; b. New York City November 5, 1898; married; ed. New York City Schools, Cooper Union, Electrical Engineering 1922; interested in radio since 1912; licensed as amateur 2AGD in 1915, re-licensed as 2FD in 1920, presently W2FX; electronic sales business since 1915; taught radio in YMCA Schools and Jamaica Vocational High School; Senior Member IRE, member ARRL, North Shore Radio Club; Past President North Shore Radio Club; President Quarter Century Wireless Association.

DiBLASI, JOHN S. (M) 1951 - Salesman, Cooper-DiBlasi 90 Main St., Port Washington, L.I., N. Y.; b. May 3, 1924 Elmhurst, L.I. married; ed. Bayside High School, U. S. Sig. Corps. Communications. Airforce Pilot Training - O.S.S. Communications St. Johns University Science B.S.

DICKEY, EDWARD T. (F) 1927 - Engineer RCA Laboratories, Princeton, N. J.; res. 104 Jefferson Rd., Princeton, N. J.; b. November 16, 1896 Oxford, Pa.; married; ed. B.S. College of the City of New York; interested in radio since 1909; held amateur license for station 2CN from about 1913/1928; professional experience RCA Research Department in New York 1919/1924; Technical and Test Department 1924/1929; RCA Victor 1929/1941, RCA Laboratories 1942 to date. Present position, Coordinator, Technical Publications; several patents on radio; about ten technical articles on Radio; Hobby - Photography; Senior member IRE.

DIEHL, WILLIAM FRANCIS (F) 1924 - Engineering Executive, Dumont-Airplane and Marine Instrument, Inc., Clearfield, Pa.; res. 1012 S. Second St., Clearfield, Pa.; b. December 18, 1896 at New York City; ed. Flushing High School, Columbia University, Alexander Hamilton Institute, LaSalle; married; interested in radio since 1907; amateur 1907/1917, professional experience, Chief Radio U.S.N. 1918/1919, Chief Engineer A. H. Grebe 1919/1928, Assistant Chief Engineer and Division Manager RCA Mfg. Co. Camden 1928/1938; Director of Engineering and Manufacturing, Product Manager Assistant Vice President Dumont, Airplane and Marine Instruments, Inc. 1938 to date; patents Cathode-Ray Oscillograph, Apparatus for Calibrating Piezo-Electric Elements, Crystal holder; Publications: Section (2) Properties of Materials, Pender-McIlwain, Electrical Engineers Hand Book, Volume (5) Electrical Communications and Electronics; Papers in Radio Club, Electronics, Radio; Chairman, Philadelphia Section, Chairman IRE Ninth Annual IRE Convention; Fellow IRE; Certificate of Commendation U.S.N. World War Two; Sports: Tennis, Badminton and Crokinole; Hobby - Photography including medical. Registered Professional Engineer, Commonwealth of Pa. Standard Teaching Certificate (Photography), Commonwealth of Pennsylvania; Commercial Radio Operator's License-1913; Commercial Radio Operator-1919.

DIETRICH, FREDERICK (F) 1925 - Retired 1 Wall St., N.Y.C.; res. 1136 Fifth Ave., New York City; b. New York City September 15, 1880; Grammar School, New York City, two years City College of New York; interested in radio since 1908; Member, IRE; Engineer's Club.

DOUCHA, ARTHUR FRANK (M) 1951 - Industrial Salesman Continental Sales Co., Inc., Newark, N. J.; res. Clark, N. J.; b. New York City September 30, 1907; ed. Grammar and High School, N. Y. Electrical School; married; interested in radio since 1924; built transmitters and receivers for amateur use in late 1920s; Radio Service business with a stress on sound installations; served in U. S. M. C.; member of A.E.S. and V.F.W.

DREHER, CARL (F) 1923 - Writer, res. R.F.D. #3, Brewster, N. Y.; b. Vienna, Austria, February 16, 1896; married; ed. B.S. City College of New York 1917; Assistant Research Engineer, Marconi Wireless Telegraph Co.; Receiving Engineer, Broadcasting Station Engineer, Radio Corporation of America; Staff Engineer NBC, Chief Engineer RCA Photophone; Director of Recording, RKO Studios; Air Corp, AUS 1942/45; Fellow, IRE. Radio Club of America Director 1927/1928, Vice President 1929.

DROSTE, GEORGE THEODORE (M) 1926 - Estimator and Project Manager, Starrett Brothers and Eken, Inc., 225 Broadway, N.Y.C.; res. 215 Meisner Ave., Staten Isl. 6, N. Y.; b. N.Y.C. November 23, 1886; ed. Public School, Night and Trade Schools; interested in radio since 1903; School under Kolster 1904/1905; amateur 1912 2EU, after World War I call changed to W2IN; Signal Corps WWI; Production Engineer WW2 Bell Labs. at West Street and Western Electric at Kearney on radio, architect and builder since 1901; Infantry 1906/1911, Signal Corps 1911/1936, Grade Captain N.G.N.Y., 1940/1942 Lieutenant Colonel Infantry; Member Staten Island Amateur Radio Club, IRE.

DUBILIER, WILLIAM (F) 1920 - res. 72 Esplanade, New Rochelle, N. Y.; b. N.Y.C. July 1888; married; ed. Technical Institute, Cooper Institute; interested in radio since 1903; professional experience; experimental and

original development of high frequency generators 1906, Chief Electrician Continental Wireless and Telegraph Co. 1907, President and Technical Director Commercial Wireless and Telegraph Co. 1909, organized Dubilier Electric Co. London 1910, Dubilier Electric Co. 1912, Dubilier Condenser Corporation 1913, Radio Patents Corporation 1917, all leading up to many present companies in this country and abroad.

EASTHAM, MELVILLE (F) 1917 - Retired, formerly with General Radio Co., Cambridge, Mass.; res. 8 Gray Gardens, Cambridge, Mass.; b. June 26, 1885 at Oregon City, Oregon; married; interested in radio since 1902; professional experience; Design Engineer for over 40 years, Clapp Eastham Co. 1906/1915, then General Radio to retirement; Fellow IRE, AIEE, American Physical Society, Acoustical Society, IRE Medal of Honor 1938; Medal for Merit-1946; Armstrong Medal-1956 Honorary Doctor of Engineering, Oregon State College-1945.

EDINGER, JOHN RAYMOND (F) 1949 - Production Manager, Pickering and Co., Plainview, L.I., N. Y.; res. 852 Henry St., Uniondale, N. Y.; b. September 17, 1914 at Watervliet, N. Y.; ed. V.T.I. 1934; married; interested in radio 25 years; amateur W2JKF 20 years; professional experience radio operator, engineer; Audio Engineering paper - June 1947.

EGOLF, RICHARD S. (F) 1945 - Supervisor, International Program-Radiophoto Department, RCA Communications, Inc., 66 Broad St., N.Y.C.; res. 90 Eighth Ave., Brooklyn 15, N. Y.; b. Brooklyn, N. Y. December 30, 1895; ed. Public School 131, Manual Training High School, Pratt Institute, Brooklyn; married; interested in radio since 1909; Amateur station RS 1909, licensed 2LE in 1912, relicensed W2WX in 1919 and active ever since, hold Amateur Extra Class, First Class Radiotelephone and Radiotelegraph Licenses; Marine Radio Operator for Marconi Company 1914 SS Hamilton, SS North Land, SS Evangeline and for National Electric Signalling Company SS Priscilla, SS Commonwealth and land station FNK Brooklyn; Radio Intelligence Division Signal Corp. U. S. Army World War 1, Senior Member IRE, Member Veteran Wireless Operators Association, Quarter Century Wireless Association, Old Old Timers Club, DeForest Pioneers, Broadcast Pioneers.

ELDRIDGE, ALBERT B. (M) 1958 - Sales Engineer, "Measurements" A. McGraw - Edison Div., Boonton, N. J.; Box 473, Sparta, N. J., e. attended, Rutgers University, Business Administration, RCA Institutes, Engineering; Military Service Signal Corps. Air Corps., 1942/1945.

ENGLE, KARL D. (M) 1929 - Sales Representative Karl D. Engle Co., 4724 N. Sheridan, Chicago 40, Ill.; res. 6111 N. Damen Ave., Chicago 45, Ill.; b. February 9, 1899 Shelbyville, Ky.; ed. High School. Ex Courses in E.E. at Columbia University; interested in radio forty-five years; married; professional experience in radio parts manufacturing since 1917, mostly as Factory Superintendent and production Manager with large Eastern parts manufacturers; member Chicagoland Chapter of "Electronic Representatives Association," past President 1956.

ESPENSCHIED, LLOYD (F) 1925 - Research Consultant, retired from Bell Telephone Laboratories; res. 99-82nd Rd., Kew Gardens 15, N. Y.; b. April 27, 1889 St. Louis, Mo.; ed. Pratt Institute 1909, hon. D.Sc. 1957; married; interested in radio since 1904; amateur 1904/1909 Brooklyn, N. Y. Station "XY"; summers 1907/1908 ship wireless telegraph operator United Wireless Teleg. Co.; 1909/1910 assistant engineer Telefunken Wireless Telegraph Co. of Amer., TWT at 111 Broadway, N.Y.C.; 1910 to 1954 with Bell Telephone System (AT&TCo, and Bell Telephone Labs.) on research and development in radio and carrier systems; over hundred U.S. patents, dozens of technical papers, participated in national and international conferences on electric communications, received several honors; hobby - history, electrical and family (genealogical); Fellow AIEE, IRE; mem. Ocean Club of Forest Hills; Radio Club Director, 1931.

FARRAND, CLAIR L. (F) 1921 - President - Farrand Controls Inc., 4401 Bronx Blvd., N.Y.C.; President - Inductosyn Corp., 729 N. Carson St., Carson City, Nev.; res. 133 Pondfield Rd., Bronxville, N. Y.; b. October 22, 1895 at Newark, N. J.; ed. Central High School, Philadelphia, Pa. 1908/1911; married; interested in radio 45 years; amateur station WN 1908, Denver 1910; professional experience: 1912/1919 Design Engineer, Marconi Wireless Telegraph Co., 1919/1920 Assistant Chief Engineer Liberty Electric Corp., 1921/1922 Chief Engineer Wireless Improvement Co., 1922/1924 Consulting Engineer Atwater Kent, 1924/1929 President Farrand Manufacturing Co., 1930/1936 President United Research Corp. (subs. Warner Brothers Pictures), 1936/1937 Consulting Engineer Warner Brothers Pictures, 1937/1940 President Independent Res. Service, 1940 to date President Farrand Optical Co., Inc.; about 30 U.S. Patents, about 10 Foreign Patents; Sports - Tennis, Fly Fishing, Yachting; Societies - Fellow IRE, Society Motion Picture and Television Engineers, Member American Physical Society, British Kinematograph Society; Clubs - New York Yacht Club, West Side Tennis Club, Bronxville Field Club; Naval Ordnance Development Award, U.S. Navy December 10, 1945, Technical Mission to British Isles and Germany 1946, Honorary Degree of Mechanical Engineer, Stevens Institute of Technology, 1949.

FELCH, EDWIN PIERSON (F) 1939 - Director of Military Systems Development, Bell Telephone Laboratories, Inc., Whippany, N. J.; res. 109 Fairmount Ave., Chatham, N. J.; b. January 10, 1909 at Madison, N. J.; ed. A.B. Physics 1929 Dartmouth College; married; interested in radio about 35 years; amateur 1930/1937 W3AWT associate; professional experience Bell Telephone Labs. 1929 to date, electronic measuring apparatus development 1930/1953, Airborne Magnetometer Development World War Two, now in charge of Titan ICBM Guidance system development; several patents on automatic frequency control systems and Magnetometers; member AIEE, Fellow IRE; Hobby Sports cars.

FELIX, EDGAR H. (F) 1928 - Planning Co-Ordinator, Government Division, Radio Corporation of America, Camden, N. J.; Manager, Market Development, Missile and Surface Radar Division, Radio Corporation of America, Moorestown, N. J. Res. 1103 York Rd., Barclay Farm, Haddonfield, N. J.; b. March 29, 1898; married; ed. Sheffield Scientific School, Journalism at Columbia School of Journalism; interested in radio since 1912; amateur 1915 2ADQ; professional experience, technical writer on radio 1918/1922, allocation.

FINK, DONALD G. (F) 1934 - Director of Research Philco Corporation, Tioga and "C" Streets, Philadelphia 24, Pa.; res. 845 Dale Rd., Meadowbrook, Pa.; b. Englewood, N. J. November 8, 1911; married; ed. Bachelor of Science, M.I.T. 1933, Master of Science Columbia University 1942; interested in radio since 1921; amateur W2AFX 1928 to date, W3TVI 1952 to date; professional experience editorial staff Electronics 1934/1952, Editor-in-Chief 1946/1952, Staff Member MIT Radiation Laboratory 1941/1943, Expert Consultant, Office of Secretary of War 1943/1945, Director of Research Philco Corporation 1952 to date; Books: Engineering Electronics 1935, Principles

of Television Engineering 1940, Microwave Radar 1942, Television Standards and Practice 1943, Radar Engineering 1947, Television Engineering 1952. Television Engineering Handbook-1957; Editor, Proceedings of the IRE-1956/57; President-IRE-1958.

FINLAY, ROBERT (F) 1939 - Manufacturers' Representative, 307 Lincoln Building, Ridgewood, N. J.; res. 104 Brookside Ave., Ridgewood, N. J.; b. N.Y.C. December 17, 1901; ed. U.S.M.A. West Point 1924; married; West Point Society of New York, Association of Graduates, U.S.M.A., Armed Forces Communications Assn., Electronic Representatives Ass'n., PGA Hole-In-One Club. Director, Radio Club, 1959.

FOWLER, CHARLES J. (F) Supervisor Bldgs. & Grounds, Armstrong Research Field Lab. for Columbia Univ. at Alpine, N. J. res. 135 E. Madison Ave., Dumont, N. J.; b. Sea Bright, N. J. July 10, 1899; married; professional experience, Construction of radio stations for 27 yrs., Belfast, Maine, Tuckerton, N. J., Riverhead and Rocky Point, L.I., N. Y. WEAF Bellmore, L.I., WJZ at Bound Brook, N. J. past 21 years at Alpine, N. J. (17 yrs. with Maj. Armstrong).

FOWLER, HENRY L. (M) res. 319 Vermont Ave., Irvington 11, N. J.

FRENCH, B. V. K. (M) 1947 - res. 2221 East 52 St., Indianapolis, Ind.; b. Coudersport, Pa. February 19, 1903; ed. B.S. University of Buffalo; staff of Barnard Studios, 2136 East 52 St., Indianapolis 5, Ind.; Senior Member IRE.

FRESEMAN, WILLIAM L. (M) 1957 - Executive, Communication Engineering & Mfg. Co., prior, International Standard Electric Corporation (ITT); e. B.S., U. S. Naval Academy 1922, M.S. Harvard University 1929, Certificate, U. S. Naval War College 1935; Military Service, 29 Years, U. S. Navy; Patents, Books, etc. Book (with H. W. Hiser) Radar Meteorology, 1955, Various Technical Papers; Sports, Hobbies, etc. Yachting, University Yacht Club, Miami, Fla., Army Navy Country Club, Arlington, Va.

GAW, NORMAN W., JR. (M) 1958 - Measurements Corp., Boonton, N. J.

GAWLER, HARRY (F) 1921 - Engineer, Gawler-Knoop Company, 168 Eagle Rock Ave., Roseland, N. J.; res. 102 North 22nd St., East Orange, N. J.; b. Washington, D. C.; interested in radio 1904; professional experience, U. S. Radio Inspector, New England 1912/1920, Army and Navy Radio, Graduate of First Navy Wireless Class 1904 at Brooklyn Navy Yard; married; Senior Member IRE.

GERNSBACK, HUGO (F) 1919 - Publisher - Gernsback Publications, Inc., 154 West 14th St., N.Y.C.; res. 263 West End Ave., N.Y.C.; b. August 16, 1884 at Luxembourg, Luxembourg; ed. Ecole Industrielle, Luxembourg; Founded Electro Importing Co. 1905 offering first spark transmitters and receivers to public; Modern Electrics 1908, Electrical Experimenter 1913, Radio News 1919, Radio Craft 1929 (now Radio Electronics) and a series of technical publications to date.

GHIRARDI, ALFRED A. (F) 1933 - Consulting Electronics Engineer, Technical Publications Consultant, Author Technical Books, self-employed; res. 94 Alpine St., Stamford, Conn.; b. New York City August 16, 1904; ed. Cooper Union Institute of Technology B.S. and post Graduate E.E.; interested in radio since 1917; professional experience, Electrical Engineer, Livingston and Co. 1923/1924, Engineer of Experimental Laboratory and Associate Editor Radio Engineering Magazine 1924/1926, Head of Electrical and Radio Department Technical Institute N.Y.C. 1926/1934, Technical Consultant Pilot Radio and Tube Corp. 1931/1934, President Radio and Technical Publishing Co. 1930/1943; author Radio Physics Course, Modern Radio Servicing, Radio and Television Receiver Troubleshooting and Repair, Pix-O-Fix TV Trouble Finder Guide, Radio Troubleshooter's Handbook; Co-author; Radio & TV Receiver Circuitry & Operation, TV Probes & Their Application; Senior Member IRE; Member Tau Beta Pi.

GILLEN, RICHARD G. (M) 1952 - Engineer, Cornell Aeronautical Laboratory, Inc., Flight Research Division, 4455 Genesee St., Buffalo, N. Y.; res. Tockey St., Burt, N. Y.; b. Dorchester, Mass. November 11, 1924; ed. B.EE. New York University College of Engineering 1954; married; interested in radio since 1939; amateur W3JOS 1941/1948, W2ZCD 1948 to present; professional experience Commercial Operator's License 1941, Experimental Broadcasting license 1941/1942, Army Air Force Radio Maintenance 1942/1945; research assistant Edwin H. Armstrong Columbia University Laboratories 1945/1954; Member ARRL 1941 to present, Active in NYU Student Branch AIEE and IRE Officer 3 years, Chairman 2 years, Associate IRE; Hobbies - Amateur Radio, Photography.

GILLETTE, EDWARD CLINTON, JR. (F) 1947 - Colonel U. S. Army 0-12697 "Professor and Head of Dept. of Physics and Chemistry" U. S. Military Academy, West Point, N. Y.; res. West Point, N. Y. and Castine, Maine; b. Philadelphia, Pa. July 25, 1900; married; ed. B.S. West Point Military Academy 1920, M.S.E.E. Purdue University 1931; attended Harvard University, Columbia Univ., Penn State Univ., Atomic Energy Com. Nuclear Institute, Purdue Univ. 1958; interested in radio since 1912; amateur 1929/1936; professional experience military only 1918 to present in Reg. Army, Artillery and Signal Corps, appointed permanent Prof. of Physics and Chemistry at U. S. Military Academy 1946; World War Two service in ETO 1943/1945, Signal Div. SHAEF, Chief Signal Officer First Allied Airborne Army and Chief Signal Officer Berlin District; Decorations include Legion of Merit, Bronze Star and ACM(US), Order of British Empire, Croix de Guerre (Belgium), Croix de Guerre (France); Sports - Tennis, Swimming, Handball, Squash, and Sailing; Hobbies - Radio and Electronics, metal and wood-working, collecting and refinishing antique furniture, collecting old clocks, repairing and restoring antique automobiles; Member IRE, Member Army and Navy Club, Washington, D.C. AFCEA, Member American Assn. of Physics Teachers, member American Soc. for Eng. Ed., Member Nat. Geographic Soc.

GIRDWOOD, JAMES, (M) 1952 - Associate Publisher, Electronics Magazine, McGraw-Hill Publishing Co., 330-West 42nd St., New York 36, N. Y.; b. Maplewood, N. J. November 12, 1919; ed. Kent School 1938, M.I.T. 1942, Mechanical Engineering University of Main 1943; Business Administration, Harvard Graduate School of Engrg., 1944, M.I.T. Graduate School 1945 electronics engineering; Military Service, U. S. Marine Corps. 1st. Lieutenant Radar Counter-measures Officer and Electronics Engineering; Patents, Paper, etc. Textbooks-Govt. prepared on Radar Theory and Maintenance, editorial work on marketing in the electronics field; Sports, Hobbies Clubs, etc., U. S. Amateur Roller Skating Assn., exec. Board and dance com., U. S. Bronze & Silver Bar Medalist, National Skating Judge, member Phi Gamma Delta Club, N.Y.C., Loantaka Skeet Club, Florham Park, N. J. Ganahgoate Gun Club, Gardner, N. Y.; 1948/1956, Advtg. Salesman, N. J., Electronics and Nucleonics, 1957/1958 Sales Mgr., Electronics and Nucleonics, 1959 Assoc. Publisher Electronics.

GLASER, EDWARD M. (F) 1946 - Chief Electrical Engineer, Kollsman Instrument Corporation, Elmhurst, L.I., N. Y.; res. 2733 Wallace Ave., Bellmore, L.I., N. Y.; b. Brooklyn, N. Y. September 19, 1905; ed. B.S. in E.E., assorted graduate courses; married; interested in radio since 1920; amateur W2BRB 1921 to date, 8AX during 1929, schedules Byrd Antarctic Expedition; professional experience 3 years in radio manufacturing, test, foreman, engineer, 5 years Pioneer Instrument Co., development engineering aviation instruments, 24 years Kollsman as Chief of Electrical Experimental Department in charge of laboratory; Senior Member IRE, Member AIEE; Hobbies - piano, small orchestra, fishing, bowling, gardening, photography, piloting; Avocation - free servicing and consulting on electronic gear for friends, relatives and neighbors. Organ; Coast Guard Auxiliary Training Officer.

GLASER, MARCUS (F) 1941 - Professional Engineer, N. Y. & N. J. DeWald Radio and TV Corp., 35-15 37 Ave., Long Island City, N. Y.; res. 226-07 137 Ave., Laurelton, N. Y.; b. Brooklyn, N. Y. February 5, 1908; ed. Pratt Institute E.E.; married; interested in radio since 1918; amateur W8IE & K2GR; professional experience 29 years Chief Engineer and Vice President United Scientific Laboratories and Chief Engineer and Vice President DeWald Radio and DeWald Radio and TV Corporation; Senior Member IRE, Member Filicity Lodge 1100 New York, AIEE.

GODLEY, PAUL F. (F) 1914 - Consulting Radio Engineer, Paul Godley Co., Great Notch, N. J.; res. Old Quarry Rd., Great Notch, N. J.; b. Garden City, Kans., 9/25/1889; ed. Defiance College & Univ. Illinois; married; professional experience United Wireless Tgh. Co. 1909; radio instructor 1909/11; Radio Engineer Brazillian Govt. Amazon River Radio Service 1912/13; Independent VT circuit research 1914/15; partner Adams Morgan Co. 1915/24 also, design engineer Marconi's Wireless Tgh. Co. 1918/19; Technical Editor, Wireless Age 1918/19; design engineer Liberty Electric Co. 1920; Receiving Operator ARRL Trans-Atlantic Tests 1921; Radio Editor Newspaper Enterprise Assn. 1922/24; Organizer VP & GM Farrand Mfg. Co. 1924/25; VP Chalmers-Godley Corporation, 1926/27; Consulting Radio Engineer 1926 to date; Radio Club of America President 1939, VP 1923/25, Director 1915/17, 1919/22, 1926, 1931/33; Armstrong Medal 1950 for IBCG reception at Ardrossan, Scotland; Marconi Memorial Award, Veteran Wireless Operator's Association 1947; Life Member I.R.E.

GOLDSMITH, DR. ALFRED N. (HM) 1922 - Consulting Engineer, 597 Fifth Ave., N.Y.C.; b. New York, N. Y. September 15, 1888; ed. College of the City of New York, Columbia University; married; interested in radio since 1901; amateur 2XN, New York; professional experience Professor of Electrical Engineering, College of the City of New York, Vice President and General Engineer Radio Corporation of America, Director of Research, Marconi Wireless Telegraph Company of America, Consultant to General Electric Co.; about 200 patents; numerous technical papers; Fellow AIEE, Fellow American Physical Society, Fellow Acoustical Society of America, Fellow IRE; Medal of Honor IRE- Radio Pioneers Award; Progress Medal Award, Society of Motion Picture and Television Engineers; Director, RCA Communications, Inc.

GOLDSMITH, T. T. JR. (F) 1939 - Vice President, Allen B. DuMont Labs.; res. 519 Highland Ave., Upper Montclair, N. J.; ed. Furman University B.S. 1931, Cornell Ph.D. 1936; member IRE and American Physical Society.

GOLDSTEIN, HAROLD (M) res. 147-06 76th Ave., Flushing, N. Y.

GOUDY, CARL F. (F) 1925 - Retired as Chairman of the Board of Technical Appliance Corp., Sherburne, N. Y.; in 1955, Continuing as a Director; res. South Main St., Sherburne, N. Y.; b. Enfield, Illinois May 26, 1890; ed. Grammar School and 1 year Fairbury Ill. High School, Bradley Horological School Peoria, Ill. 1 year, Graduate Pratt Institute, New York; interested in radio since 1920; married; professional experience, Assistant Instructor in Mechanical Laboratory Pratt Institute 1 1/2 years, in charge of Engineering Pacent Electric Company, N.Y.C. 9 years, President Technical Appliance Corp., Sherburne, N. Y. 20 years; several patents assigned to Pacent Electric and TACO; Member Board of Directors, Chenango Memorial Hospital, Norwich, N. Y., Member Village Board of Trustees, Sherburne, N. Y.; military service 1918/1919 U. S. Naval Aviation; Member of Shrine, Ziyara Temple, Utica, N. Y., Member International Rotary Club, Sherburne, N. Y.; sports - motorcycling.

GRAHAM, VIRGIL M. (F) 1931 - (Director of Technical Relations, Sylvania Electric Products, Inc., Bayside, N. Y.); res. 40 Brompton Rd., Great Neck, N. Y.; b. Rochester, N. Y. January 22, 1902; ed. University of Rochester; married; interested in radio since 1916; professional experience 1923/1935 Head of Radio Laboratory, Stromberg Carlson, 1935/1942 Director of Tube Application Department Sylvania Electric, Plant Manager 1942/1946 and 1946 to 1954 as above; Fellow IRE, Standards Engineers Society; IRE Australia, Member Engineers Club, AIEE; Acoustical Society of America and Societe' des Radioelectriciens, Presently: Associate Director, Engineering Department, Electronic Industries Association, 11 West 42nd St. New York 36, N. Y.

GREBE, ALFRED HENRY, (M) 1952, Dept. Hd., New Product Design and Development, Allied Control Company, Inc., Plantsville, Conn. (main offices, 2 East End Ave., N.Y.C., res. 440 Juniper Lane, Cheshire, Conn.; b. Jamaica, Long Island, N. Y., April 3, 1926; ed. B.S.E.E. (electronics) Rensselaer Polytechnic Institute, 1950, 11 months U. S. Navy Aviation Electronics Technician Training, World War II; Professional Experience, Chief Eng., Filtors, Inc., Port Washington, N. Y., Owner Greve Radio & Television Co., sales and service, 1 1/2 yrs., Asst. Project Eng., Sperry Gyroscope Co., 1 1/2 yrs., Aviation Electronics Technicians Mate Second Class, U. S. Navy, 2 yrs., Professional Societies and memberships, Tau Beta Pi, Eta Kappa Nu, Institute of Radio Engineers, American Management Ass'n.

GRIM, W. MANNING (F) 1925 - Field Engineer, Lepel High Frequency Laboratories, Woodside, L. I., N. Y.; res. 136 Davis Ave., White Plains, N. Y.; b. Brooklyn, N. Y. September 14, 1890; ed. South Side High School, Ex. Courses Penn State College, Army Signal Corps School; married; interested in radio since 1913; W2AQJ 25 years; professional experience signal engineer, telephone, fire alarm, traffic control, communication radio, metal heating by high frequencies, affiliated Signal Corps 1925/1935; Hobbies - old automobiles, models; Societies ARRL, Army Ordnance Association, American Society for Metals, International Municipal Signal Assn.

GROGAN, WILLIAM F. (M) 1949 - Purchasing Director, Times Facsimile Corporation, 540 West 58th St., N.Y.C.; res. 243 East 39th St., N.Y.C.; b. Acworth, Georgia May 19, 1898; ed. High School; married; interested in radio since 1922; amateur licenses 4QY 1922, J9NB and J9ANB 1946 Okinawa; Commerical Telegraph and Telephone Operator Licenses; Professional experience 3 years commercial operator (ships), 1 year Blimps, Goodyear Rubber Co.; Commander, Naval Reserve, Retired, Two years instructor Navy Radio School, 3 years Commanding

Officer, Naval Training School (pre-Radar) Grove City College, Pa.; secretary Greater New York Chapter Retired Officers Association.

GRUBER, PAUL, (M) 1957 - Electrical Engineer, Radio Engineering Laboratories, 29-01 Borden Ave., L. I. City, 8 yrs.; res. 1357 Prospect Ave., East Meadow, N. Y.; ed. Polytechnic Insititute of Brooklyn, B.E.E. (Communication Engineering), Graduate School Adelphi College, Physics Major; RCA Institute, General Course Electrical Technology; Military Service, 1942/1945 U. S. Army; Patents, Papers, etc. "Electronics" April 11, 1958 Crystal Converter for Tropo-Scatter Receivers.

GULLI, ANTHONY (M) res. 198 West 231st St., Bronx 63, N. Y.

GUNTHER, FRANK A. (F) 1940 - Executive Vice President & General Manager, Radio Engineering Laboratories, Inc., 29-01 Borden Ave., Long Island City 1, N. Y.; res: 10 Highpoint Rd., Dongan Hills, Staten Island 4, N. Y.; b. New York February 3, 1908; ed. Grade Schools, N.Y.C., Stuyvesant High School, Columbia University Ex. N.Y.C. Wagner College, S. I., N.Y.C.; interested in radio since 1919; married; amateur W2ALS since 1919; professional experience REL 34 years - First two way police radio; senior member IRE, member Armed Forces Communications and Electronics Association - Director New York Chapter, member ARRL, member Quarter Century Wireless Association, Director - Single Side Band Amateur Radio Association; Retired Major U. S. A. Air Force, Reserve Civil Air Patrol, Commercial Pilot; Radio Club of America - President 1956 and 1957, Vice President 1954 and 1955, Recording Secretary 1952 and 1953, Director 1951, 1958 and 1959.

GUY, RAYMOND F. (F) 1939 - Engineering Executive, National Broadcasting Company, 30 Rockefeller Plaza, N.Y.C.; res. Haworth, N. J.; b. Hartford, Conn. July 4, 1899; ed. E. E. Pratt Institute 1921; married; interested in radio since 1911; amateur station 1911 to present, W2AK; professional experience Marconi Co. 1916, WJZ 1921, RCA Research 1924/1929, National Broadcasting Company 1929 to present; U. S. Army 1918/1919 AEF, president IRE 1950, Director IRE 9 Yrs. Trea. IRE, Chairman TV Advisory Com. N.A.R.T.B., Life Member VWOA, Fellow IRE, Member Radio and TV Executive Club, Manager Radio and Allocations Engineering, NBC, Radio Club Director 1941, President, Broadcast Pioneers, 1956, Now Secretary, Chairman, Engineering Committee and Member, Industry Advisory Committee, Voice of America, Member, National Executive Reserve, Television Allocations Study Organization; First Vice President, Veteran Wireless Operators Ass'n. Recipient of Marconi Gold Medal of Achievement. Member Ass'n. of Federal Communications Consulting Engineers, Member, CCIR Study Group 10, Member American Institute of Electrical Engineers, Member, Broadcast and TV Systems Com., AIEE, Member, Executive Com., IRE Professional Group on Broadcasting, Member IRE Admissions Com., Member NAB Convention Program Committee (Former Chairman.)

HACKBUSCH, RALPH ANTHONY (F) 1929 - President and Managing Director, Hackbusch Electronics, Ltd. 23 Primrose Ave., Toronto, Canada; res. 55 Arjay Cres Willowdale P. O., York Mills, Ontario, Canada; b. Hamilton, Ontario, Canada September 18, 1900; ed. Public Schools Hamilton, Hamilton Collegiate Institute, Hamilton Technical and Art College, Alexander Hamilton Institute; married; interested in radio since 1912; amateur 1912/1914, VE9AE 1937/1954; professional experience 1914/1926 Canadian Westinghouse Co., 1926/1930 Associate Radio Engineer Kolster Radio Co., Toronto, 1930/1939 Radio Engineer, Chief Engineer, Vice President and General Manager Stromberg-Carlson, Co., Ltd., 1940/1943 Vice President and Director Radar Division Research Enterprises, Ltd., 1944 to present as above; Fellow IRE, Member Acoustical Society of America, member Rochester Engineering Society, Member Royal Canadian Institute, Golden Fleece Lodge AF and AM, registered Professional Engineer, Past Vice President and Director IRE, Past President RTMA of Canada, Past President Canadian Radio Technical Planning Board 1949/1953, Granite Club, Toronto General Technical Co-ordinator CRTPB 1955/59; Member IRE Gen. Standards Committee 1954/59; Member BIA Gen. Standards Committee 1930/59; Dir. of Engineering BIA of Canada 1932/39 & 1945/59; Chairman CSA Sectional Committee on Radio 1957/59.

HALL, F. SUMNER, (F) 1949 - Audio Engineer, Audio Accessories, 279 Broadway, Amityville, N. Y.; res. 45 Franklin St., Amityville, N. Y.; b. Worcester, Mass. February 26, 1907; ed. High School; married; interested in radio since 1920; professional experience Control Room and Field Engineering (broadcasting), theatre sound service and inspection, disc and film recording, design and installation broadcast audio facilities and recording facilities, presently design production and sales; Past President & Fellow Audio Engineering Society.

HAMILTON, HUGH G. (M) 1950 - res. RFD #2 Dover, N. H.; b. July 21, 1905; ed. B. S. in Engineering (Communications) M. I. T.; amateur 2GK 1921/1926, W2AIF Schenectady; President Eastern Air Devices; Vice Pres. Norbute Corp.

HANLEY, JOHN F. (M) 1926 - Radio Engineer, Assistant Director Electron Tubes Division U. S. Army Signal R&D Labs., Ft. Monmouth, N. J.; res. 28 Park La., Fair Haven, N. J.; b. Boston, Mass. October 23, 1901; ed. Radio and Electrical Engineering night courses at Columbia University 1920/1924; married; interested in radio since 1914; professional experience electron tube manufacturing 1918/1920; Automatic Tel Exch. N. Y. TEL. Co. & Western Electric telephone equipment 1920/1924, radio and EE Investigations 1925/1940, Electrical Testing Laboratories, N. Y. C., Electron Tubes and Semiconductor Devices Research, Development, Production and Procurement for Military Applications 1941 to present; senior member IRE. Licensed Professional Engineer State of N. Y.

HARA, BENJI (M) res. 630 W. 135th St., New York, N. Y.

HARMATUK, SAMUEL N., (M) Engineer, New York Fire Dept., 20 yrs., res. 1575 Odell St., Bronx 62, N. Y., military service WW II 4. 1942/1946. Lt. Col.--A. F. Reserve Current, amateur call letters W2ELE (EX), Patents, Books, Etc., New York Fire Dept. - Radio System.; Sports, Swimming.

HARNETT, DANIEL E. (F) 1926 - Engineer, General Electric Co., Syracuse, N. Y.; res. DeWitt, N. Y.; b. Emira, N. Y. July 20, 1899; ed. Columbia University A. B. 1922, E. E. 1925; married; interested in radio since 1923; professional experience Pacent Electric Co. 1925/1929, Hazeltine 1929/1948, Emerson Radio-Phonograph 1948/1949, General Electric Co. 1949 to date.

HAYNES, N. M. (M) 1940 - res. 1115 Beach 9th St., Far Rockaway, 91, N. Y.; b. Brooklyn, N. Y. June 15, 1908; ed. Brooklyn Technical High School, CCNY, Long Island University Ph. G.; Amplifier Corp. of America 1944.

HAZARD, THOMAS T. (F) 1939 - Pensioner Public Service Corporation, Newark, N. J.; res. Box 57 Cherry La., Brookside, N. J.; b. August 5, 1875; single; interested in radio since 1922; member American Radio Relay League, The Universal Radio DX Club, Newark News Radio Club.

HAZELTINE, (LOUIS) ALAN (F) 1915 - Technical Consultant 15 Tower Drive, Maplewood, N. J.; b. Morristown, N. J. August 7, 1886; ed. M.E. 1906 Stevens, Sc. D. (Hon.) 1933 Stevens, A. M. 1938 Columbia; married; interested in radio since 1914; professional experience professor of Electrical Engineering at Stevens 1918/1925, Professor of Physical Math at Stevens 1933/1944, President IRE 1936, Consultant Washington Navy Yard 1918/1919 radio receiver design, OSRD 1944/1945; many patents including the "Neutrodyne," Book "Electrical Engineering" (MacMillan, 1924), many papers mostly on radio and education; Fellow IRE, AIEE, American Physical Society, AAAS, Member ASEE, American Mathematical Society, Mathematical Association of America, American Association of Physics Teachers, Optical Society of America; Radio Club of America President 1946/1947, Armstrong Medal 1937.

HEALEY, WILLIAM J. (M) 1952 - Sales Manager, Weston Electrical Instrument Co., 50 Church St., N.Y.C. res. Glen Ridge, N. J.; b. Tacoma, Wash. March 5, 1895; ed. Electrical Engineering ICS; interested in radio since 1924; professional experience in engineering and sales; Boy Scouts, Scout Master 18 years, Church Trustee 12 years, Masonic Orders.

HEALY, ELLIOTT L. (M) res. R. F. D., Hanover, N. J.

HEES, GEORGE C. (F) 1943 - Purchasing Agent, Sperry Gyroscope Co., Great Neck, N. Y.; res. 701 5th Ave., New Hyde Park, N. Y.; b. Brooklyn, N. Y. May 10, 1899; ed. Pratt Institute, Brooklyn, N. Y.; married; interested in radio since 1918.

HEISING, RAYMOND A. (F) 1921 - Consulting Engineer and Patent Agent, 232 Oak Ridge Ave., Summit, N. J.; b. Albert Lea, Minn. August 10, 1888; ed. E.E. University of North Dakota 1912, M. S. (physics) University oc Wisconsin 1914; married; interested in radio since 1907; professional experience Western Electric Co. and Bell Telephone Laboratories 1914 to 1953; research and development on all pioneer commercial and military radio telephone applications; retired from Bell Telephone Laboratories 1953; over 120 U. S. Patents, dozen engineering papers, 1 book; American Physical Society, AIEE, Radio Club of America Director, Armstrong Medal 1952 for Heising Modulation. D. Sc. - University of North Dakota, 1947.

HENNEY, KEITH (F) 1927 - Editor, McGraw-Hill Publishing Co., 330 West 42th St., N.Y.C.; res. Garden City, N. Y. and Snowville, N. H.; b. McComb, Ohio October 28, 1896; ed. A.B. Western Reserve University 1921, A. M. Harvard University 1925; married; interested in radio since 1913; amateur 8ZD and 8ADP Marion, Ohio 1915, 2EJ-1925, W1QGU-1947, K2BH-1948; professional experience Engineer Western Electric Co. 1923/1924, Radio Broadcast Magazine 1925/1930, McGraw-Hill 1930 to date; Radio Operator United Wireless 1918 and Marconi 1922; Books - "Principles of Radio" 1930, "Color Photography for the Amateur" 1938, "Electron Tubes in Industry" 1934, "Handbook of Photography" 1939, "Radio Engineering Handbook" 1933; Fellow IRE, Member Harvard Club of N.Y.C.; Radio Club of America, President 1940, Vice President 1939, Recording Secretary 1934-1938.

HEWGLEY, CHARLES W. (M) res. 170-10 Cedarcroft Rd., Jamaica 32, N. Y.

HIGGS, HAROLD P. (M) 1950 - Advanced Development Engineer, Lehigh Engineering Associates; 295 Plane St. Newark, 2, N. J.; b. Toronto, Canada December 4, 1907; ed. Chicago Radio Institute, Detroit Institute of Technology; interested in radio since 1920; amateur 9CKS; professional experience mostly responsible for engineering groups dealing with design of radio and recording apparatus for home entertainment, also military equipment; married; Hobby - Photography.

HINNERS, FRANK A. (F) 1942 - President, HINNERS-GALANEK RADIO CORP., Manufacturers Cavalier Radios - Phonographs, 66-02 Austin St., Forest Hills 74, N. Y.; res. 233 Raymond St., Rockville Centre, N. Y.; b. New York City February 19, 1894; ed. E. E. Pratt Institute, N. Y. 1915; married; office boy, Radio Telephone Co. (Lee DeForest, Metropolitan Tower) 1910 forward; Charter Member IRE via Wireless Institute 1912, Fellow IRE 1926.

HIRSCH, CHARLES JOACHIM (F) 1947 - Executive Vice-President, Hazeltine Research Corporation, 59-25 Little Neck Parkway, Little Neck 62, N. Y.; res. #1 Fox Ridge Lane, Locust Valley, N. Y.; b. Pittsburgh, Pa. October 25, 1902; ed. Columbia College A. B. 1923, Columbia School of Engineering E. E. 1925; married; professional radio experience since 1925; several patents; papers in IRE, Radio Club, IEE, SMPTE, Onde Electrique, Acta Electronica; Contributing author: "Pender-McIlwain Electrical Engineering Handbook," "Principles of Color Television"; Fellow IRE and Radio Club of America, Member IEE (Great Britain), Societe des Radio-electriciens (France), SMPTE, SPSE. Past Chairman Long Island Section IRE, Past Chairman of U. S. Committee for CCIR Study Group XI and of several U. S. delegations abroad on TV standards, Chairman Broadcast Television Systems Committee of EIA; Panel 1 NSRC; Certificate of Commendation from U. S. Navy for contributions to Radar in World War II.

HOGAN, JOHN VINCENT LAWLESS, (HM) 1915, Consulting Engr., 1921; b. Philadelphia, Pa., February 14, 1890; s. John Lawless and Louise (Shimer) H; Grad. University School, New Haven, Conn., 1908; Lab. Asst. to Dr. Lee De Forest, 1906/1907; E.E. student Sheffield Scientific Sch. (Yale), 1908/1910, honors in physics and math.; hon. D. Eng., Polytechnic Institute of Brooklyn, 1957; m. Edith MacLennan Schrader (December, 1917); registered U.S. Patent Solicitor, 1921—; N. Y. Prof. Eng. 1924—; pres. founder and consultant, Interstate Broadcasting Co., Stations WQXR and WQXR-FM, 1936/1949; special asst. to dir. of Office of Scientific Research and Development, 1943/1946; mem. Stag to JCS, ECM Panel RDB 1950/1953, Pres. & Dr. Hogan Labs., Inc., Fascimile, Inc., 1929—. Mem. Patent Compensation Bd., A.E.C., 1949—. Mem. and former chairman Joint Tech. Adv. Com., I.R.E., E.I.A. 1949—. Decorated King Christian X's Medal of Liberation, 1946; Armstrong Medal, Radio Club of America, Radio Pioneer's Award, 1953; Marconi Memorial Wireless Pioneer's Medal, 1954; Medal of Honor, Inst. Radio Engineers, 1956. Fellow Inst. Radio Eng. (v. pres., 1916/1919; pres. 1920), Acoustical Soc. of Am., American Inst. Elec. Engrs. Mem. AAAS, Armed Forces Communications and Electronics Assn., Broadcast Pioneers, De Forest Pioneers, Inc. (pres., 1959), Radio Club of America, Soc. American Mil. Engrs., Soc. Motion Picture & TV Eng., U.S. Preparatory Com. for Internat. Radio Conf., Vet. Wireless Oper. Assn., Inc., Alpha Sigma Phi. Republican. Episcopalian (Sr. Warden, St. Luke's Episcopal Church, Forest Hills, L.I., N. Y.). Clubs: Yale (N. Y.), The Players (N. Y.), Dutch Treat (N. Y.), Cosmos (Wash.). Author: The Outline of Radio, 1923, 1925, 1928. Lecturer on technical subjects. Inventor radio devices, Res., 239 Greenway S., Forest Hills 75, L. I., N. Y. Office: 155 Perry St., New York 14; interested in radio since 1902; amateur stations in N. Y., Northport, L. I. and Cos Cob, Conn., 1902/1908; numerous patents, including single control tuner and Rectifier Heterodyne; hobbies, swimming, sailing, book, coin and stamp collecting, piano.

HOLD, HENRY WALTER (F) 1942 - Sales Engineer, Art Cerf and Co., 744 Broad St., Newark, N. J.; res. 628 Grier Ave., Elizabeth, N. J.; b. Brooklyn, N. Y. November 18, 1902; ed. Brooklyn Grade Schools, Bushwick High School, 2 years Electrical Engineering M.I.T.; married; interested in radio since 1916; Pirate amateur 1916/1917 and have kept interest though no station; professional experience 1925/1930 General Motors Delco Division, Service work in Elizabeth 1931/1938, Continental Sales Co., Newark 1938/1945, Art Cerf and Co., Mfrs. Representatives 1945 to present; member AES, Associate IRE, member BPOE, Hobbies Hi-Fi & Stereo Reproduction & 3D Photo.

HONNELL, M. A. (M) res. 50 Hanover Rd., Mountain Lakes, N. J.

HOPKINS, SIDNEY K. (F) 1950 - Sales Engineer, Chemical Coatings Corp., Rocky Hill, Conn.; res. 45 Carolin Rd., Rocky Hill, Conn.; b. Upper Montclair, N. J. February 22, 1896; ed. one year Electrical Engineering Polytechnic Institute Brooklyn interrupted by First World War; married; interested in radio since 1909; professional experience, Radio Operator United Wireless and American Marconi Co. 1912/1915; Radio Section Signal Corps 1917 to 1919; First Lieutenant Signal Corps AEF; Hobby - Good Musical Reproduction.

HORAN, JOHN J. (M) 1956; Engineer, Barnes Engineering, Stamford, Conn., res. 98 Hollow Tree Ridge Rd., Darien, Conn.; b. March 15, 1928, N.Y.C.; ed. University of Rhode Island, B.S. in E.E.; Military Service, U.S. Army 1949/1951 Signal Corp.

HORN, CHARLES W. (F) 1921 - Partner, Impulsora Mexicana S.A., Radio Manufacturers, Calle Rhin #33, Mexico City D.F., Mexico; res. Montes Auvernia 220 Mexico City, 10 D.F. Mexico; b. New York City July 9, 1894; ed. High School, 2 years college and special courses in electricity; married; Amateur station HN at Far Rockaway, N. Y. 1908 before licenses; United Wireless Ship operator 1909, United Fruit five years, World War One Lieutenant (JG) and World War Two as Captain as Assistant Chief of Naval Communications; Westinghouse 1920/1929 as Manager of Radio Operations; National Broadcasting Co. as Vice President and Director of Research and Development 1929/1941; number of patents including parabolic microphone, rectifier; Fellow IRE, VWOA, Princeton Engineering Association, Captain in U.S. Naval Reserve, Retired, In Mexico - Churubusco Country Club, Rotary Club, American Club, American Society, Radio Club Vice President 1932, President 1933.

HOUCK, HARRY WILLIAM (F) 1920 - Vice President and Divisional Manager Measurements, a McGraw-Edison Division, Boonton, N. J.; Director Sag Harbor Industries; Pres. Measurements Corp. Canada; Vice President Armstrong Memorial Research Foundation. Res. Mountain Rd., Wallpack, N. J.; b. New Cumberland, Pa., April 11, 1896. Married. Interested in radio since 1909; 1909/1917 operated amateur wireless station. Professional experience: 1917/1919 World War One U. S. Signal Corps Laboratory in Paris, France; original development work of superheterodyne method of reception with the late Major Edwin H. Armstrong. Later designed the first second harmonic super-heterodyne broadcast receiver to be placed in commercial production; 1922/1923 Consulting Engineer; 1923/1931 Chief Engineer Dubilier Condenser and Radio Corp., where his research and development of capacitors made practicable the filter systems used in modern receivers; 1931/1933 Federal Telegraph Co., Special research and development, Consulting Engineer through 1937, and Measurements to the present. His pioneer work on alternating-current-operated radio receivers resulted in many patents—over 80 U. S. issued to date. Life Member AIEE, Engineers' Club, N.Y.C., former Manager IRE, Fellow IRE, President Radio Club 1934, Vice President 1933, Recording Secretary 1930/1932, Director 1928 to present.

HOWELL, JOSEPH E. (M) 1956 - Radio Specialist, Flight Enterprises and self-employed Consulting Engineer, Flight Enterprises, Navy Dept., and various Radio and Television Stations; res. Folly Beach, S. C., b. January 9, 1929, Dillon, S. C., ed. Indiana Tech., Western Electric Co., Philco and Navy Dept., advanced Radar, Sonar School, and numerous correspondence courses; Amateur Call letters W4SOD, 12 Yrs., Wife's letters W4BTP, Son's K4ZEL; Patents, Books, etc. Six articles "Electronic Industries," one (1) each "CQ" and old "Radio Cropt," patent applications pending. Hobby "Horsetrading" elec. gear, member I.R.E., member A.S.A., interested in medical electronics, space technology, experimentation.

HUGHES, MATTHEW J. (M) 1938 - res. P. O. Box 7248 Orlando, Fla.; b. Harrison, N. J. March 17, 1902; radio serviceman.

HUGHES, KENNETH E., (M) 1957 - Sales Engineer, Kenneth E. Hughes Co., 4808 Bergenline Ave., Union City, N. J., 20 yrs.; res. 4808 Bergenline Ave., Union City, N. J., b. October 21, 1901, Elyria, Ohio; ed. Case School of Applied Science, Cleveland, Ohio.

HULL, LEWIS M. (F) 1951 - Consultant, Aircraft Radio Corporation, Boonton, N. J.; (ret. Chairman of the Board) Director, Lab. for Electronics, Boston, Mass.; res. Boonton, N. J.; b. Great Bend, Kansas, February 27, 1898; ed. University of Kansas, Harvard University; married; interested in radio since 1911; active as amateur 1912/1917 - none since; professional experience World War One Signal Corps Laboratory at Bureau of Standards, 1918/1920 Assistant and Associate Physicist Radio Section Bureau of Standards; Consulting Engineer and various engineering positions 1920 to date; various patents in radio field 1922/1930; contributor to technical journals; Clubs - Metropolitan, Anglers of New York, Cosmos (Washington), Tabusintac N.B. Canada; President IRE 1933.

HULTS, ELLSWORTH, H. III (F) - res. 18 Milburne Court, Baldwin, N. Y.; b. Pa. February 23, 1904; ed. Germantown High School 1918/1922; United Nations Sound 1947.

HUMPHREY, GEORGE B. JR. (M) 1958; Ass't. Vice President, First National City Bank of New York, 55 Wall St., N.Y.C., 28 Yrs., b. Cherubusco, N. Y.; ed. Columbia University, B.S. and M.S.; Amateur Call Letters W2REQ 1958; Sports, etc. Amateur Radio, Boating, Hiking, Columbia University Club.

IRELAND, FREDERICK (F) 1937 - Box 2002 Pasadena, Cal.; b. N.Y.C. May 19, 1911; ed. Harvard A.B. Physics 1933; married; interested in radio since 1921; amateur W1DK 1930/1939; professional experience General Radio Company Engineering Department 1934/1937, Field Engineer New York 1937/1940; Los Angeles 1940/1958; Senior member IRE, Chairman Los Angeles Section 1944, Registered Professional Engineer, State of Cal.

JACQUET, LLOYD (M) res. 175 W. 76th St., New York 23, N. Y.

JAFFE, D. LAWRENCE (M) 1953 - President and Director of Research, Polarad Electronics Corporation, 100 Metropolitan Ave., Brooklyn 11, N. Y.; res. 33 Nassau Dr., Great Neck, N. Y.; b. Brooklyn, N. Y. July 6, 1913; ed.

B.S. in E.E. City College 1935, M.S. in E.E. Columbia University 1936, Ph.D. in E.E. Columbia University 1940; married; interested in radio since 1940; professional experience College of the City of New York Instructor 1935/1937, Awarded Bridgham Fellow in E.E. at Columbia University, associated with Professor E. H. Armstrong on fundamental problems in frequency modulation 1937/1939; Columbia Broadcasting System, television Studio equipment 1939/1942; Raytheon Manufacturing Company, Waltham, Mass. Radar 1942/1944; Templetone Radio Manufacturing Corp. Chief Research Engineer 1944/1945, Polarad Electronics Corp. 1945 to date; eleven technical papers in various publications; Fellow IRE, Member RTMA Technical Products Division, Broadcast Transmitter Section.

JAMES, WALLACE M. (F) 1930 - Engineering Manager, Radio Corporation of America, Harrison, N. J. res. West Caldwell, N. J.; b. Hutchinson, Kan. September 2, 1901; ed. University of Kan., 5 years, B.S. in E.E. and B.S. in Engineering, other miscellaneous courses; married; interested in radio since 1925; professional experience radio and electric engineering since 1925; Member T B Pi, Sr. Member IRE; Am. Assn. for the Advancement of Sciences; Listed in "Who is Who" in Engineering. Director 1940.

JARVIS, KENNETH W. (F) 1935 - President, Jarvis Electronics Corporation, 6058 West Fullerton Ave., Chicago 39, Ill.; res. 1140 Cherry St., Winnetka, Ill.; b. Mansfield, Ohio, October 18, 1901; ed. Graduated E.E. Ohio State University 1923; married; interested in radio since 1912; amateur 1915/1916; professional experience Westinghouse Engineering School and Radio Laboratory, Crosley, Colonial, U.S. Radio, Director of Engineering Zenith, Consulting Engineer 18 years, Manager Electronics Department Automation Electric; 20 Patents several pending; Chapter on Detection and Modulation Henney's Radio Engineering Handbook, many papers IRE; Fellow IRE, AIEE, Member ASM, AAAS, AFCA, Chicago Radio Engineers Club; Lecturer Graduate School Northwestern University; Reserve Officer Signal Corps, Princ. Staff Eng., Electronics & Electric Dept., The Martin Co., Boy Scout Leader; Hobbies - Camping, Travelling, Flying own Plane.

JENNINGS, MALBON H. (F) 1948 - Director, Military Requirements, Ramo-Wooldridge Div. of Thompson Ramo Wooldridge, Inc., 1825 Connecticut Ave., N.W., Washington 9, D. C. Res. 2801 Dumbarton Ave., N.W., Washington 7, D. C.; b. Haverill, Mass. April 3, 1917; ed. University of Maine - Columbia University; married; interested in radio since 1930; professional experience E. H. Armstrong Junior Engineer 1938/1942, Radiation Laboratory MIT Staff Member 1942, BuShips U.S. Navy 1942/1943, Radio Engineering Laboratories 1943/1951 (Chief Engineer 1944/1951), Laboratory for Electronics 1951 to 1953. Director, GCA Division, 1953/1955. Independent Consultant, 1955/1956. Ramo-Wooldridge, 1956 to present. Patent on FM Recording on film or tape; Hobbies - private flying, restoration of early American houses and furniture.

JOHNSON, JOHN KELLY (F) 1927 - Consulting Engineer, Office & res. 184 South Ave., New Cannan, Conn.; b. Oskaloosa, Iowa, January 27, 1903; ed. A.B. and B.S. Penn College, Oskaloosa, Iowa 1923; A.B. Columbia 1924, B.S. Columbia 1925, E.E. Columbia 1927; married; interested in radio since 1916; professional experience - Instructor in E.E. Columbia 1927/1929; Chief Engineer Silver Marshall 1930, Wells Gardner 1934/1937, Engineer Hazeltine Corporation 1930/1934 and 1937/1942, U.S. Navy Consultant 1943/1944, Hammerlund 1944/1945 and Consultant 1945 to present; Numerous patents all assigned to Hazeltine; Fellow IRE, Member AIEE; Columbia University Club, N.Y.C., The Engineers Club N.Y.C.

JOLLIFFE, CHARLES BYRON (F) 1939 - Radio Executive, Radio Corporation of America, Princeton, N. J. & Camden, N. J., res. 1204 E. Cherry Hill Apt., Merchantville, N. J.; b. Mannington, W. Va. November 13, 1894; ed. W. Va. University B.S. 1915, M.S. 1920, HonLL.D. 1942, Cornell University Ph.D. 1922; widower; interested in radio since 1917; professional experience: Instructor in Physics W. Va. University 1917/1918 and 1919/1920, Physics Instructor Cornell University 1920/1922, Physicist Bureau of Standards Radio Section 1922/1930, Chief Engineer Federal Radio Commission and Federal Communications Commission 1930/1935, Radio Corporation of America Engineer-in-Charge RCA Frequency Bureau, Chief Engineer of RCA Laboratories, Assistant to President, Vice President and Chief Engineer RCA Manufacturing Company 1935/1945, Vice President of RCA in charge of RCA Laboratories 1945, Executive Vice President in Charge of RCA Laboratories Division since 1945, 1951 Vice Pres. & Technical Advisor, RCA.; World War Two Chairman of Communication Division of the National Defense Research Committee, Secretary of the Industry Advisory Committee, Board of War Communications, Member Engineers Defense Board, Certificates of Appreciation from Army and Navy; Fellow AAAS, AIEE, IRE. Member Radio Pioneers.

JONES, CARY BODLEY (M) 1937 - Electrical Engineer, Director of Palo Alto Physicists, P.O. Box 1059 Palo Alto, Cal.; b. St. Louis County, Mo. August 9, 1910; married; ed. B.S. in E.E. Lehigh University 1934; interested in radio since 1927; professional experience Research in Electronics at Sperry Products 1936/1937, Engineering Laboratories, Tulsa 1938/1940, Research in Magnetic Recording Brush Development 1940/1945, Research and Engineering at Stanford University 1946 to present, Director Palo Alto Physicists 1948 to present; Member, Institute of Radio Engineers; Amer. Asso. for Advancement of Science; Audio Engineering Society; Acoustical Society of Amer.; Society of Motion Picture & TV Engineers; Amer. Inst. of Elec. Engineers.

KAHN, LEONARD R (M) 1953 - Owner and Research Director, Kahn Research Laboratories, Elizabeth Building, 22 Pine St., Freeport, N. Y.; res. 46 West 95th St., N.Y.C.; b. N.Y.C. June 16, 1926; ed. B.E.E. Polytechnic Institute of Brooklyn; single; interested in radio since 1940; amateur W2NOW since 1940; professional experience Consultant in Communications and Electronics, Research Director of Communications Laboratory, Adjunct Professor of Electrical Engineering Department, Polytechnic Institute of Brooklyn; number of patents and patentpendings. Papers published in Proceedings of IRE and AIEE Electrical Engineering.

KARDAUSKAS, EDMUND (M) 1950 - Project Engineer - Airborne Avionics Systems; US Army Signal R&D Lab., Fort Monmouth, N. J. - res. 180 Franklin Ave., Long Beach, N. J.; b. Elizabeth, N. J. October 26, 1924; ed. B.S. EE Newark College of Engineering 1949; married; interested in radio since 1938; professional experience Shepard Laboratories and Prese; Hobby - Audio.

KELLERMAN, KARL F. (F) 1946 - Engineer, Asst. V-P.- Engineering, Bendix Aviation Corp., Washington, D. C.; res. 1701 K St. N.W., Washington, D. C.; b. Washington, D. C. May 11, 1908; ed. E.E. Cornell University 1929, Graduate work in Law, Economics and Electronics; married; interested in radio since 1921; amateur work extensive but unlicensed; Registered Professional Engineer member IRE, Cornell Society of Engineers, AAAS, TB Pi

HKN, Cosmos Club, Columbia Country Club, ex-Commander USNR; Hobby - Golf.

KELLY, ARTHUR WILLIAM, JR. (M) 1957; Sales Mgr. Photocircuits Corp., Glen Cove, N. Y., res. 29 Derby Rd., Port Washington, N. Y.; b. March 31, 1926, N.Y.C.; ed. Taft Preparatory School, Watertown, Conn., Rensselaer Polytechnic Inst., Troy, N. Y., prev. emp. Motorola 1951, 1 yr., Photocircuits 1952 to present; military service 1944/1946 U.S. Naval Air Corp., Aviation Electronic Technicians mate; Sports, hobbies, etc., Hi-Fi, skiing, sailing.

KELLEY, LEO A. (F) 1938 - res. 34-38 87 St., Jackson Heights, N. Y.; b. July 7, 1897 Arlington, Mass.; ed. M.I.T., Harvard B.S. in E.E. 1918; professional experience - U. S. Signal Corps 1918/1919; Engineering Department Western Electric Co. 1920/1925, AT and T 1925/1929, International Communications Laboratories 1929/1932; Consulting Engineer to Date.

KENNEDY, ROBERT E. L. (F) 1942 - Consulting Engineer, Kear and Kennedy, Washington, D. C.; res. Forest Heights, Md.; b. Norfolk, Va. January 19, 1910; ed. High School, Engineering Courses University of Va. extension, George Washington University and Catholic University; married; interested in radio since 1921; Amateur station 3RT 1924/1928, W3CQK 1930/1935; professional experience 1945 to date Partner Kear and Kennedy, 1942/1945 Assistant Head Radio Section Bureau of Aeronautics, 1940/1942 Senior Engineer with John Barron 1938/1940 Engineer with Paul Godley; Lt. Cmdr. U.S.N.R. Senior Member IRE, Charter Member Also Past President Association Federal Communications Consulting Engineers, Hobby - Yachting, Capitol Yacht Club, Washington.

KENT, ROSCOE (F) 1949 - Professional Engineer, Florida and New Jersey, and Florida representative, Industrial Instruments, Inc., Cedar Grove, N. J.; res. 1630 Dormont St., Orlando, Fla.; b. St. Paul, Minn. February 22, 1885; ed. School, Navy, Correspondence, home study; interested in radio since 1904; professional experience, Chief Engineer Great Lakes Radiotelephone 1908/1910, Radio Telephone and Telegraph Co., 1910/22 Mgr. N. Y. Territory, Matthews Gravity Carrier Co., 1922/31 Vice President Florida Associated Engineers, Inc., DeForest Radio, Radio Inventions, Hogan Laboratories, Consultant and Manufacturers Representative to date; Builder of first two commercial radio telephone instruments for Sandusky tests 1907, Chief Engineer Radio Telephone Co. and supervised building and installation for Navy, Admiral Evans World cruise 1908, operating the equipment from Hampton Roads to San Francisco; Senior Member IRE, Charter member DeForest Pioneers, member VIW.O.A., Society American Military Engineers, American Ordnance Assn.; During World War Two, Mgr. War Contracts Gemex Co.; developed and produced stainless steel electrodes for pressure mounted crystals, pivot mechanisms for altimiters, non-leaded nickel silver pins for crystal holders, one piece spring release levers for airplane starters and other small delicate units.

KING, FRANK (CM, F, LM) 1909 - Consulting Engineer, Amy Aceves and King, Inc., 11 West 42 St., N.Y.C.; res. 85 Willow Ave., Larchmont, N. Y.; b. N.Y.C. January 12, 1893; ed. New York University, Columbia University E.E. 1917; interested in radio since 1907; married; amateur station "FK" 1907, later 2MP 1925, W2MP 1929, constructed and operated first amateur Telephone Broadcasting Station in U. S. in 1911; professional experience, Radio Operator S/S Montgomery 1912, President King Radio Corporation New York 1922/1926, 1926 to date Consulting Engineer New York City, Licensed Professional Engineer New York State 1941; military, organized and was officer in Charge of the First U. S. Naval Aircraft Radio Laboratory, Hampton Roads, Va. 1918, Officer in Charge of Aircraft Radio Telephones Headquarters Northern Bombing Group (U.S. Navy) France 1919, U. S. Naval Headquarters Washington, D. C., and Anacostia; Sports - Tennis, Golf, Horseback, Hunting; Societies - Senior Member IRE, Life Member Friendly Sons of St. Patrick, Phi Gamma Delta; Radio Club of America Charter Member and First President.

KISHPAUGH, A. W. (F) 1921 - Retired; res. 10 Yale Terrace, West Orange, N. J.; b. Newberry, Mich. November 5, 1891; ed. E.E. University of North Dakota 1912; professional experience; General Electric Co. 1912/14; Utah Power and Light Co. 1914/16; Western Electric Co. and Bell Telephone Laboratories 1916/56. Member AIEE and IRE.

KLINGENSCHMITT, FRED A. (F) 1929 - Sales Engineer, Amy Aceves and King, Inc., 11 West 42 St., N.Y.C.; res. Hudson View Gardens, N.Y.C.; b. N.Y.C. September 8, 1892; ed. High School; married; interested in radio 44 years; amateur 1908/1910; professional experience 1910/1916 commercial operator, installation and inspection, United Wireless Telegraph Co. and Marconi Wireless Telegraph Co. of America; World War I Military Intelligence Branch Lieutenant, Vice President, Sleeper Radio Corporation 1921/1927, E. T. Cunningham, Inc. 1928/1929; Amy, Aceves and King 1929 to present; Radio Club of America President 1944/1945, Director-1945 to Date, Vice President 1938, Corresponding Secretary 1934/1937.

KNOOP, WALTER A., JR. (F) 1942 - Professional Engineer, Gawler-Knoop Co. 178 Eagle Rock Ave., Roseland, N. J.; res. 63 Grover La., W. Caldwell, N. J.; b. Chicago, Ill. May 14, 1919; married; ed. B.E.E. Rensselaer Polytechnic Institute; amateur W9KHG 1932, W2PXR and operated at W8XYR Whiteface Mountain Observatory; professional experience Manager Contract Division DuMont Laboratories until 1946; two patents on CR Tubes, articles for QST, Radio News, IRE Proceedings, Instruments Magazine; Member AIEE, IRE and Montclair Society of Engineers, Member-Sibma XI; Tau Beta Pi; National Pilots Assoc.

KOBI, JOHN THOMAS, (M) 1956 - Electronic Engineer, Radio Engineering Laboratories, 6 years; res. 2 Henrietta La., Massapequa Pk., L.I., N. Y.; b. November 10, 1924, Atlas, Pa., Military Service U.S.A.F. 1942/1945, Education, B.E.E., Brooklyn Polytechnic Institute, Brooklyn, N. Y.

KUNIK, I. JORDAN (M) 1952 - Patent Lawyer, 521 Fifth Ave., New York, N. Y.; b. Hartford, Conn. November 10, 1912; ed. Wesleyan University, Harvard Law School; interested in radio since 1938; professional experience in Patent Law including all phases of electronics; IRE, AAAS (Fellow), American Bar Association, New York Patent Law Association, American Chemical Society, American Institute of Chemists (Fellow), American Society for Metals.

LAFFERTY, RAYMOND E. (M) 1947, (F) 1957 - Section Supervisor, The Daven Co., Livingston, N. J. res. 12-05 Sumner Pl., Fairlawn, N. J.; b. Brooklyn, N. Y. July 12, 1918; ed. High School, RCA Institutes, General Engineering Course; married; interest in radio since 1930; Amateur W8VTJ in Ogdensburg, N. Y. (expired), First Class Radiotelephone License since 1939; professional experience: Engineer with Boonton Radio Corporation, Ferris Instrument Corporation, A. B. DuMont Laboratories; Chief Engineer WSLB; Instructor with N. Y. State Signal Corp Training School, Paterson Radio Institute; Develop-

ment Engineer, 1948-1957, with NBC; presently with the Daven Co. of Livingston, N. J. since 1957; several patents and numerous papers dealing with audio and radio devices and radio frequency measurements, 1956 IRE National Convention paper on High Frequency Shields; Senior Member IRE.

LAMB, FRANCIS XAVIER (F) 1945 - Vice Pres. and Chief Engineer, Weston Instruments, Div. of Daystrom, Inc., 614 Frelinghuysen Ave., Newark, N. J.; res. 49 Mountain View Ave., East Orange, N. J.; b. Newark, N. J. August 5, 1905; ed. Newark Technical School 1927-AE; Newark College of Engineering B.S. in E.E. 1930; married; interested in radio since 1920; amateur non-licensed experiments; professional experience 1928/1936 Electrical Eng. with Weston; 1937/1939 Res. Eng. in Japan for Weston, 1940/1942 Project Eng. on Research and Development, 1942/1943 Liaison Eng. for Weston assigned to Sangamo-Weston Co., Springfield, Ill., 1944/1951 Asst. Chief Engineer, Weston, 1952/1953 Chief Eng., Weston, 1954 Vice Pres. and Chief Eng. Weston; Profession Eng. License #5573, 25 U. S. Patents; Fellow AIEE, Member IRE, ISA, RCA, SAMA, ASA, NAM, AFCEA, Company Rep. ASA (C39), ASA (Indicating Instruments C39. I). Honorary Membership Eta Kappa Nu Assn.; Technical Publications 9.

LAMB, JAMES J., (F) 1958 - Consulting Eng.; res. 4 Rock Ridge Dr., S. Norwalk, Conn.; b. November 30, 1900 at Michigan City, N. Dakota; ed. Michigan, N.D. grade and high school; St. Thomas College (S.A.T.C.) 1918, U. of Minn., 1919, Catholic Univ. of America, 1919/22, B.S. in E.E. Georgetown U. Law, 1928, U. of Conn. Industrial Eng. course, 1944; employed by Remington Rand Div., Sperry Rand Corp., 1941 to date; American Radio Relay League, 1928/1941; J. P. Lamb Land Co., Michigan, N. D. 1924/1927, Valley Radio Div., Electric Construction Co., Grand Forks, N. D. 1922/24; Military Service, enrolled in Student Army Training Corps., 1918; Amateur Call Letters 9CEI, 1925/27, 3CEI, 1928, WICEI and WIAL, 1928-WW2. Also held 2nd. Class Commercial 1922/1927 and First Class Commercial, 1928/29; Patents, 6 Patents in electronic field, co-author two technical manuals, author over 60 papers and articles published, including one in RCA Proc., Q.S.T. Also gave one RCA paper on Industrial TV, Stereo sound and photography, Norwalk Shore and Country Club designing ham radio gear; member of So. Norwalk Public Library Board and member of 3rd Ward Democratic com., member of National Catholic Social Action Conference.

LANDMAN, RAY R., (M) - Engineering Aid, Radio Engineering Labs., 3 years, res. 67-108th St., Forest Hills, N. Y.; b. England, ed. attending City College, N. Y.; Military Service Air Force 4 years; Amateur Call Letters K2AWQ, 6 yrs.; Hobbies, photography, automatovies.

LANGER, PETER LAWRENCE (M) 1954 - Sylvania Electric Products Co., 700 Ellicoh St., Batavia, N. Y.; res. 43-55 168 St., Flushing, L.I., N. Y.; b. N.Y.C. February 17, 1915; ed. Lawrence High School 1928/1934, Navy Electronics School 1943/1944; professional experience - Philco Field Service Engineer 1946/1949; 1949 to date Field Service Engineer, Sylvania Elec. Products; Member IRE.

LANGLEY, RALPH H. (F) 1928 - Retired; res. 18 Prescott Ave., Bronxville, N. Y.; b. N.Y.C., January 5, 1889; ed. Columbia University, E.E. 1913; married; interested in radio since 1906; built IKW Quenched Gap Transmitter in the Electro-Chemical Laboratory at Columbia; professional experience 1913/1916 with Colonel John Firth, 1916/1920 Marconi Wireless Telegraph Co. of America, 1920/1927 General Electric Co., Radio Department, Schenectady, 1927/1931 Director of Engineering Crosley Radio Corporation, Cincinnati, Ohio, then as Consulting Engineer following 1931; Underwater Sound Laboratory, New London, Conn. 1941/1943, Asst. to Dir. Hazeltine Electronics Corp., Little Neck, L.I., N. Y 1943/1946; in charge of Licensee Laboratory Olympic Radio & Television Corp. Long Island City, N. Y. 1946/1948, Vice President in charge of Engineering, Farrand Optical Co., Inc. Bronx, N. Y. 1948/1957 Asst. to the President; Radio Club of America President 1935/1936, Vice President 1934, Corresponding Secretary 1933, Director 1932.

LaPENNA, FRANK (M) 1949 - Assistant Professor, Hudson Valley Tech. Inst., Troy, N.Y.; res. Staten Island, N.Y.C.; b. N.Y.C. December 18, 1898; ed. RCA Institutes; married; interested in radio since 1933.

LAYMAN, PAUL N. JR. (M) - 50 Sutton Place South, New York 22, N. Y.

LeBEL, CLARENCE J. (F) 1926 - Chief Engineer, Audio Instrument Co., Inc., 135 West 14 St., New York 11, N. Y.; Vice President, Audio Devices, Inc.; res. 370 Riverside Dr., New York 25, N. Y.; b. New York, N. Y. December 16, 1905; ed. S.B. and S.M. in E.E. MIT; single, interested in radio six years, audio 32 years; professional experience 32 years Raytheon, Inc. Research Engineer 1927/1929, 1929/1932 Research Eng., Hygrade Sylvania Co., Consulting Engineer, Audio Devices Inc., Maico Co., Audio Instrument Co., 9 Patents, many papers, one book "How to Make Good Tape Recordings;" member AIEE, Acoustical Society of America, SMPTE, Fellow AES, Past President and now Secretary; Radio Club of America Director.

LEMMON, WALTER S. (F) 1914 - President Radio Industries Corporation, 1 East 57 St., New York 22, N. Y.; res. Greenwich, Conn.; b. N.Y.C. February 3, 1896; ed. E.E. degree Columbia University; married; Amateur Station "AX" New York 1908 and later licensed 21E until 1917; professional experience U. S. Navy Radio Officer, Development Engineering Radio Receivers, general radio executive work, developed radiotype for International Business Machines Corp., International Broadcasting stations, WRUL, Boston; Radio Club of America Recording Secretary 1917/1920, Director 1915/1916, 1921/1922.

LEMPERT, IRVING E. (M) 1941 - Engrg. Sector-Mgr., Westinghouse Electric Corp., Metuchen, N. J.; res. 51 Linden Ave., Metuchen, N. J.; b. N.Y.C. April 11, 1917; ed. Lehigh University B.S. in E.E.

LERZ, OTTO M, JR. (M) - res. 25 Iowa Rd., Great Neck, N. Y.

LESCARBOURA, AUSTIN C. (F) 1919 - Pres., Lescarboura Advertising, Inc., County Trust Bldg., Ossining, N. Y.; res. 105 Narragansett Ave., Ossining, N. Y.; b. N.Y.C. June 5, 1891; ed. High School of Commerce, N.Y.C., evening courses, correspondence courses, Hon. D. Litt. Guest Lecturer, School of Journalism, Syracuse University; married; interested in radio since 1907; amateur spark coil station "JR" in New York 1908/1909; professional experience: Engineer with Telefunken Wireless Telegraph Company in New York 1908/1909, editor Modern Electrics 1907/1908, Associate Editor of Dun's Review 1911/1912, Editor of Modern Electrics and Mechanics (Now Popular Science Monthly) 1912/1915, Managing Editor of Scientific American 1915/1924, Editor with Hardware Age 1925, owner industrial advertising agency 1925 to present; co-inventor of adjustable pitch mechanical phonograph reproducer; Books: "Radio for Everybody" (1921); "This Thing Called Broadcasting" (1931); Chevalier French Legion of Honor, Past Governor of Rotary International (New York Area); Hobby

Photography; Advertising Club of N. Y., 32° Mason; Rotary Club of Peekskill; Avocations: Lay preacher and Lay reader in Protestant-Episcopal Church; Radio Club of America Director 1927/1929.

LEWIS, HAROLD MILLER (F) 1925 - Professional Engineer N. Y. State; res. 510 Blanchard Parkway, West Allenhurst, N. J.; b. Geneva, N. Y. January 12, 1893; married; ed. B.E. Union College 1916, Radio Engineering Course, Sorbonne, Paris 1919; interested in radio since 1906; amateur: electrolytic receivers 1906/1910; professional experience General Electric Research 1916/1917, Signal Corps Division of Research Paris 1918/1919, Radio Engineer Signal Corps 1919/1921, President Radio Service Laboratories 1921/1925; President LeMor Radio 1925/1927, Signal Corps Fort Monmouth 1927/1930, Hazeltine Electronics Corp. Engineer in charge of Television 1930/1937, Consulting Engineer 1939/1941, Hazeltine Corp. in Charge of I.F.F. Training 1942/1944, Technical Adviser Hazeltine Patent Department 1945/1946, Patent Adviser Signal Corps 1948 to 1955; about 60 U.S. Patents, papers in IRE and Electronics; original superheterodyne development with E. H. Armstrong 1918, Television Standards Committee 1931/1936, devised Whip Antenna for Army Tanks; member AIEE, IRE, Chairman, N. Y. section 1944; Director Radio Club 1934/37.

LONG, ESCO C. (M) - Senior Standards Engineer, Stavid Engineering, Inc., Plainfield, N. J.; res. New Providence, N. J.; b. Twin Rocks, Pa. August 24, 1906; ed. Indiana State Teachers College B.S., Penn State and University of Pittsburgh Graduate Work; married; five children; interested in radio since 1918; amateur: built various types transmitters and audio amplifiers; professional experience: Radio Engineering Naval Research Laboratory, Washington, D. C.; three years Stavid Engineering, Inc., Supervisor of the Standards Section; eleven years Shepard Laboratories, Summit, N. J. as Project Engineer in Electronics; High School Instructor in Mathematics (12 years); Metropolitan Life Insurance Co. (2 years); U.S.N.R. (Electronics) during World War II, Boy Scout (Eagle Scout), Played Baseball, Football, Basketball and Tennis; Hobbies - Gardening, Hunting and Fishing; Lions Club (Secretary), PTA (President).

LOUGHLIN, BERNARD D. (F) 1940 - Electronic Research Consultant; res. Little Neck Rd., R.D. 5, Huntington, N. Y.; b. May 19, 1917; ed. Cooper Union B.E.E. 1939; Fellow IRE, member AIEE, IRE Zworglin TV Prize Award, 1952, SMPTE Sarnoff Gold Medal Award, 1955, IRE, 1957 award of PGBTR.

LOUGHREN, ARTHUR VIVIAN (F) - Vice Pres., Airborne Instruments Laboratory Division of Cutler-Hammer, Inc., Mineola, N. Y. Applied Research Division; res. 22 Broadlawn Ave., Great Neck, N. Y.; Radio Eng.; b. Rensselaer, N. Y., September 15, 1902; ed. Columbia Univ. A.B. 1923, E.E. 1925; Phi Beta Kappa, Sigma Xi, Tau Beta Pi; married; Gen. Elec. Co., Schenectady 1925/30; RCA Mfg. Co., Camden, N. J. 1930/34; Gen. Elec. Co., Bridgeport, Conn. 1934/36; Hazeltine Electronics Corp. 1936/56 - Ch. Eng. 1946/49, V.P. charge research 1951/56 also Exec. V.P. Hazeltine Research Corp. 1952/56. Holder of 29 patents, and continuously in radio and TV since 1925. Fellow of IRE, SMPTE, AIEE, and Radio Club of America; President IRE 1956; member Joint Technical Advisory Committee; National Stereophonic Radio Committee; holder David Sarnoff Gold Medal, 1953; Morris Liebmann Memorial Prize 1955; U.S. Navy Certificate of Commendation, 1947.

LYNCH, ARTHUR H. (F) 1922 - Field Engineer, Arthur H. Lynch and Associates, 67 W.N. Shore Ave., Fort Myers, Fla.; b. Brooklyn, N. Y. July 2, 1894; ed. 3 Years High School several correspondence courses electronics etc.; married; interested in radio since 1908; amateur station Brooklyn and Jamaica, L.I. 1908; presently W4DKJ all bands; professional experience Marconi Wireless Telegraph Co. 1912, Army Officers Training School, Tours France World War One, Radio Department New York Times 1920, Director of Publicity RCA 1920, Editor Radio Broadcast 1924/1928, Manufacturer Fixed Resistors 1929/1940 and Noise Reducing Antennas 1937/1942, Editor Radio News 1935/1936, now represents 30 manufacturers in Fla.; Senior Member IRE, Life Member VWOA and Recipient VWOA Marconi Medal; Hobbies - amateur radio, flying, yachting; Director Lee County Chamber of Commerce, Florida; Radio Club of America Recording Secretary 1924/1926

LYON, WALTER (M) 1951 - Communications Engineer, RCA Communications, Inc., 66 Broad St., N.Y.C.; res. 3326 160 St., Flushing, L.I., N. Y.; b. October 5, 1906 N.Y.C.; ed. Morris High School, McGill University B.S. in Engineering 1928, M.Sc. in Physics and Mathematics 1932; married; interested in radio since 1918; Professional experience Hazeltine Service Corp. 1929/1932, 1934/1937, Chief Engineer Wells-Gardner 1933/1934, Chief Engineer Emerson Radio TV Corp., Asst. Chief Engineer Majestic Radio and TV Corp. 1937/1938, RCA Victor design Engineer 1938/1945, RCA International Division Staff engineer 1945/1946; RCA Communications Manager, Station Facilities (Equipment & Systems) 1946 to present; 15 U.S. Patents, several papers in "Electronics" RCA Review, I.R.E. and A.I.E.E. Transactions also Sigma Xi., member IRE, Cold Iron Society, Roslyn Rifle and Revolver Club, Chairman E.I.A. TR 6 Com. on Long Distance Point to Point Radio Communications 1949 to date; Professional Engineer, N. Y. State, Consulting Communications Engineer, Adjunct-Professor of Electrical Engineering, Polytechnic Institute of Broklyn.

MAC DONALD, WILLIAM ALEXANDER (F) 1937 - Chairman of the Board, Hazeltine Corporation, 59-25 Little Neck Parkway, Little Neck, N. Y.; res. Bayville Rd., Locust Valley, N. Y.; b. New York, N. Y. December 27, 1895; ed. University of Paris, France; married; interested in radio since 1913; amateur 2 yrs.; professional experience 43 years, licensed Professional Engineer, N. Y. State, Radio Operator Marconi Wireless Telegraph Co. 1913/1915 aboard munitions ships, Laboratory asst. Western Electric Co. 1916, U. S. Army Signal Corps 1917/1918 advancing through grades to commissioned officer, assisted Edwin H. Armstrong in establishing at Paris first Laboratory, Div. of Research and Inspection. Set up school at Orly and instructed pilots and observers in first air-borne radio-telephone equipment. During 1918, constructed first superheterodyne receiver under Armstrong guidance, Assistant Radio Eng. Civil Service Com. 1919/1920, Engineer Radio Corp. of America 1920/1924, Chief Engineer Hazeltine Corp. since 1924, Director since 1934, Vice President 1934/1952, Pres. 1952/1957, Chairman since 1957, Research Corp. of Calif. 1946/1952, Dir. since 1946; 110 U.S. and Foreign Patents; American Society of Naval Engineers, National Security Industrial Assn., Armed Forces Communications Assn., Army Ordnance Assn., Fellow Institute of Radio Engineers, Dir. Radio-Electronics Television Manfrs. Assn., Member Electronics Equipment Industry Advisory Com. of the Munitions Bd., Member of the Joint Electronics Industry Com., Awarded Certificate of Merit World War Two, Engineers Club, Founding Member, Armstrong Memorial Research Foundation, Inc., Member Advisory Group on Reliability of Electronics Equipment (Agree) Task Group No. 6.

MacLAREN, FRED B. (M) 1951 - President, F. B. MacLaren Inc., 15 Bay Drive West, Huntington, L.I., N. Y.; Vice-President, Photomechanisms; res. same; b. Jersey

City September 9, 1915; ed. B.E. Degree E.E. Yale University 1936; married; interested in radio since 1928; amateur WIGYE; professional experience Engineering Consultant electronic and mechanical component design, development and production, Perkin-Elmer Corp. computer design 2 years, Glenn L. Martin Co. (airborne Fire Control System) 2 1/2 years, Officer in Charge A.A. Fire Control Developmen Army Ordnance Department 4 1/2 years, The Bristol Co. Electronic Development Engineer 4 1/2 years; six patents on various industrial electronic instruments; "Servo-mechanisms for Industry" Applied Hydraulics 1953; Hobbies - Tennis, swimming, golf, bridge.

MAFFIA, BLASE R. (M) - res. 1630 East 36th St., Brooklyn 34, N. Y.

MALLORY, HENRY ROGERS (M) 1957 - Technical Consultant, P. R. Mallory & Co., Inc., President Round Electric Products Co., Inc.; P. R. Mallory & Co., Inc., 41 East 42nd St., New York 11, N. Y.; b. May 9, 1912, Rye, N. Y.; ed. The Hill School, 4 yrs., Yale University Sheffield Scientific School, 2 yrs.; Patents, Papers, etc., Several; Sports, Hobbies, etc., Electronics, boating, tennis, music, photography.

MALONEY, WILLIAM P. (M) - res. 1241 Taylor Ave., Bronx 72, N. Y.

MANSON, RAY H. (F) 1931 - Retired from Stromberg-Carlson C.; res. 373 Beresford Rd., Rochester, N. Y.; b. Bath, Maine August 25, 1877; ed. University of Maine B.S.(E.E.) 1898, E.E. 1901, D. Eng. 1933; married fifty years 1953; interested in radio over 36 years; professional experience: design and manufacture of Broadcast Radio Receivers and Components for Stromberg-Carlson Co. at Rochester, N. Y.; over 100 United States Patents on Communications and Kindred Subjects; President of IRE in 1931, member Acoustical Society, Fellow IRE, Fellow AIEE. Retired.

MANSON, WALTER B., JR., (M) 1957 - Asst. Division Manager, Measurements, Boonton, N. J.; res. 115 Lake Dr., Mountain Lakes, N. J.; b. September 13, 1911, Elyria, Ohio; ed. Newark Academy, Cornell University, E.E. 1936; previous emp. Thomas A. Edison Industries, 22 yrs., Measurements Div. 2 yrs.; Sports, Hobbies, etc., Sailing, skating, swimming, Hi-Fi, model railroad.

MARTIN, DEVEREAUX (F) - Assistant to Manager, Product Engineering Department, Hughes Aircraft Company, Communications Division, P.O. Box 90902, Airport Station, Los Angeles 45, Calif.; res. 11631 Chanera Ave., Inglewood 4, Calif.; ed. Electrical Engineering, Mass. Institute of Technology, Class of 1929; married; interested in radio since 1922; professional experience since 1929, in fields of aircraft equipment, navigational systems, high power transmitters, industrial controls and military airborne systems equipment, with Westinghouse Electric Corp., Federal Telephone & Radio Corp., J. H. Bunnel & Company, Wilex Gay Corp., Radio Receptor Company, Electronic Corp. of America, Viking Instruments Inc., member of AIEE and IRE, including many professional groups.

MARX, ERNEST A. (F) 1949 - Director International Division, Allen B. Du Mont Laboratories, Inc., 515 Madison Ave., N.Y.C.; res. 310 East 44 St., N.Y.C.; b. N.Y.C. March 9, 1896; ed. Columbia University B.S. E.E., U. S. Naval Research Laboratory, Bowdoin College, Electronics; interested in radio since 1910; Amateur 1910/1917; professional experience: General Manager DuMont Television, Chief Radio Theory Instructor U. S. Navy World War One, Electronics Officer Third Naval District (Radar) World War Two; Hobbies - Sailing (Ocean), Painting.

MARX, FRANK LOUIS (M) 1956 - Vice President in charge of Engineering American Broadcasting Co. employed there from 1944 to present; res. 35 E. Hartsdale Ave., Hartsdale, N. Y.; b. January 31, 1910, Birmingham, Ala.; ed. Shreveport College, University of Virginia, William & Mary College, Columbia University; Call letters W3OF - 15 yrs. given up about 1931; Patents, Papers, etc., Papers published in numerous technical journals, holder of several patents.

MASIN, OLDRICH F. (F) 1946 - Field Engineering Representative, O. F. Masin Co., 1 Wolf's La., Pelham, N. Y.; res. 65 Durham Rd., Bronxville, N. Y.; b. N.Y.C. June 7, 1900; ed. B.S. in E.E. Cooper Union Day Technical School; married; interested in radio since 1921; professional experience: Radio Corporation of America Harrison, N. J. Development 200A and 201A, Ward Leonard Electric Co., Mt. Vernon, N. Y. Design and Development of resistors and rheostats 9 years, past 25 years in O.F. Masin Co. representing Companies such as Cannon Electric Tru-Ohm Products Div. of Model Engineering; Leach Relay Corp.; Switchcraft Inc.; Sigma Instruments Inc.; G. Felsenthal & Son; Raytherm; Sun Electric Corp.

MAYER, WILLIAM G. (F) 1921 - Electronic Engineer, Evans Signal Laboratories, U.S. Army Engineering Labs., Belmar, N. J.; res. 404 Sixth Ave., Asbury Park, N. J.; b. N.Y.C. January 13, 1900; ed. Columbia University B.S. 1922; single; interested in radio since 1912; amateur since 1916, W2NF Class A license, First Class Radiotelephone license; professional experience: Marconi Wireless Telegraph Co., Aldene, N. J. Engineering Department World War One, Signal Corps Engineering Laboratory 12 years since 1941; 3 Patents relative to "Electronic Ignition System for internal combustion engines," "Triggered spark gap for Radar Modulators," "Improvement in Ignitrons;" Member ARRL, U. S. Power Squadrons; Hobbies - Boating and deep sea fishing; amateur radio, Collector of Chinese Art, Paintings.

MAYHEW, B. ALAN (M) 1922 - Consultant, National Sugar Refining Co., N.Y.C.; res. Harbourton Woosville Rd. Route 1, Pennington, N. J.; b. Englewood, N. J. March 12, 1897; ed. M. E. Stevens Institute of Technology, P.E. N. Y. State; married; interested in radio since 1911; amateur 1913 2HP, 1KB in 1916, W2BYW 1921, K2DD 1951, extra class 1953; member of Tenafly Boro Council 1944/1951 (Police Commissioner); Hobbies - Amateur Radio, photography; Societies - ASME, Sugar Industry Technicians.

MENZEL, GEORGE E. (M) - res. 242 West 71 St., New York 23, N. Y.; b. Brussels, Belgium, August 20, 1923; ed. New York University M.A.; Military Service, Infantry and Ordnance (1942/1946) U. S. Army; Sports, Hobbies, etc. Baseball, ice skating, skiing, hiking, "Do it Yourself" addict, Stamp Collecting, (plate blocks especially) leather worker.

MEZGER, G. ROBERT (M) 1956 - Electrical Engineer, Allen B. Du Mont Labs., Inc., 20 yrs., Measurements Corp., 1 yr., Avion Div. ACF Industries, 2 yrs.; res. 617 Beverly Rd., Teaneck, N. J.; b. November 11, 1914; ed. Elec. Engr. Rensselaer Polytechnic Institute, Troy, N. Y., 1936; Amateur Call Letters, W2BLL, since 1933; Sports, Hobbies, etc. Amateur Radio, ARRL, AIEE.

McAINSH, NEVILLE J. (M) 1936 - Chartered Electrical Engineer, General Electric Co. Ltd., Coventry, England; b. Manchester, England, October 28, 1899; ed. Associate of College of Technology, Manchester; Member Institute

of Electrical Engineers; professional experience: engineering and development of electronic and television equipment at executive level.

McCOY, DANIEL C. (F) 1921 - Consulting Engineering, Refrigeration, and Food Technology, Sales and Sales Management; 7546 Normandy La., Dayton 59, Ohio; res. same; b. N.Y.C. December 22, 1894; ed. Public Schools of Tarrytown and Yonkers, N. Y., Cornell University (Chemistry); married; interested in radio since 1900; active amateur since 1906 except for war periods and brief periods due to change in residence; professional experience: Marine operator 1911/1916 (summer vacations); Lecture Assistant Department of Chemistry Cornell University 1914/1917; Commissioned Officer Signal Corps and Air Service World War One; Sales and Sales Management in automobile business 1919/1925; Frigidaire Division of General Motors Corp. 1925-retired October, 1955, activities included sales, sales engineering, and sales management work in commercial and industrial refrigeration and air conditioning, directed field engineering organization, edited three commercial refrigeration engineering manuals, directed frozen food research, final assignment Technical Consultant staff of General Sales Manager; Fellow, American Society of Refrigerating Engineers; Charter Member of the Institute of Food Technologists, Member American Society of Agricultural Engineers, Engineer's Club of Dayton, ARRL, Old Old Timers Club, Quarter Century Wireless Association, Dayton Amateur Radio Association (past president), Delta Upsilon Fraternity, Scabbard and Blade, Alembic (Cornell); hobbies are amateur radio, fishing, and sailing.

McDOUGALL, DUGALD S. (M) 1950 (F) 1953 - Patent Attorney, Ooms, McDougall, Williams & Hersh, 135 So. La Salle St., Chicago, Ill.; res. 1231 Ashland Ave., Wilmette, Ill.; b. Indianapolis, Ind. May 15, 1916; ed. A.B. University of Chicago 1935, J.D. University of Chicago 1937, special courses Harvard University radar and ultra-high-frequency techniques 1943, MIT 1943; married; interested in radio since 1927; amateur W9CVQ since 1929, presently W9CVQ; professional experience; practiced patent law since 1946 with emphasis on electronics, Instructor in Radar U. S. Naval Reserve 1943/1945, Naval Research Laboratories 1945/1946; member IRE, American Bar Association.

McKENZIE, ALEXANDER ANDERSON (F) 1948 - Editor, Engineering Books, McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y.; res. 245 Poplar Ave., Hackensack, N. J.; b. Albany, N. Y. October 2, 1908; ed. Albany public Schools and Albany Academy 1928, Dartmouth College A.B. 1932; married; interested in radio since 1920; amateur W1BPI (1931) and W2SOU 1946 but continuously licensed; professional experience: radio operator or radio operating engineer at Mt. Washington, N. H. Observatory, Research Assistant Yankee Network, Inc., Research Assistant Carnegie Institution of Washington, Staff member Radiation Laboratory MIT; Member (SM) IRE, Institute of Navigation, ARRL, Appalachian Mountain Club, Mt. Washington Observatory Inc.; Active in Hackensack politics, PTA and similar school-centered work, Member, Board of Education 1955/60, President 1959/60, local church work; Co-editor "Loran," author and publisher "Key and Answers to New Radiotelegraph Examination Questions," Radio Operating Questions and Answers;" pioneered in 5 meter and 2.5 meter communications between Mt. Washington and Blue Hill Observatory 1935/1937 and with Radiosonde at 60 mc and during 1937 on similar sounding at the Bartol Research Foundation, returned to Mt. Washington to install Yankee Network 41 mc FM station and heard first FM Signals from Alpine in 1938; transferred to Paxton 1939 on first 50 KW FM station, Radiation Laboratory MIT 1942 on Loran with field work in U.S., Canada, Labrador and Newfoundland; Electronics magazine 1945 to 1957; McGraw-Hill Book Co. 1957 to present.

McMANN, RENVILLE H. (F) 1919 - Consultant; res. 60 East 96th St., New York City 28, N. Y.; b. N.Y.C. June 29, 1895; ed. Choate, U. S. Naval Radio School, Harvard University; married; interested in radio since 1912; amateur 2 MC from 1919 to 1928; professional experience R. H. McMann, Inc. radio distributors, 12 Warren St., N.Y.C., Procurement Director Republic Aviation, December 1942 to 1945, Westinghouse Electric Corp. 1945/1957; Past President West Side Tennis Club, Past President United States Lawn Tennis Association; Radio Club of America Corresponding Secretary 1921/1924.

McMANN, RENVILLE H., JR. (F) 1944 - Engineering Manager CBS "Sentry" CBS Laboratories, Stamford, Conn.; res. 60 East 96 St., N.Y.C.; b. N.Y.C. August 20, 1927; ed. B.E. Yale University, 1950; single; Pioneer in amateur teletype activities; Professional Experience, 5 summers plus one and one-half years in Columbia University and Alpine, New Jersey Laboratories of Major E. H. Armstrong; TV Development Laboratory National Broadcasting Co., 52/55 Pilot Member Soaring Society of America, Patents in Color TV field.

MEYERS, JAMES G. (M) 1949 - Government Electronics Inspector, Department of Defense, U. S. Army Signal Supply Agency, 225 S. 18 St., Philadelphia 3, Pa.; res. 1056 Sheridan Ave., Bronx 56, N. Y.; b. N.Y.C. January 13, 1914; ed. University of Illinois, RCA Institute, Capitol Radio Engineering Institute; interested in radio since 1933; married; ex-amateur and ship's operator, American Export Line; professional experience: radio operator 2 years, Chief Engineer 5 years, Laboratory Electronic Engineer 10 years, Government Electronics Inspector 7 years, U. S. Marines 2 years; Captain U. S. Marines Radar School, Senior Member IRE, Charter Member AES; Hobbies - Radio, Audio Amplifiers; Contributor Radio and Television News; Sports - wrestling.

MEYERSON, ART H. (M) 1956 - Lieutenant, New York Fire Department, Bureau of Fire Communications, 22 yrs.; res. 60 Knolls Crescent, New York 63; b. August 1, 1909, N.Y.C.; ed. Fordham University 1 yr., Pratt Institute, 2 yrs., New York University 1-1/2 yrs.; Patents, Papers, etc., Various papers published in "Communications," on superregeneration VHF techniques, Coil Q, portable mobile XMTRS and RCVRS; Sports, Hobbies, etc., Member IRE, Member AES, Hobby High Fidelity.

MEYER, STUART F. (M) 1955 - Engineering Dept. Supervisor, Allen B. DuMont Labs., 5 1/2 yrs.; res. 1103 Kent Pl., Linden, N. J.; b. N.Y.C. February 4, 1918; ed. High School and DeVry Institute Correspondence Course (Radio & TV) and 6 months Technical Course U. S. Navy; Military Service 5 yrs. U. S. Navy, Maintenance Radar and Communication Equipment 2 1/2 yrs. as Instructor; Amateur Letters, W2GHK since 1933; Patents, Papers, etc. IRE Papers, a Manually Operated Demand Repeater, Vehicular Noise Problems in Modern Land-mobile Systems, plus many technical talks before; Association of Police Communication Officers, International Municipal Signalmans Assn. Pennsylvania Elec. Assn. Forestry Conservation Service, etc., "Many Radio Clubs;" Sports Hobbies, etc., Bowling, Woodworking, Member IRE, ARRL, RSGB, Tri County Amateur Radio Assn., Former President Staten Island Amateur Radio Assn.; Currently finishing up installation of San Francisco Police Radio System which is used in Filming of Current "Line-up" series.

MEZGER, GEORGE ROBERT (M) - res. 617 Beverly Rd., Teaneck, N. J.

MILLER, ARTHUR G. (M) 1949 - Electrical Manufacturing, Delta Electronics, 259 Green St., Brooklyn, N. Y.; res. 730 Rifton St., Elmont, L.I., N. Y.; b. N.Y.C. January 3, 1916; ed. Cooper Union; married; interested in radio since 1925; First Class Radio Operator.

MILLER, DONALD H. (F) 1944 - New York District Manager, Electronics, Advertising Sales Dept., McGraw-Hill Publishing Company, Inc., 500 Fifth Ave., New York 36, N. Y.; res. 177 Clinton Ave., Dobbs Ferry, N. Y.; b. Cambridge, Mass. May 4, 1902; ed. B.S. in Engineering Tufts University; married; active in radio and electronics since 1921.

MILLER, JOHN HAROLD (F) 1933 - Retired, Consultant to Weston Instruments, Division of Daystrom Inc., Newark, N. J.; res. Harbor Bluffs, Fla.; b. Oak Park, Ill. June 6, 1893; ed. B.S.E.E. University of Illinois 1915; married; interested in radio since 1907; amateur spark transmitter and receiver Oak Park, Ill. 1907/1911; professional experience in conjunction with engineering work on electrical measurements, application to radio in all its aspects has always played a prominent part; some 38 patents, miscellaneous papers on measurement before AIEE and IRE; Radio Club of America President 1937/1938, Vice President 1936, Director 1934, Fellow-AIEE; Fellow-IRE.

MINDEL, MARVIN T. (M) - res. 1023 Beach 12th St., Far Rockaway, N. Y.

MINTER, JERRY B. (F) 1942 - President, Components Corporation, Denville, N. J.; res. Normandy Hts. Rd., Morristown, N. J.; b. Ft. Worth, Texas October 31, 1913, ed. B.S. MIT 1934; married; interested in radio since 1925; amateur ex-W1EQC and ex-W2RDH; professional experience: Boonton Radio Corporation 1935 development bandpass intermediate frequency transformers, Radio Frequency Laboratories 1936 aircraft radio receivers, Malcolm P. Ferris 1936/1939 in charge of development of a signal generator, a radio noise and field strength meter, 1939 assisted in organizing Measurements Corporation and Vice President and Chief Engineer until 1953; member Aircraft Owners and Pilots Association, American Society for Metals, Past President & Fellow, Audio Engineering Society; assisted in organizing Northern New Jersey Sub-section IRE and acted as Chairman of the Sub-section 1947/1948; numerous RMA, IRE, SAE and ASA Standards Committees; several patents in his field of work and numerous papers ranging from Audio Distortion to Standard Signal Generators; Radio Club of America President 1948/1949, Director.

MOORE, WILLIAM CULLEN (M) 1957 - Executive Eng. Motorola Research Laboratories, Phoenix, Ariz.; previous employment United Air Lines 1936/38, Motorola 1938/47, Boston University 1947/1951, Tracerlab 1951/1953; Boonton Radio Corp. 1953/1958, Motorola 1958/; res. 6824 E. Montecita, Scottisdale, Ariz.; b. Portland, Ore., 1912; ed. B.A. 1933 Reed College, Portland, Ore., M.A. Physics, Boston University 1949; Patents, Papers, etc., Three patents, discriminator, avigation system, tunable coils; Two papers in American Jr. of Physics; one in Electronics, numerous reports and technical papers, including URSI and special conferences. Popular illustrated lectures on rocket research programs; Sports, Hobbies, etc. Private flying, canoe-camping trips, motion picture and still photography, woodworking; Radio Engineers' Club of Chicago 1941/47; Program Chairman, Vice-Chairman; IRE: Chicago, Program Chairman, vice-chairman, chairman 1946, Northern N. J. Program Chairman, Treas. Sec., Vice Chairman, chairman elect., 1958; Member National Electronics Conference Bd. of Dir. 1945/46, Member School Board, Lombard, Ill., Member School Board, Mountain Lakes, N. J., Scoutmaster, five years.

MOREHOUSE, RAYMOND LYNUS (M) 1956 - Field Engr., Sales Rep. 1946- presented by Adolph Schwartz, Sales Rep. Eitel McCullough, Inc., res. 2609 Ave. "R," Brooklyn 29, N. Y.; b. Topeka, Kans. October 4, 1898; ed. High School 3 yrs. Elec. Engrg., Night courses Columbia Univ.; former emp. Sales Manager, 1935/1945 Allan D. Cardwell Mfg. Corp., Brooklyn, N. Y., Lab. Tech. 1924/1934 Allan D. Cardwell Mfg. Corp.; Wireless Operator 1919/1922, Telegrapher, A.T.SF to 1917; Military Serv. U. S. Naval Reserve 1917/1919; Amateur Call Letters W2QA, over 25 yrs.; Hobbies, Veteran Wireless Opr. Assoc., Radio Club of America, Quarter Century Wireless Assn., Inc.

MORELOCK, JAMES (F) 1937 - Consulting Engineer, The Morelock Company, Box 348, Millington, N. J.; res. Millington, N. J.; b. Lockport, N. Y.; ed. Rensselaer and Brooklyn Polytechnic Institutes, E.E. 1932; married; interested in radio since 1925; professional experience: engineer, Weston Electrical Instrument Co. 1930/1939, Chief Engineer Electronics Div. 1940/1952; Consulting Engineer to date, private practice, electronics in the field of measurement, instrument and component design and manufacture, tubetesters, signal generators resistors, counters, infrared generators, computor amplifiers, air and ground navigation systems; 14 patents, National Product Design Award; avocation: country farm at Millington with horses and some cattle; Radio Club of America President 1950, (conducting the 1BCG Monument Dedication) and 1951, Vice President 1944 thru 1947, Corresponding Secretary 1942/1943, 1954 thru 1959, Director 1941, 1948/1949, 1952.

MUNN, W. FAITOUTE (CM) - Analytical and research chemist, res. 75 Walker Rd., West Orange, N. J., b. January 20, 1891, East Orange, N. J., ed. Columbia University, interested in radio since 1905. Professional experience: Laboratory of Thomas A. Edison; 2-1/2 years, Laboratory Assistant to Dr. S. A. Tucker, Electrochemical Laboratory, Columbia University; Chemist, West Virginia Pulp & Paper Co.; Ass't Director, Lederle Laboratories, New York; Electrical Engineer, Electrical Alloy Co.; Chief Chemist, General Chemical Co., Baker & Adamson Plant, Easton, Pa.; Chief Chemist, Brewster Film Corp., Chief Chemist, Colura Pictures Corp.; Chemist, Carroll Dunham Smith Pharmaceutical Co.; 10 years Certified Chemist, American Bureau of Shipping; Consulting Microscopist, Evans Research & Development Corp., 1948----. Private research laboratory (optical, chemical, microscopical, electric furnace, high frequency, photographic). Patents: No. 2371405, "Gas Analysis Apparatus," and No. 2537846, "Knife-Edge Device for Three-Dimensional Effect Images Through Microscope." Societies: Fellow, Royal Microscopical Society, New York Academy of Sciences, and Charter Member, Radio Club of America.

MUNROE, ROBERT KING (M) February 25, 1959 - Consulting Engineer, 120 Well St., (23rd. Fl.), New York City 5, N. Y.; b. August 3, 1894, Litchfield, Conn.; ed. Horace Mann Sch. N.Y.C.; Groton School, Groton, Mass., Columbia Univ. Engineering Sch., E.E. 1917; employed by Coverdale & Copitts, 15 yrs.; Military Service Capt., Corps of Engrs. U. S. Army, 1917/1922; Grad. Army Sch. of the Line and Gen. Staff College A.E.F.; Hobbies, Clubs, St. Anthony Club, N.Y.C., Developing own sound systems, Citizens Union of N. Y., vice chairman (civic organization), Member ASCE.

ODGERS, ARTHUR J. (F) 1950 - Vice President, Northern Radio Co.; res. 80 Heights Rd., Plandome, L.I., N. Y.; b. Calumet, Mich. August 6, 1912.

OFFENHAUSER, WILLIAM H. (F) 1936 - Engineer, self-employed; res. New Canaan, Conn.; b. Brooklyn, N. Y. May 8, 1904; ed. B.A. Columbia (with Engineering Option); married; interested in radio since 1915; always on fringe of amateur station, still have hopes of running ham set; made first recordings of mosquito sounds, confirming Hiram Maxim's findings after 75 yrs.; about 20 odd patents (such as noiseless recording for sound films, direction finder with response to the tangent of the field angle, a system for recording and utilizing low energy sound of insects to effect control of them); one book on 16 mm Sound Motion Pictures, A Manual (Interscience 1949, reprinted 1953, 1958) another book on Microrecording (microfilming) with C. Lewis (Interscience 1956); also numerous technical papers. Fellow - Sc. Motion Picture Television Engrs., Ands Eng. Society. Member - Acoustical Society of America, Inst. Radio Engrs. Am. Ordnance Assn.; Awards - OSRD Certificate (VT Fuze Project); ASA War Standards Certificate (252 Project); Naval Ordnance Development Award Certificate (NDRC Tropic Deterioration Project).

OLSON, A. ELLIOTT (M) - res. 31 Jervis Rd., Yonkers 5, N. Y.

OSBAHR, BERNARD F. (M) 1951 (F) 1956 - Editor, Electronic Industries, (Chilton Company) Chestnut & 56th Sts., Philadelphia 39, Pa.; res. 923 Longview Rd., King of Prussia, Pa.; b. Brooklyn, N. Y. December 17, 1918; ed. University of Pennsylvania, RCA Institutes Inc.; married; interested in radio since 1933; professional experience 1939/1942 Engineer RCA Mfg. Co. Camden, N. J.; 1942 Chief Engineer New York School of Radio; 1943/46 U. S. Army 1946/1947 Chief Electrical & Mechanical Procurement USFET Corps. of Engineers (Germany); 1947/1948 Director Services Division U. S. Army Exchange Service (Germany) 1948 to present Editor Electronic Industries, Senior member IRE, Member AES, AFCA; Hobbies - fishing, boating.

OSBORN, PERRY H. (F) 1944 - Senior Engineer, Radio Engineering Laboratories, Inc., 29-01 Borden Ave., Long Island City 1, N. Y.; res. 546 Sunsey Ave., Haworth, N. J.; b. Buskirk, N. Y. August 31, 1904; ed. E.E. Rensselaer, Polytechnic Institute, M.Sc. University of Pittsburgh; married; interested in radio since 1920; amateur W2FAA; Radio Engineer with Westinghouse, Signal Corps, RCA and E. H. Armstrong, Director Radio Club 57 Member IRE.

OSTERLAND, EDMUND (F) 1950 - Electronic Instrument Design and Manufacture, EO Electronics, Inc., Mountain Lakes, N. J.; b. Brooklyn, N. Y. 1909; ed. B.S.E.E. New York University; married; professional experience Chief Engineer Ballantine Labs., Inc. until January 1952, own business since that time.

OTIS, G. EDWIN (M) 1953 - Site Manager, General Electric Co. in Product Service, Bolori, Miss.; b. Plattsburg, N. Y. 1915; ed. graduated Union College 1938; interested in radio since 1930; professional experience - General Electric Co. 1941/1943, U. S. Army Signal Corps 1943/1946, instructor in radio and television at Veterans Vocational School, Troy, N. Y.; presently President of Otisonde, Inc., majoring in Hi-Fi Custom Sound Installations and Industrial Television; Technical article in "Radio" 1943 on volume expander, U. S. Army, developed special test equipment for carrier telephone and a noise suppressor for background line noise.

PACKARD, LUCIUS E. (F) 1940 - Engineer, President, Sales Manager, Technology Instrument Corporation, Acton, Mass.; res. Framingham Centre, Mass.; b. Sommerville, Mass. January 21, 1914; ed. Graduate MIT 1935; married; interested in radio since 1928; amateur WIDFL; patent, variable resistor, Patent Electric method and system for measuring Impedance and Phase Angle (conjunction with Hermon H. Scott).

PAGE, ESTERLY CHASE (F) 1945 - Consulting Engineer, Partner, Page, Creutz, Steel and Waldschmitt, President Page Communication Engineers, 710 14th St. N.W., Washington 5, D. C.; Vice Chairman Board of Director Edison-Page S.P.A. Rome, Italy; b. Chicago, Ill. July 16, 1902; Senior Member IRE, member Engineers Club, New York, ex-Lieut. Colonel AUS Signal Corps; Awards - Legion of Merit Order of British Empire.

PAINE ROBERT C. (F) 1935 - Test Engineer, Measurements Corporation, Boonton, N. J.; res. 436 Cornelia St., Boonton, N. J.; b. South Randolph, Vt., August 10, 1895; ed. Electrical Engineering at Worchester Polytechnic Institute and Marine Engineering at Webb Institute of Naval Architecture 1914/1917; married, four grandchildren; interested in radio since 1928; left college for Army 302nd Field Artillery 1917/1919, attended Royal Technical College, Glasgow, Scotland, Technical Staff Bell Telephone Laboratories 1923/1932, Ferris Instrument Corporation 1934/1948; Senior member IRE, Morris County Engineers Club, Masonic Lodge, Author of many articles in radio magazines.

PALMER, CHARLES WALTER (F) 1935 - Engineer, Western Electric Co., Inc., Lexington Rd., Winston-Salem, N. C.; res. 2429 Fairway Dr., Winston-Salem, N. C.; b. Kingsbridge, N. Y. August 26, 1907; ed. E.E. Cooper Union and Cornell University, also studied at Columbia University, N. Y. University and Stanford University; married; interested in radio since 1919; amateur formerly W2BV, W2BOY until 1940, Present W4ASV; professional experience: Technical Assistant Bell Telephone Laboratories 1928, Engineer Dresser Mfg. Co. 1929, Engineer Western Electric Co. 1929, Technical Editor Radio News Magazine 1931, Technical Editor and Managing Editor Radio-Craft Magazine 1933, Engineer, Section Chief and Department Chief Western Electric Co., Inc. Radio Division 1936 to date, presently Chief of Training Department; numerous articles in technical publications AIEE, Radio Magazine, Radio News, Radio-Craft; associated with radar and sonar engineering since 1940; Senior Member IRE, Member of Executive Board Boy Scouts of America, Old Heckory Council.

PANTER, PHILIP F. (F) 1946 - Fellow 1958 Executive Engineer ITT Laboratories (formerly Federal Telecommunication Laboratories) Nutley, N. J.; res. 6 Hooper Ave., West Orange, N. J.; b. Poland 1908; ed. McGill University 1929/1936, B.S. 1933, B. Eng. 1935 and Ph.D. 1936; married; professional experience: teaching one year in Palestine, teaching mathematics and physics Sir George Williams College, Montreal and staff of Physics Department McGill University until 1945, 1941 Canadian Marconi Co. Montreal, 1945 Federal Telegraph and Radio Corporation, Senior Engineer in Charge of Development of FM Broadcast Equipments, 1946 Federal Telecommunication Laboratories, 1950 International Standard Electric Corporation technical adviser on telephone installations in Israel; Federal Telecommunications Laboratories since June 1952; Senior Member IRE and Member American Technion Society; author of various papers on FM and PCM.

PAPAMARCOS, GEORGE (F) 1940 - Sales Engineer, Radio Engineering Lab's, Inc., 29-01 Borden Ave., Long Island

City 1, N. Y.; res. 14 Grayley Pl., Huntington Station, N. Y.; b. N. Y. August 6, 1914; ed. Brooklyn Technical High School, RCA Institute; married; interested in radio since 1933; ex W2FZM advanced class; professional experience: five years with U.S. Navy as Chief Radio Technician and Electronics Officer, with REL since 1940 except for five years with Navy; Member IRE, AFCEA, ARRL.

PARKER, SHEPARD (M) 1955, Senior Project Engineer, REL 8 yrs., Edo Corp. 1 yr.; res. 371 Cedar La., East Meadow, L. I., N. Y.; b. May 29, 1921, Brooklyn, N. Y.; ed. BEE City College, N. Y., 1950; Military Service, U.S. Merchant Marine Radio OP 1941/1942, USN Chief Radio Technician 1942/1945, USS Hickox DD673; Amateur Call Letters W2WOD since 1941; Project Engineer for Diana Moon Radar System.

PARKES, ALANSON WILLISTON JR. (F) 1947 - Vice Pres., Aircraft Radio Corporation, Boonton, N. J.; res. 200 Overlook Ave., Boonton, N. J.; b. Sandwich, Mass. December 24, 1899; ed. Clark University A.B. 1922, Lafayette College A.M. 1926, Harvard University A.M. 1929; married; interested in radio since 1912; amateur intermittently 1912/1930; Physics Instructor at Lafayette College & Harvard 1922/1930, Radio Engineer & Executive Specializing in Airborne Electronics 1930 to present; Dir or Ballantine Lab., Boonton, N. J. 1953 to date; Tr e, Clark University Worcester, Mass., 1959/1963; U.S Navy World War One Chief Electrician Radio, Aviation, currently Vice President in charge of Field Engineering and Sales Division of Aircraft Radio Corp. since 1948.

PERRETTO, ARMAND (M) 1952, Senior Technical Aid, Bell Telephone Labs., since 1954; res. 94 Brook Dr., Dover, N. J.; b. January 31, 1927, Brooklyn, N. Y.; ed. High School, graduated 1944, R.C.A. Advanced Tech. T-3 Course, graduated 1954; employed by Major E. H. Armstrong from 1945 till his death 1954.

PETRY, CHARLES B. (M) 1942 - Chief Engineer, Radiaphone Co. Inc., 600 Evergreen St., Monrovia, Cal.; res. 19014 E. Dwell St., Glendora, Cal.; b. Paterson, N. J. May 13, 1904; ed. Paterson High School, Bell Laboratories Technical School, Columbia University Extension courses; married; interested in radio since 1918; amateur W6NIV; professional experience: in all branches of engineering since 1923; several patents; Senior Member IRE; Hobbies - Gunsmithing and Gem and Lapidary Work, amateur radio.

PFEIFER, CLARENCE H. (M) 1957, Pres. & Treas. Frederick Pfeifer Corp., Mfrs. Rep. & Distributors, 44 yrs.; 53 Warren St., New York 7, N. Y.; b. November 15, 1894, Brooklyn, N. Y.; ed. High School; Military Service 1918/1919 U.S. Sign. Corp, Radio Intelligence; Amateur Call Letters 1908/1911 (RD); 1912/1918 (2FA); 1942-present (W2FG); Hobbies, Amateur Radio, Q.C.W.A., V.W.O.A.; Always enjoy meeting old and new friends in the club, personally and over the air.

PILLER, S. EDWIN (M) 1958 - Radio Engineer, Allocations Engineering Transmitting Station Design & Construction, National Broadcasting Company, 11 yrs.; 157-32 20th Ave., N.Y.C.; b. August 6, 1921, N.Y.C.; ed. B.E.E. City College, N. Y., 1943; Military Service U. S. Army Signal Corps 1946/1947; Amateur Call Letters, W2KPQ, licensed in 1937; Patents, Books, etc. Editor of the Sidebander, Official Publication of SSB Amateur Radio Assn., Contributor to CQ and First Army Mars Newspaper QUA; Hobbies, etc., President SSB Amateur Radio Assn., Member I.R.E. and N. Y. Radio Club; Dir. of the First Army Mars SSB, Technical Net - "For the Dissemination of Technical Knowledge by Radio Communication," Wednesday Evenings at 9 P.M. on 4030KC upper sideband.

PLAMJACK, HAROLD J. (M) res. 34 Stauber Dr., Plainview, N. Y.

POPKIN, CLURMAN, J. R. (M) 1950 - President (Radio Engineer), Telechrome Mfg. Corp., Amityville, L. I., N. Y.; res. 46 Lee St., Roosevelt, L. I., N. Y.; b. Brockton, Mass. August 29, 1916; ed. M.I.T. S.B. 1938, Harvard Business Sch. M.B.A. 1940, also Brooklyn Polytechnic Institute and Columbia; married; interested in radio since 1922; amateur WIEPH, W2LNP; professional experience Hazeltine Electronics Corp., Panoramic Radio Corporation, Servo Corp. of America, Signal Corps, Automatic Radio; 4 Patents pending; over 40 technical articles published; Senior Member IRE, Nassau Radio Club; Sr. Mem. Fernseh Technische Gesel. (Germany), Sr. Mem. British Soc. of Television Engineers, Sr. Mem. Institution of Elect. Eng. (Brit), Sr. Mem. Institution of Elect. Eng. (India), Sr. Mem. Institute of Television Eng. (Japan) Sr. Mem. SMPTE (Soc. of Mot. Pict. & Tel. Eng.) U.S. Delegate: CCIR (Com. Consultative International Radio Telecommunications), NTSC (Nat. Tel. Systems Com.), Member: NAB (Nat. Assoc. of Broadcasters), EIA (Electronic Industries Assoc.), AFA (Air Force Assoc.).

POPPELE, J. R. (F) 1940 - Voice of America, Washington, D.C.; Advisory-Committee; res. 9 Crest Circle, South Orange, N. J.; b. Newark, N. J. February 4, 1898; married; professional experience: radio operator on commercial vessels 1915/1920, Chief Engineer WOR Broadcasting Station 1922/1952, Vice President 1946/1952, Secretary 1936/1948, Director 1936/1952, Mutual Broadcasting System Board of Directors 1947/1952, Radio Consultant to New Jersey State Police; President of Television Broadcasters Association for seven years, Founder of original FM Broadcasters Association, President Radio Pioneers Club, Fellow IRE, Member Board of Directors Veteran Wireless Telegraph Operators Association, Trustee South Orange Presbyterian Trinity Church, member Advisory Council Upsala College, member American Physics Society, Society of Motion Picture Engineers, member Committee on Civil Defense Planning under office of Secretary of Defense; Hobbies - Golf, Photography. President, Green Mountain Enterprises, Vt.

PORTER, H. F. (M) - 7722 Old York Rd., Elkins Park 17, Pa.

PRATT, HARADEN (F) 1930 - Engineer, Retired, Wake Robin La., Stamford, Conn.; b. San Francisco, Calif. July 18, 1891; ed. University of California B.S. in Electrical Engineering 1914; married; interested in radio since 1905; amateur 1905/1915; President and Secretary Bay Counties Wireless Telegraph Association 1910/1914; professional experience: United Wireless Telegraph Company and Marconi Wireless Telegraph Co., San Francisco ship and shore station operator and installer 1910/1914; Marconi high power 300 kw trans-Pacific stations at Bolinas and Marshall, Cal. 1914/1915; U. S. Navy Department Bureau of Steam Engineering Expert Radio Aide at Mare Island Navy Yard and then at Washington in charge of construction and maintenance of all high power naval radio stations during World War One; Federal Telegraph Co. engineer in charge of factory and design and construction of its Pacific Coast public service telegraph system 1920/1923; private business in Cal. 1923/1928; Western Air Express constructed and supervised high frequency radio telegraph system between Los Angeles and Salt Lake City 1925/1927; Bureau of

Standards Washington development radio aids for air navigation 1927/1928; Mackay Radio and Telegraph Company Chief Engineer in 1928 and then Vice President until 1951; Telecommunications Adviser to the President of the United States 1951/1953, Vice Pres., Dualex Corp. 1953/1958; Fellow, Director, Secretary and past President of IRE, Fellow AIEE, Associate Fellow Institute of Aeronautical Sciences, Honorary Life Member of the Institution of Radio Engineers Australia, Life Member VWOA.

PROUDFIT, ALEXANDER (M) res. 48 Thompson Park, Glen Cove, N. Y.

QUINBY, EDWIN JENNYSS (M) 1958, Product Mgr., Shepard Laboratories, Inc., (Electronic); res. 30 Blackburn Rd., Summit, N. J.; b. January 13, 1894, N.Y.C.; ed. St. John's Cathedral (Military School) City College, N. Y., (B.S.E.E.); North Jersey Rapid Transit (Interurban Electric R.R.) when I first got out of school, 2 yrs., Marconi, De Forest, Sarnoff, RCA (Communications at Sea, Ashore and in RCA Labs.) 20 yrs.; Monroe Calculating Machine Co. (Monrobot Corp.) 5 yrs., Philco Corp. G. & I. Div. (Transac Computers) 2 yrs.; Military Service, U.S. Naval Reserve since 1932, active duty, World War II (Commander) 5 yrs. (ashore and at sea) Officer in Charge, Naval Ordnance Unit, Key West, Fla. (Electronic Weapons); Amateur Call Letters 2 XK (N.Y.C.) 3 yrs.; Patents, Papers, etc., 12 U.S. Patents, 3 Foreign. Founded RCA's "Broadcast News" and edited, 4 yrs. - also various magazine articles; Sports, Hobbies, etc. Founder and Honorary President, Electric Railroaders' Assn., Co-Founder, President, Branford Electric Railway, Chairman of the Board, Greene Line Steamers, Inc. (S.S. Delta Queen); Member, I.R.E., De Forest Pioneers, Steamship Historical Society, National Railway Historical Society, American Guild of Organists, Association of Theatre Organists; have a rather unusual pipe organ in Summit residence that occupies entire main floor 30' x 72' with 10 h.p. electric power plant in basement. This "20 year project" now has over 1000 pipes controlled from a 4- manual console, and is still being expanded,- my wife plays organ, piano and harp.

QUIST, ANDREW HAROLD (F) 1940 - Electronic Engineer, Signal Corps, Ft. Monmouth, N. J.; res. 1106 Aileen Rd., Brielle, N. J.; b. Brooklyn, N. Y. December 31, 1911; ed. Brooklyn Technical High School, Cooper Union; married; interested in radio since 1931; professional experience: radio servicing 5 years, production foreman and FM Test Engineer Radio Engineering Laboratories, Inc. 5 years, Signal Corps Maintenance Planning Engineer 15 years; Papers "FM Mobile Equipment" FM Magazine 1942, "Radio Control for your Model Railroad" The Model Railroader 1941; Hobbies - High Fidelity Audio, model railroad electronic control, Member AIEE, National Model Railroad Association, Armed Forces Communications Association.

RANDALL, HERBERT D. JR. (M) 1948 - Waxcadowa Ave., Weekapaug, R. I.; b. Providence, R. I. November 17, 1916; ed. University of R. I. B.S.; married; interested in radio since 1943.

RANGER, RICHARD H. (F) 1929 - President Rangertone, Inc., 73 Winthrop St., Newark 4, N. J.; res. 574 Parker St., Newark 4, N. J.; b. Indianapolis, Ind. June 13, 1889; ed. B.S. Mass. Inst. Tech. 1911; married; interested in radio since 1907; amateur first station in Indianapolis 1909; professional experience: RCA 1920/1930, Rangertone 1930, Captain Signal Corps World War One, Colonel Signal Corps World War Two, Commanding Officer Signal Laboratories, Ft. Monmouth 1919, pioneer in radio facsimile and tape recording; 55 patents, books "Radio Pathfinder," "Artillery Lines of Information"; Hobby - music; Fellow IRE, AIEE, Audio Eng. Soc.; SMPTE Royal Society. Member Acoust. Soc., AGO, Received Oscar 1956 and Samuel L. Warner Award 1957 for Synchronous Magnetic Tape Development.

RASER, EDWARD G. (M) 1956 - Technical Advisor and Radio Supervisor, N. J. State Police Radio System, P.O. Box 1420, Trenton, N. J. from 1942/1959; previous employment, Marconi Wireless Telegraph Co. 1917, Pioneer Broadcast Engineer established WMAL, 1922, designed and constructed Trenton's first 500 watt station WOAX, 1923/1929, Senior Partner Raser & Kale, 1930/1940; Engineer, Squire Signal Laboratory, Ft. Monmouth, N. J., 1941/1942; res. 19 Blackwood Dr., Wilburtha Gardens, Trenton 8, N. J.; b. April 1, 1899, Bordentown, N. J.; ed. Grade Schools, School of Industrial Arts, Technical Schools in Electrical Engineering and Physics; Military Service, Radio Operator, U.S. Navy 1917/1921. On duty at Naval Air Station, Cape May, N. J. Installed and test hopped first 500 cycle spark sets aboard an aircraft. Duty at Naval Radio Stations NSD, NAH, NAI and various Naval vessels; Amateur Call Letters, licensed amateur radio operator since 1914 to date, continuous service. On the air since 1910, held calls as follows: 3NG (1914) 3CS (1919) 3ZI (1922) 2ZI (1946 to date); Historical collection of over 200 books, magazines, and early data and papers on subject of wireless history, dating back to 1895; Sports, Hobbies, Clubs, etc., Senior Member IRE, Charter Member DeForest Pioneers, Member ARRL since 1915, Co-Founder Delaware Valley Radio Assn., Veteran Wireless Operators Assn., Historian; Antique Wireless Gear, vacuum tubes, Morse and wireless keys, marine radio receivers in the country. Amateur historian and authority on wireless back to 1900. Wireless operator aboard ship from Marconi Co., United Fruit Co., Kilbourne & Clark, U.S. Shipping Board throughout the years, married, Licensed Radiotelegraph 1st. 1917 to date, amateur extra class license since 1952. DVRA Silver Cup Award for Faithful Service 25 Years, ARRL Public Service Award, cited 5 times.

REDINGTON, JOHN H. (F) 1935 - Radio Engineer, Measurements Corporation, Boonton, N. J.; res. 324 Cornelia St., Boonton, N. J.; b. Brooklyn, N. Y. October 5, 1904; ed. High School and supplementary engineering courses; married; interested in radio since 1923; amateur W3FNM 1936/1941; professional experience Bell Telephone Laboratories 10 years, past 20 years engaged in design development and manufacturing of radio test equipment and in the sales engineering field.

REINHARDT, NICHOLAS J. res., 150 Bard Ave., Staten Island 10, N. Y.

RENWICK, ERLE B., JR. (M) 1955, Sales Engineer, Gawler-Knopp Co., 6 yrs., res. 29 Birchwood Rd., Denville, N. J.; b. July 13, 1921, Portland, Me.; ed. B.S. Electrical Engineering, 1947 University of Me.; Military Service, U.S. Navy, 2 yrs. 1944/1946; Sports, Hobbies, Clubs, etc. HI-FI hobbyist, also automobile enthusiast; Great believer in vacuum tubes as opposed to transistors - witness new cold cathode tube.

REPLOGLE, DELBERT E. (F) 1928 - President, Electronic Mechanics, Inc., 101 Clifton Rd., Clifton, N. J.; res. 300 Godwin Ave., Ridgewood, N. J.; b. Douglas, Alaska July 31, 1896; ed. Pacific College A.B. and B.S. 1916, M.I.T. B.S. 1924, M.S. 1925; married; interested in radio since 1916; built and operated station NZO in Alaska, 60 miles north of Arctic Circle, W2XAE at Ridgewood; professional experience: Vice President and Chief Engineer DeForest

Radio 1930/1934, President Electronic Mechanics 1936 to present, President of General Electronics 1942 to present; patents on cable protection devices, radio and television circuits; Member DeForest Pioneers; Radio Club Director 1932.

RETTENMEYER, F. X. (F) 1928 - Engineer, Philco Corporation, Tioga and "C" Sts., Philadelphia, Pa.; res. 709 Stanwick Rd., Moorestown, N. J.; b. Kendrick, Okla. July 27, 1900; ed. M.A. Columbia University 1925; married; professional experience: Bell Telephone Laboratories 1922/1935, RCA Mfg. Co. 1935/1940, Federal and Philco to date; Radio Club of America Vice President 1935, Recording Secretary 1933, Director 1929, 1931/1932.

RICE, C. THOMAS (M) 1954 - Edgar L. Scillotoe Engineering Laboratories, 617 Brooklyn Ave., Brooklyn, N. Y.; res. 347 East 51 St., New York 22, N. Y.; b. Brooklyn, N. Y. October 27, 1893; professional experience: instructor in communications U. S. Maritime Service 1944, product specialist Geophysical Equipment 1945/1951, U.S. Air Force A.M.C. 1952.

RICHARDSON, AVERY G. (F) 1941 - Manager Technical Service, ITT Lab. (formerly Federal Telecommunication Lab.), 500 Washington Ave., Nutley, N. J.; res. 180 Vreeland Ave., Boonton, N. J.; b. Brooklyn, N. Y. March 22, 1901; ed. Boys High School, Brooklyn, Polytechnic Institute Brooklyn E.E. 1924; married; interested in radio since 1928; professional experience: radio receiver design for Brunswick, Bremer Tully and DeWald, Radio Compasses at Fairchild, FM Signal Generators at Boonton Laboratories, military Direction Finders at Federal; about 18 patents, IRE papers at Rochester and Dayton; member AIEE, Institute Aeronautical Sciences, Acoustical Society of America, Fellow IRE.

RICHARDT, JOHN W. JR. (M) 1951 - Electronic Engineer, Last 6 years Proprietor of John W. Richardt Co., Pine Brook, N. J. Engineering Sales Representative; res. Cove Lane Rd., Whippany, N. J.; b. May 29, 1922; ed. B.S. Physics, B.S. Mathematics Ind. State, working on MS in EE at Stevens; widower; interested in radio since 1933; amateur W2WIY since 1947; professional experience Bell Telephone Laboratories six years, Chief Project Engineer at Tel-Instrument Corp. on Navy Subcontract, One patent on electronic circuit assigned Bell Labs; member Essex County Sherrifs Department, President North Jersey Mobile Amateur Radio Club.

RIDER, JOHN F. (F) 1931 - Author and Publisher, President, John F. Rider Publisher, Inc., N.Y.C.; b. N.Y.C., April 30, 1900; ed. High School of Commerce and Cooper Union. Radio Engineer, J. W. Jones Radio Mfg. Co. 1921/1923; Chief Engineer, J. W. Jones Mfg. Co. 1924/1925; Radio Research and Consulting Work 1926/1954; radio feature writer 1921/1930 for New York Sun, New York Telegram, New York Herald Tribune, New York World. Associate Editor Radio Engineering; Managing Editor, Radio Listener Guide & Call Book; Technical Editor, Motion Picture News 1929/1931. Served for three and one-half years in U.S. Signal Corps, World War II. Retired in August 1945 with rank of Lt. Col. Awarded Legion of Merit. Publisher of Rider Radio Manuals; Rider Television Manuals; also technical school tests relating to electricity, electronics, radio, television and allied sciences; physics, since 1927. Author of Cathode-Ray Tube at Work; How To Use Meters, Interpreting Test Scope Traces, and numerous other texts; co-author of Encyclopedia of Cathode Ray Oscilloscopes and Their Uses.

ROBERTS, WILLIAM (M) 1952 - res. 1505 Bunker Hill Dr., Charlottesville, Va., Manager Commercial Products, Sperry Piedmont Co., Charlottesville, Va.

ROBERTSON, JOHN F. (M) 1942 - 129 Soundview Ave., Huntington, N. Y.; ed. B.S. University of Wis.

ROCKETT, FRANCIS H. (F) - Engineering Staff Editor, McGraw-Hill Book Co., Encyclopedia of Science and Technology, 10 Elliewood Ave., Charlottesville, Va.; b. Philadelphia, Pa., September 9, 1919; ed. B.S. in E.E. Lehigh University 1942; married; interested in radio since 1932; professional experience: Junior Radio Engineer The Johns Hopkins University, Laboratory Assistant Lehigh University, Laboratory Instructor Columbia University, Associate Editor "Electronics"; Technical Report Consultant, Airborne Instruments Laboratory, Director of Advertising, Airpax Products Co.; member IRE, AIEE, STWE.

RONALD, THOMAS T. (M) 1946 - res. 470 Piaget Ave., Clifton, N. J.; b. Vrdnik, Yugoslavia January 19, 1906; ed. Technical College Mittweida, Germany, Newark College of Engineering E.E. 1933.

ROUND, HENRY JOSEPH (HM) 1952 - Physicist, self-employed; res. c/o Barclays Bank, 1 Station Parade, Maswall Hill, London N 10, England. (address for letters) Lab. A 105 John St. London E C I (telephone) Terminas 9117; b. Worchestershire, England June 2, 1881; ed. Cheltenham Grammar School, Royal College of Science, London, City and Guild Technical College, London; widower, seven children, thirteen grandchildren; interested in radio since 1902; professional experience Marconi Wireless Telegraph Co. of England, Marconi Wireless Telephone Co. of America (now Radio Corporation of America) and since 1932 own laboratory, pioneered in development of radio frequency amplifiers and their application to direction finders that spotted the departure of the German fleet leading to the famous Jutland engagement of World War One; very many patents on radio, gramaphones, microphones, loudspeakers, talking pictures, underwater signalling, magneto-stricture transducers; large number of technical papers and one book on Tetrodes (1927); Institute of Electrical Engineers (Britain) Duddell Premium (Twice); Radio Club of America Armstrong Medal 1952.

RUITER, JACOB H. (M) 1956, Sales Manager, Electronic Equipment Dept. Curtiss-Wright Electronics Div., 1957-present, also, President J. H. Ruiter Advertising; prev. emp. Wm. C. Copp Associates 1956/1957, Allen B. DuMont Laboratories 1943/1956, Signal Corps. Civilian Training School 1942/1943; res. 387 Highland Ave., Upper Montclair, N. J.; b. Aug. 21, 1917, Montreal, Canada; Books, "Modern Oscilloscopes and Their Uses" published by Rhinehart & Co. 1949, revision 1955; Sports, Hobbies, etc. Montclair Society of Engineers, Senior Member IRE, Past Pres. N. J. Chapter of National Industrial Advertisers Assn. 1953/1954, Chairman of Exhibitors Com., IRE, 1954/1956, Chairman, Publications Com., Radio Club 1958/1959; Guest lecturer, Newark College of Engineering on Industrial Advertising, 1952 - present.

RUNYON, CARMAN R. JR. (F LM) 1912 - Chairman of Bd., Radio Engineering Laboratories, Inc., 29-01 Borden Ave., Long Island City 1, N. Y.; res. 130 East End Ave., New York 28, N. Y.; b. East Orange, N. J. August 9, 1893; ed. Cornell; married; interested in radio since 1908; professional experience: U.S. Naval Reserve Ensign World War One, U.S. Navy Commander World War Two; pioneered in the development and demonstration of frequency modulation broadcasting with Major E. H. Armstrong beginning in 1934; amateur station 2AG since 1908; Radio Club of America Vice President 1927, Treasurer 1926. Armstrong medal 1945.

RUNYON, C. R. III (F) 1948 - Purchasing Agent, Radio Engineering Laboratories, Inc., 36-40 37th St., Long Island City 1, N. Y.; res. 27 Robin La., Levittown, Long Island, N. Y.; professional experience: Sales Manager, Sales Engineering and Purchasing.

RUNYON, JOHN B. (M) res., New Providence, N. J.

RUSSELL, WILLIAM GORDON (F) 1926 - Staff Technician, General Precision Lab., Inc., Pleasantville, N. Y.; res. 62 Farragut Ave., Hastings-on-Hudson, N. Y.; b. Yonkers, N. Y. October 14, 1906; ed. Columbia University, United States Navy, Mechanics Institute, RCA Institutes; married; interested in radio since 1923; professional experience: E. H. Armstrong Laboratory, Columbia University, Norden Lab. Corp., White Plains, N. Y.; Radio Club of America Recording Secretary 1954.

RUSSELL, WILLIAM T. (F) 1915 - Retired Superintendent Electrical Tests, New York Central Railroad Co.; res. 62 Farragut Ave., Hastings-on-Hudson, N. Y.; b. London, England 1879; ed. Grade School and Trinity School, N.Y.C.; widower; interested in radio since 1898; early amateur stations and railroad storm detection tests; co-laborator with E. H. Armstrong on feed back tests. Radio Club of America Recording Secretary 1928, Director 1927, 1929.

SADENWATER, HARRY (F) 1913, Assistant to Vice President, Radio Engineering Laboratories, Inc. 29-01 Borden Ave., Long Island City 1, N. Y.; res. 1165 Fifth Ave., New York 29, N. Y.; b. N.Y.C. September 3, 1894; ed. Extension Courses Mechanics Institute, Columbia University, Union College and University of Pa.; interested in radio since 1908; Amateur "SW" 1908 in Bronx, WSEPZ, 2PZ, and currently W2YI; Professional Experience, Marconi Ship Operator 1912/1913, Radio Instructor, East Side YMCA 1913/1914, U.S. Assistant Radio Inspector N. Y. 1914/1917, Radio Officer Lieut. (Jg) U.S. Naval Reserve Force 1917/1919, Radio Engineer General Electric Co. 1920/1929, RCA Camden Engineering and Sales 1930/1941, RCA Laboratories Princeton 1941/1944, RCA Victor Sales Manager Engineering Products, N.Y.C. 1944/1947; Technical Sales Representative N.Y.C., 1948/1955, Radio Engineering Labs., Inc. 1956 to date; Navy Cross First Transatlantic NC-1 Flight 1919; Veteran Wireless Telegraph Operators Assn.; Radio Club of America President 1931, Corresponding Sec. 1946/1947, Director at intervals between 1916 and 1959.

SADENWATER, PAUL OSGOOD (M) 1952 - Electrical Engineer, Manager Field Engineering, Electronic Defense Laboratory, Sylvania Electric Company - Mountain View, California; residence 657 Mills Ave., Los Altos, Cal.; b. Schenectady, N. Y., February 1, 1927; ed. B.A. Columbia University 1949 - B.S.E.E. Columbia University 1950; married; interested in radio since 1935; amateur W2SLD 1946/1956; professional experience U.S. Navy Technician 1945/1946; E. H. Armstrong Laboratory Columbia University 1950/1951; Electrical Engineer Bell Telephone Laboratories 1952 to 1955, communications course; Sylvania Electric 1955 to present; member I.R.E.; Hobbies - High Fidelity and Music.

SAMPSON, HARVEY E. (M) 1941 - Executive Harvey Radio Co. Inc., 103 West 43rd St., N.Y.C.; res. 269 West Shore Dr., Massapequa, N. Y.; b. Jamaica, British West Indies November 17, 1907; interested in radio since 1923; married; amateur W2LJL; professional experience: distribution and sale of electronic equipment to laboratories, schools, amateurs and home users and hobbiests.

SARA, JOSEPH (M) 1930 - Owner, Sara Electronics and Mfg. Co., 15 Ward St., Bloomfield, N. J.; res. 836 Bloomfield Ave., Montclair, N. J.; b. Avola, Italy December 10, 1885; ed. Technical Schools, Italy.

SARNOFF, DAVID (HM) 1926 - Chairman of the Board, Radio Corporation of America, 30 Rockefeller Plaza, New York 20, N. Y.; res. 44 East 71 St., New York 21, N. Y.; b. Uzlian, Russia February 27, 1891; ed. Special Course E.E. Pratt Institute, Brooklyn, N. Y.; married; interested in radio since 1906; professional experience: Wireless Operator 1908/1912, Chief Radio Inspector and Assistant Chief Engineer Marconi Co. 1913, Contract Manager, Marconi Co. 1914; Assistant Traffic Manager, Marconi Co. 1915; Commercial Manager Marconi Co. 1917, Commercial Manager Radio Corporation of America 1919, General Manager Radio Corporation of America 1921, Vice President and General Manager Radio Corporation of America 1922, Executive Vice President Radio Corporation of America 1929, President Radio Corporation of America 1930, and Chairman of the Board Radio Corporation of America 1947 to date; 2 patents, U.S. Army Signal Corps Reserve Lieutenant Colonel 1924, Colonel 1931, Brig. General 1944; appointed Member of Committee on Department of Defense Organization 1953; appointed by President Eisenhower (1953) to serve indefinite term as Brigadier General (Res.), Army of the U.S.; Member of New York State Chamber of Commerce, A.I.E.E., Armed Forces of Communications Association, Economic Club of New York, IRE, Newcomen Society of England, Poor Richard Club, Royal Society of Arts, U.S. Naval Institute, VWOA; Member of Army and Navy Club of Washington, D.C., Metropolitan Club, Washington, D.C., India House, Century Country Club and Engineers' Club of Philadelphia; He has received twenty-one honorary degrees from American colleges and universities. Included among his many awards from scientific, industrial, military, civic and cultural groups are: Medal of Honor of the Radio-Television Manufacturers Association (1952); First Founders Award of the IRE (1953); First Keynoter Award from National Association of Radio and Television Broadcasters (1953); and the Gold Pin Award of the Radio Pioneers of America (1956). Included among his U.S. Government Decorations are the Legion of Merit (1944); Medal for Merit (1946); and the U.S. Army's Decoration for Exceptional Civilian Service (1956)

SCHMIDT, FRED W., JR. (M) 1950, Engineer, Specialist, doing guidance and pulse automation on a missile test set for the Army; previous emp. project eng. Allen B. DuMont Lab., Inc. Los Angeles, Cal., Hoffman Laboratories Sr. Project Eng. receiver designs, Colonial Radio Corp., Buffalo, N. Y. eight years test equipment design, Standard Coil Products, Project Eng. Front End design for TV receivers, res. 11468 Allerton St., Whittier, Cal.; b. November 25, 1908, Buffalo, N. Y., ed. B.S. Canusius College, Buffalo, N. Y.; Certificate Courses in UHF, Newark College of Engineering; married; interested in Radio since 1928; 10 patents.

SCHNABL, FRANK J. (M) res., 115 Harrison St., Haworth, N. J.

SCHNEIDER, ROBERT E. (F) 1946 - Technical Writer, res. 10 Wagg Ave., Malverne, N. Y.; ed. Pekin, Ill. Community High School, University of Illinois 1922, B.S. 1924; b. Iowa, U.S.A. June 11, 1902; Hazeltine Electronics Div.

SCHNOLL, NATHAN (F) 1928 - President & Chief Eng. Industrial Devices Inc., Edgewater, N. J.; Founder, Industrial Instruments Inc., Cedar Grove, N. J.; res. 1485 Jefferson St., West Englewood, N. J.; b. N.Y.C. March 20, 1904; ed. Stuyvesant High School, B.S. Columbia University 1947; married; interested in radio since 1917;

amateur 2AGG 1919/1927; professional experience: Assistant Chief Engineer Polymet Mfg. Co. 1929/1932, Chief Engineer Solar Mfg. Co. 1932/1939, President and Chief Engineer Industrial Instruments Inc. 1939/1949, Chairman to date; Senior Member IRE; about 15 U.S. Patents in electronic and capacitor fields.

SCHOMBURG, RICHARD A. (M) res., North 921 Burns Rd., Spokane, Wash.

SCHUMACKER, ALLAN L. (M) 1937 - Senior Eng., Research & Development, Arma Division, American Bosch Arma Corp., Roosevelt Field, Garden City, L. I., N. Y.; res. 40 Maple Ave., Westbury, L. I., N. Y.; b. Brooklyn, N. Y. September 14, 1904; interested in radio since 1915; amateur 2AJ 1923/1925; held First Grade Radiotelephone operators license 1933; professional experience: Freshman Radio Co. Laboratory Assistant 1923/1929, Colonial Radio Corp. Engineer 1921/1931, Wired Radio Inc. engineer 1931/1940, Research and Development Department Arma Division, 1942 to present, on design & development of precision components for Analog & Digital Computers; Specializing in the design of Electromagnetic Components, Net-Works, Precision Electrical Measurements, Circuitry; Associate Member IRE 1942 to date; one paper "The Electromagnetic Resolver" AIEE 1951; Hobbies - Photography, music, Hi-Fi.

SCHWARTZ, ADOLPH (M) 1950, Radio Manufacturers Sales Representative, Eitel-McCullough, Inc. (Eimac), 23 years; res. 612 Sagamore Ave., Teaneck, N. J.; b. December 25, 1898; ed. High School, Marconi Institute on Elm St., N.Y.C.; Military Service, U.S. Army, WW 1, Hon. Discharge; Amateur Call Letters, W2CN, Licensed since 1916, old calls 2 AFT, 2 ASK; Golf, Aldecress C/C.

SEELEY, S. WARD (F) 1948 - Retired 1956; RFD 1, Carmel, N. Y.; b. Philadelphia, Pa. October 9, 1890; married 1920, Rosemary Clarke; ed. Central High School, Philadelphia, Pa.

SEKLEMIAN, ROBERT S. (M) 1942 - Manager, Real Estate Department, RCA Communications, Inc., 66 Broad St., New York 4, N. Y.; res. RFD 1, Babylon, L. I., N. Y.; b. Fresno, Cal. April 20, 1902; ed. LL.B., J.D., LL.D.; married; interested in radio since 1922; professional experience: Announcer, radio operator, in charge of terminal office installations of RCAC domestic radiotelegraph network; Former Ensign U.S.N.R.; member IRE Morse Telegraph Club, Real Estate Board of N. Y. (Rental Conditions Committee).

SHACKELFORD, BENJAMIN E. (F) 1943 - Vice President, Ad. Auriema, Inc., 85 Broad St., New York 4, N. Y.; res. 743 Mosswood Ave., Orange, N. J.; b. Richmond, Mo. August 12, 1891; ed. University of Mo. A.B. 1912, A.M. 1913, University of Chicago Ph.D. 1916; married; "working" interest in radio since 1918; amateur experience, none, father of one; professional experience Westinghouse Physical Laboratory Tube Engineering 1916/1929, RCA Research, Patent and License activities 1930 to 1956.

SHEA, RICHARD F. (F) 1934 Electronics Engineer, General Electric Co., Electronics Pk., Syracuse, N. Y.; res. 225 Twin Hills Dr., Syracuse 4, N. Y.; b. Boston, Mass. September 13, 1903; ed. B.S. in E.E. M.I.T. 1924; married; interested in radio since 1917; amateur 1AZG, 1ADZ, W1BEC, W3BAI 1919/1931; professional experience 1925 to present American Bosch, Amrad, Kolster, Atwater Kent, Pilot (Chief Engineer), Freed-Eiseman (Chief Engineer), Fada (Chief Engineer), General Electric; 10 patents on electronic circuits; numerous technical magazine articles over past 35 years; Editor of "Principles of Transistor Circuits" Wiley 1953; Chairman, Syracuse Section IRE, Senior Member IRE, member IRE Receivers, Standards and Papers Committees; currently Supervisor Semiconductors Applications G. E. Electronics Laboratory.

SHENIER, HENRY L. (M) 1951 - Patent Lawyer, Own Office, 230 Park Ave., N.Y.C.; res. Forest Hills, N. Y.; b. N. J. 1902; ed. U.S. Naval Academy B.S. 1922; Georgetown School of Law LLB 1931; married; professional experience: Communication Officer U.S. Navy 1925/1927.

SHEPARD, FRANCIS H. JR. (F) 1936 - Consulting Engineer, and President of Shepard Laboratories, Inc., Summit, N. J.; res. Lee La., Countryside, Summit, N. J.; b. N.Y.C. May 6, 1906; ed. B.S. in M.E. Yale, Sheffield Scientific School 1929; married; interested in radio since 1930; professional experience: Laboratory Assistant to the late E. H. Sperry, Radio Corporation of America 1933/1940, Chief Eng. Revalation Patents Co. 1942/1945, Pres. of Shepard Labs. formed 1956, work in electro-mechanical fields, Computer input-output equipment, etc., about fifty patents mostly in electronics field on hearing aids, synthetic base response; Member IRE, member ASME, Director Kiwanis, member Chamber of Commerce, Summit, N. J.; Radio Club of America, President 1954 and 1955.

SHORTT, HUBERT L. (M) 1945 - President, Technograph Printed Electronics, Inc., 920 Northwest Blvd., Winston-Salem, N. C.; res. 3018 Cambridge, Winston-Salem, N. C.; Member IRE, & AIEE; Committee-PGPT-(IRE), 40C (EIA) Committee A(EIA).

SIEMENS, RUDOLPH H. (M) 1937 - Government Sales, RCA Electron Tube Division, 744 Broad St., Newark, N. J.; res. 31 Deer Trail Rd., No. Caldwell, N. J.; b. N.Y.C. 1905.

SIEMINSKI, EDWARD (F) 1935 - Grumman Aircraft Engineering Corp., Avionics Engineering Dept., Bethpage, Long Island, N. Y.; res. 134-14 Franklin Ave., Flushing 55, N. Y.; b. New Bedford, Mass. January 30, 1912; ed. M.I.T. B.S. in E.E. 1934, Polytechnic Institute of Brooklyn Master in E.E. 1953; married; interested in radio since 1927; amateur WIDFD in New Bedford 1929/1934; professional experience: Press Association, Inc. (Research) 1940/1941, Amy, Aceves and King (Research) 1935/1940 and 1941/1942, Fairchild Camera and Instrument Corp. Project Engineer 1942/1945, Aeronics, Inc. Chief Engineer 1945/1947, Sylvania 1947/1955 Section Head in Electronics and missile systems laboratories, American Machine & Foundry Company 1955/1958 Group Supervisor in military electronics development, Grumman since January 1959; member IRE, AIEE, ARRL, Society of Professional Engineers, Sigma Xi, RESA, articles and papers on television, etc.; Hobbies: ice skating, swimming, automobile mechanics.

SIMON, WILLIAM C. (F) 1946 - Electronic Engineer United Fruit Co., General Manager Tropical Radio Service Corp., Pier 7, North River, New York 6, N. Y.; res. R.F.D. Box #36, Boston Ave., Bay Shore, L.I., N. Y.; b. Midway, Ky., June 16, 1899; ed. Grammar and some High School, U. S. Naval (Marine Corps) Radio School Parris Island 1917/1918; CREI; interested in radio since 1915; married; amateur 1913/1917; professional experience: U. S. Marine Corps 1917/1920, licensed commercial radio operator 1920/1924, United Fruit Co. 1924 to present; Senior Member IRE, LM, Director and Secretary of VWOA, Member Marine Corps League, American Legion, Masonic Lodge; Baptist Church; Served on numerous committees with RTCA, RTCM, SLS, ITU, American

Merchant Marine Institute dealing with Marine Electronic and Radio Matters; Marconi Memorial Medal of Merit, VWOA 1947.

SINGER, CHARLES H. (F) 1947 - Vice President Page Communication Eng. Inc., 710 14 St. N.W., Washington 8, D. C.

SINGLETON, HAROLD C. (F) 1935 - Consulting Radio Engineer, 931 S.W. King Ave., Portland 5, Ore.; res. 4488 SW Council Crest Dr., Portland 1, Ore.; b. Golden, Colo., February 7, 1904; ed. B.S. (EE) and E.E. University of Colorado; married; interested in radio since 1918; professional experience General Electric Co., RCA Victor Division, United Air Lines, Chief Engineer KGW Broadcasting Station; Resident Associate Harvard University (during World War Two); several patents on photo-electric controls. Tech. Dir. KWJJ, Portland, Ore.; V.Pres. KITN, Olympia, Wash.; Owner KUTY, Palmdale, Calif.

SKIPPER, LIONEL CARLYLE (M) 1946 - Sperry Gyroscope Co., Lake Success, Great Neck, N. Y.; res. 5 Warner Ave., Roslyn Heights, L.I., N. Y.; b. Clacton-on-Sea, Essex, England November 30, 1915; ed. Ascham College, Clacton, England, Brighton Technical College, Brighton England, British Institute of Engineering-Technology, London, England; married; interested in radio since 1932; professional experience: 1932/1935 Assistant Engineer Brighton Radio Circuit, Ltd., 1935/1940 Engineer Manager Radio Distribution Trinidad, Ltd., Port of Spain, Trinidad, BWI, 1940/1941 Director of Field Service, Radio Coverage Reports, New York City, 1941 to present Technician, Sperry Gyroscope Co. (Radar Engineering); U. S. Citizen June 10, 1947; Senior Member IRE, Massapequa Lodge No. 822 F & A.M., Rosicrusian Order AMURC, Civil Defense Rescue Service, Green Mountain Club, Dale Carnegie Club International; fond of all outdoor activities including flying (Student Pilot Rating), 1941 to present Technician - Engineering Section for Systems, Surfire Armament Division, Sperry Gyroscope Co. (Radar Engineering).

SLATER, IRA M. (F) 1946 - Manager Sales Engineering, Semi-Conductor and Electro-Mechanical Divisions, P. R. Mallory & Co., Inc., 424 South Madison St., Du Quoin, Ill.; res. 810 North Bolton Ave., Indianapolis 19, Ind.; b. Lebanon, Ind. July 14, 1906; ed. High School, College 2 years; married; radio since 1919; amateur 9DHE 1922/1926; professional experience Engineer WFBM, Engineer W. E. Co. Sound Systems; Engineer, Industrial Engineer, Divisional Chief Engineer, Sales Engineer, Divisional Sales Manager, Divisional Manager Sales Engineering, P. R. Mallory & Co., Inc. 28 years; several patents and patent applications; several papers on vibrators to technical groups; senior member IRE; Hobbies - Photography and Aviation (Private Pilot).

SLEEPER, MILTON BLAKE (F) 1925 - Publisher, Music at Home, 105 East 35th St., New York 16, N. Y.; res. Monterey, Mass.; b. Chicago, Ill. November 13, 1897; amateur 1" Spark Coil transmitter in Newtonville, Mass. from 1910 to 1914; professional experience: Radio Operator U. S. Navy 1914/1915, Associate Editor Electrical Experimenter, Laboratory Assistant DeForest Radio 1915/1916, Aircraft Radio Research Sperry Gyroscope 1916/1917, Pilot British Royal Flying Corps. 1917/1918, Laboratory Assistant Western Electric Co. 1918/1919, Radio Editor Everyday Engineering Magazine 1919/1920, President Sleeper Radio Corporation 1929/1934, Mobile radio sales and service manager Gamewell Co. 1934/1935, Domestic Sales Manager Pilot Radio 1935/1937, Domestic Sales Manager Andrea Radio 1937/1938, Domestic Sales Manager Pilot Radio 1938/1940, Publisher FM Magazine, Communication Engineering 1940/1954, High Fidelity 1951/1953, Senior Member IRE, member Eastern States Police Radio League; Publisher, Registries of Communication Systems 1945.

SMITH, MYRON T. (F) 1934 - Sales Manager, General Radio Co., West Concord, Mass.; res. Lowell Rd., Concord, Mass.; b. Meriden, Conn. July 11, 1908; ed. S.B. and S.M. M.I.T. Cambridge, Mass.; married.

SNITZER, MILTON S. (M) 1956 - Technical Editor, Radio and TV News, Ziff-Davis Publishing Co. since 1956; b. May 9, 1923, Pittsburgh, Pa.; res. 83-28 257th St., Floral Park, N. Y.; Military Service, Electronics Instructor, U.S.M.S., 8 years; Amateur Call Letters, W2QYI since 1937; Books, Papers, etc., edited about 50 technical books, wrote about 6 technical and semi-technical books including military manuals as well as many magazine articles.

SNYDER, CHRISTOPHER L. (M) - General Ceramics Corp., Keasbey, N. J.

SNYDER, RICHARD LEE (M) - res. 270 Linden St., Moorestown, N. J.

SOHVAL, LAWRENCE R. (M) - res. c/o Devlin, 111 West 95th St., New York 25, N. Y.

SPIES, DAVID (M) 1942 - Sales Manager-Owner, International Distributing Co., 185 Central Ave., Newark, N. J.; res. 239 Sanford St. East Orange, N. J.; ed. Newark College of Engineering E.E.; married; long interest in radio; Affiliate - International Sound Engineering Co.

STANTLEY, JOSEPH J. (F) 1912 - President Continental Sales Co., Inc., 521 Bloomfield Ave., Newark 7, N. J.; res. 213 Harvard Ave., Point Pleasant Beach, N. J.; b. Brooklyn, N. Y. September 16, 1891; married; ed. High School 2 years, Mechanics Institute 3 years, Pratt Institute 3 years; interested in radio since 1906; amateur 1906/1913-W2SC; professional experience: Secretary and Treasurer, Continental Radio Corp., 1920/1930, Secretary and Treasurer and General Manager Continental Radio Corp., 1922/1930, President, Continental Sales Co. Inc., 1930 to present; President Rochelle Park Bank, 1928/1952; Chairman of the Board, Rochelle Park Bank, 1952 to present. Bank now is known as Community Bank of Bergen County, N. J.; Treasurer, Armstrong Memorial Research Foundation, Inc., 1957 to present; Director, Radio Club of America, Inc., 1926; Treasurer, 1927 to present.

STANTLEY, JOSEPH J. JR. (F) 1944 - Secretary and Treasurer, Continental Sales Co., Inc. 521 Bloomfield Ave., Newark 7, N. J.; res. 231 Harvard Ave., Point Pleasant Beach, N. J.; b. Teaneck, N. J. May 10, 1926; ed. Rutgers University (Business Administration); single.

STANTON, SAMUEL WARD (F) 1940 - Patent Engineer, A. B. DuMont Laboratories, Inc., 2 Main Ave., Passaic, N. J.; res. 289 Halsey Rd., East Parsippany, N. J.; b. Tottenville, Staten Island, N. Y. June 25, 1908; ed. B.S. in E.E. Rutgers University; married; interested in radio since 1918; amateur 2AHY-1923, W2QZ-1929, W2EEW and W2EHR 1932; professional experience: United Electric Light and Power Co. 1931/1935, RCA 1936, Western Electric 1937/1939, DuMont 1939 to date; Two U. S. Patents.

STEEN, JEROME REED (F) 1947 - Engineering Reliability Specialist, Sylvania Electric Products Inc., 189 B St., Needham 94, Mass.; res. 50 Tamarack Rd., Reading, Mass.; b. West Bloomfield, N. Y. June 29, 1901; ed. Uni-

versity of Wisconsin; married; interested in radio since 1923.

STEVENS, ARCHIE McDONALD (F) 1928 - Radio Engineer, International Standard Electric Corporation, 67 Broad St., N.Y.C.; res. 539 Prospect Ave., Mamaroneck, N. Y.; b. Glidden, Iowa September 22, 1887; ed. Glidden High School 1904, LeLand Stanford Jr. University 1909 A.B. in Engineering, post graduate courses in Columbia University; married; interested in radio since 1910; professional experience 1910/1913 Poulsen Wireless Tel. and Tel. Co. San Francisco, 1913/1914 Universal Radio Syndicate, London, Poulsen System, 1915/1921 Lt. Commander U.S.N.R.F., U. S. Navy Lafayette Station, Bordeaux, France, 1922/1928 International Radio News Co., N. Y., 1928/1950 International Tel. and Tel. Corp. 1950/1952 Federal Tel. and Radio Corporation, 1952 to present International Standard Electric Corporation; Fellow (life member) IRE, Senior Member AIEE (life member), member Telephone Pioneers of America, member Armed Forces Communication Association.

STEVENS, HERBERT V. (M) 1959 - Radio Engineer; res. 63 Edson St., Buffalo 10, N. Y.; b. Buffalo, N. Y. 1904; ed. South Park High School, Buffalo Normal (2 yrs.), night school, Univ. of Michigan (2 summers & 2 falls), Adult Education 2 yrs., Cornell Univ. Ext., Buffalo Museum, La Salle Ext. University, Cleveland Institute of Radio Electronics, Buffalo Radio Institute, Eng. Soc. of Buffalo P.E. Refresher Course; approximately 50,000 hours of formal and non-formal study; Range, Physics, Chemistry, atomic physics, mathematics, economics, dietics, music, art, literature, poetry, philosophy, psychology, astronomy, astrology, criminology, law, jurisprudence, political science, accounting, auditing, business, industrial arts; Hobby, answering correspondence courses and Regents High School Question and Answer Texts. Have 50 scrap-books; Amateur Call letters, W-2 GAF (ex. 8 AYT & W8 GAF); Correspondence Courses, CIRE, CREI, NRI, DeForest, Sprayberry, LaSalle Ext. Un., Alexander Hamilton Institute, etc. Have over 5,000 questions with their answers; Sports, swimming, golf, tennis, walking, cards, checkers, chess, discussion groups, weight lifting, etc.

STOCKMAN, WILLIAM E (M) 1947 - Research Engineer, American Machine & Foundry Co., Central Research Lab., P.O. Box 889. Stamford, Conn.; res. 47 Cowing Pl., Glenbrook, Conn.; b. Stockholm, Sweden May 26, 1904; ed. equivalent to B.S.; amateur about seven years; professional experience: 25 years as a radio engineer.

STODOLA, E. KING (M) - Assistant to the President, Reeves Instrument Corp. East Gate Blvd., Roosevelt Field, Garden City, L.I., N. Y.; res. 118 Stanton St., Northport, L.I., N. Y.; married; B.S. in Electrical Engineering & Electrical Engineering degrees, Cooper Union Inst. of Technology.

STOKES, WILLIAM EARL DODGE JR. (CM, F) 1909 - Economist, self-employed, Lenox, Mass.; res. Thistlewood Farm, Lenox, Mass.; b. N.Y.C. January 6, 1896; ed. Browning School, N.Y.C., Andover, Sheffield Scientific School, Annapolis, University of Chicago (Law School); married; interested in radio since 1909; early amateur stations in N.Y.C. and Monmouth Beach, N. J.; First President Junior Wireless Club and Senate Committee witness 1910; Assistant Communications Officer USS Delaware Grand Fleet World War One; Four early U. S. Patents in radio; American Institute of Mining and Metallurgical Engineers, Chicago Bar Association, Econometric Society, Berzelious (Yale), Alpha Setta Phi, American Mining Congress, Union Club (NY), University (Wash.), Stock Exchange Lunch (NY), Lenox Club, Country Club of Pittsfield, Mid-Ocean Club, Royal Bermuda Yacht Club, Military: Naval Reserve Surface Division 1-14 LCDR USNR-R (Administration Officer); Publications: "Government Assistance to Small Gold Mines," "Free Power," "Report of the Aviation Committee-AIME," "Planetary Configurations and Stock Market Sentiment," "Origin of the Pennyweight" and numerous technical publications for the Navy on Torpedo manufacture, "Survey of the U. S. Army Catalog System" for the Navy, "Plan for a U. S. Navy Catalog System" (for the Navy), "Electrostatic Origin of Ore Deposits;" Sports and Hobbies - Golf & Squash, Racquets family, stamps, sailing, education (Trustee etc.), Navy anti-Communist Activities (various); Radio Club of America President 1909/1911.

STONE, CLARENCE GEORGE (F) 1925 - Consulting Engineer, Self-employed, Good Hill Rd., Weston, Conn.; res. same; b. Detroit, Mich. December 10, 1888; ed. E.E. and A.M. Columbia University, Professional Engineer since 1922; married; interested in radio since 1898; professional experience: taught physics at Columbia up to September 1952, also courses in Electronics and consulting work in this field; AIEE, IRE, American Physical Society.

STONE, G. EDGAR (F) 1935 - Machine Shop Owner, self-employed, 607 Cedar St.; res. 413 West Main St., Boonton, N. J.; b. Charlton, Mass. November 3, 1899; interested in radio since 1914; married; professional experience: 23 years as receiver design engineer, 10 years owner of machine shop specializing in mechanical parts for electronic equipment.

STYLES, THOMAS J. (F) 1915 - Secretary-Director, Armstrong Memorial Research Foundation, Inc., Philosophy Hall, Columbia University, New York 27, N. Y.; res. 160-01 84th Dr., Jamaica 32, N. Y.; b. Ansonia, Conn., July 25, 1887; married; ed. Walworth Institute, Pace Institute, Columbia University, Sorbonne; radio amateur 1908-16 at Yonkers, N. Y.; operated station N. J. National Guard, Sea Girt, 1911; licensed commercial radio operator 1912; seaplane radio operator, Naval Aviation Detachment, Palm Beach, Fla., 1917; Ensign, USNRF, Bureau of Engineering, Navy Department, 1918/19; Bankers Trust Company, Paris, France, 1920/23; laboratory of Edwin H. Armstrong, Columbia University, 1924/54; Recording Secretary, Radio Club of America, Inc., 1916, Corresponding Secretary 1917/20, 1925/27, Director 1928/29.

SUYDAM, CLINTON H. (F) 1932 - International Tel. & Tel. Corp., N.Y.C.; res. 451 Heywood Ave., Orange, N. J.; ed. Stanford University A.B. 1918, E.E. 1925; b. Los Gatos, Cal. October 25, 1896.

SWINYARD, WILLIAM O. (F) 1941 - Radio/TV Engineer, Hazeltine Research, Inc. 325 W. Huron St., Chicago, Ill.; res. 4948 Jerome Ave., Skokie, Ill.; b. Logan, Utah July 17, 1904; ed. B.S. Utah State University, graduate studies Columbia and Northwestern; married; interested in radio 1924; professional experience: Hazeltine since 1930, Chief Engineer 1942 to 1957; V. P. & Director 1958; Technical papers: Measurement of AM and FM radio receivers in Pender-McIlwain Handbook, Measurement of Loop Antenna Receivers IRE 1941; Member Chicago Radio Engineers Club, National Society of Professional Engineers, Lake Shore Club, Fellow IRE, Fellow AAAS; Eta Kappo Nu, Registered Professional Engineer, Ill.

TALLEY, DAVID (F) 1949, Radio Engineer, International Tel. and Tel. Corp.; res. 130 Martense St., Brooklyn 26, N. Y.; b. N.Y.C. October 20, 1903; ed. E.E. from Brook-

lyn Polytechnic Institute 1935; married; interested in radio since 1915; amateur since 1915, W2PF in 1919, extra first grade amateur license; professional experience: telephone engineer N. Y. Telephone Co. 1923 to 1946 except World War Two 1940/1945 as Lt. Colonel in Signal Corps, Telephone and Radio Engineer with International Tel. and Tel. Co. 1946/1951, Federal Tel. and Radio Corporation Govt. Contract Section 1951 to 1957, Telecommunications Operating Group of International Tel. & Tel. Corp., May 1957 to date; one patent on Signalling Systems; Senior Member IRE, member AIEE, ARRL, Radio Society of Great Britain, Reserve Officers Association of U. S. Military Order of World Wars, Vice President of N. Y. Chapter of Armed Forces Communications Assn., member Radio Club of Brooklyn, and Quarter Century Wireless Assn., Reserve Officer as Lt. Colonel in Signal Corps. USAR, engineered and installed mobile radio telephone systems in Buenos Aires 1948, Mexico City 1948, Havana 1949 and Cairo, Egypt in 1948.

TAYLOR, WILLIS H. JR. (F) 1925 - Patent Lawyer, Pennie, Edmonds, Morton, Barrows and Taylor, 247 Park Ave., New York 17, N. Y.; Chairman, Board of Trustees, Stevens Institute of Technology, Hoboken, N. J.

TENNIS, JOSEPH E. (M) 1955; Engineer, Radio Engineering Labs., res. 90-45 220 St., Queens Village, L. I., N. Y.; b. July 15, 1920, Brooklyn, N. Y.; ed. Brooklyn Technical High School, Pratt Institute; Clubs, IRE Member, Tau Beta Pi, Member.

THOMAS, LESLIE G. (M) 1928 - Management consultant, business address 610 E. Palisade Ave., Englewood, N. J.; res. Marcotte La., Tenafly, N. J.; b. London, England; ed. M.E.; married; interested in radio since 1912; professional experience: president Sheffco Mfg. Co., Palisades Park, N. J. and manufacturing executive, Vice President International Resistance Co., Philadelphia, General Manager Dejur-Amsco Corp., N.Y.C., Works Manager Fada Radio Co., Bronx 1926/1931; various patents on variable condensers.

THORP, WILBUR E. (F) 1948 - Electronic Engineer, Nortronics, Hawthorne, Cal.; res. 2213 Chelsea Rd., Palos Verdes Estates, Cal.; b. Santa Cruz, Cal. July 6, 1910; ed. B.S. in Engineering University of Cal.; married; interested in radio since 1923; professional experience: 10 years Don Lee Television, Los Angeles, 3 years U.S. Navy Electronics Officer, Bureau of Aeronautics, 4 years Radio Engineering Laboratories as Development Laboratory Supervisor, 9 years Northrop Aircraft and Nortronics, present assignment, Supervisor of Radiative Systems Group; senior member IRE, Lt. Cmdr. United States Naval Reserve; hobby - Gardening.

TOEGEL, BURT JOSEPH (M) 1941 - Engineer, B. J. Toegel, Inc., 130 New St., res. 725 Park Ave., Plainfield, N. J.; b. Austria August 29, 1901; ed. Public, Vocational, Night School; married; amateur since 1912, W2LI; professional experience: receiver design Engineer 1921 Garod Corp., Thomas A. Edison, Pilot Radio, Fada Radio, owner Coil Business since 1945; member Tri County Radio Club, Q.C.W.A., A.R.R.L. Certificate of Commendation U.S. Navy - Bureau of Ships - 1947

TOMAINO, MICHAEL F. (M) res. 786 Bronx River Rd., Bronxville, N. Y.

TOTH, ALBERT F. (F) res. 36-08 29th St., Long Island City, N. Y.; b. Hungary, September 4, 1902; ed. E.E. Polytechnic Institute of Brooklyn; RCA Director 1947/1957.

TUCKERMAN, LUCIEN P (F) 1928 - Radio Engineer - Technical Aide, Diamond Ordnance Fuze Laboratories, Washington 25, D.C.; res. 2500 Q St., N.W., Washington 7, D.C.; b. Wallingford, Conn. May 15, 1905; ed. Bell Telephone Labs. Electrical Communication Course; married; active in radio since 1923; professional experience: DeForest Radio Co., Kolster Radio Corp., Federal Telegraph Co., U.S. Navy Bureau of Ordnance, National Bureau of Standards; Commander U.S. Naval Reserve, Senior Member IRE, Member AIEE, SMPTE, Engineers Club of Washington, National Rifle Assn.; one patent "Peak Limiting Amplifier." Registered Professional Engineer, District of Columbia.

TUXEN, NIELS (M) 1952 - Manager, Communications and Electronics Division, North American Philips Co., 100 East 42nd St., N.Y.C.; res. 22 Michaels La., Croton-on-Hudson, N. Y.; b. Copenhagen, Denmark, 1915; U.S. Citizen 1943; ed. Soroe Academy, Denmark graduated 1939 from Aarhus Electrotechnicum, Aarhus, Denmark (B.S.E.E.); married; amateur OZ9T 1931; ship's radio operator Danish and British merchant marine World War Two; four years 9th Airforce in Europe; member Danish Engineers Club, N.Y.C.

ULM, ERNEST H. (F) 1950 - General Sales Manager, Semiconductor Division, Sylvania, Woburn, Mass.; res. Winchester, Mass.; b. Ft. Dodge, Iowa January 8, 1916; ed. Carleton College A.B., Graduate work at University of Iowa and Northwestern Technological Institute; married; interested in radio since 1928; amateur license 1930; professional experience: Instructor in Radio and Electronics in High School and Vocational School and Army Signal Corps and Navy (Western Electric); member IRE, and AIEE.

ULRICH, VINTON K. (F) 1936 - Distributor Sales Manager, David Bogen Co., Inc., 29 Ninth Ave., New York 14, N. Y.; res. 1 Treadwell Ave., Madison, N. J.; b. Malden, Mass. August 12, 1914; ed. B.S. in Communications Engineering M.I.T. 1935; married; interested in radio since 1923; professional experience: Managing Editor "Radio Today" to 1939, to 1941 Sales Manager Hytronic Labs Division of Hytron, to 1945 Engineer in charge War Activities Hytron, to 1950 Manager Commercial Engineering Division Hytron, to 1953 Manager Renewal Sales Division National Union Radio; Senior Member IRE, Member AIEE and Lions International.

VAN BEUREN, JOHN M. (F) 1942 - President and Director of Research, Quan-Tech Laboratories, Morristown, N. J.; res. Morristown, N. J.; b. N.Y.C. March 4, 1915; ed. Princeton University 1933/1936; married; interested in radio since 1931, amateur license (1933/1941); professional experience: Staff Advisory Engineer for Electronics, Thos. A. Edison Laboratory 1956/1957; Chief Research Engineer, Measurements Corp. 1939/1956; several patents on electronic devices; Hobby - Music and Hi-Fi; member I R E, Engineers Club, N.Y.C.

VAN DEN MEERSCHE, A. J. (M) 1930 - res. 22 St. Pieters AA1st Straat, Ghent, Belgium; b. Ghent, Belgium November 29, 1903; ed. E.E. University of Ghent; instructor University of Ghent; Associate IRE.

VAN RENSSELAER, HENRY C. (M) 1949 - Investment Counselor, The Bank of N. Y., 48 Wall St., N.Y.C.; res. Rock Ridge, Greenwich, Conn.; b. Sao Paulo, Brazil May 17, 1920; ed. Kent School, Kent, Conn., Princeton University; married; interested in radio since 1933; amateur W1HSY, 1933; professional experience: Major U.S. Air Force, Communications and Radar, 1942/1946 and 1951/1952, Sales Manager Electronic Parts Division Al-

len B. DuMont Laboratories 1947/1950; member Colonial Club, Princeton, N. J.; Hobbies - tennis, golf, skiing.

VOGEL, WILLIAM H., JR. (M) 1940 - Senior Project Engineer, Measurements, Div. of McGraw - Edison Co., Boonton, N. J.; res. 59 Crane St., Caldwell, N. J.; b. Brooklyn, N. Y. October 23, 1909; ed. Graduate Cornell University E.E. 1931; interested in radio since 1926; amateur W2BXM since 1931, member M.A.R.S. AF2BXM; professional experience: television and FM transmitters, communication and test equipment 1945 to date; active service Air Force 1941/1945 Radar Officer; Member I.R.E.

VORPERIAN, HARRY (M) 1941 - Foreman in charge of Electronic Wiring Department, Aeroflex Laboratories, Inc., 34-06 Skillman Ave., Long Island City 1, N. Y.; res. 210 Clinton Ave., Brooklyn 5, N. Y.; b. N.Y.C. January 19, 1909; interested in radio since 1923, ed. Graduate Washington Irving High School, RCA Institutes and extra-curricula courses at Pa. University, Temple University and N. Y. University; professional experience: Electronic Technician with Federal Telecommunication Laboratories, Radio Engineering Laboratories and Aeroflex Research Laboratories; married.

WALSH, DR. A LAFAYETTE (M) 1952, Dentist, self-employed, 509 Madison Ave., N.Y.C.; res. 785 Park Ave., N.Y.C.; b. N.Y.C. December 17, 1896; ed. College Dental and Oral Surgery of Columbia University; married; interested in radio since 1912; amateur since 1912, 2SP, 2BW since 1920; Past Director ARRL, Past President Radio Club, Past President N. Y. Radio Club, member IRE, member Armed Forces Com. and Elet. Soc., member U.S. Naval Institute, member ARRL, member Quarter Century Wireless Association.

WALSH, CRAIG (F) 1940 - President, Engineering Publishers, P. O. Box 2, Elizabeth, N. J.; res. 14 North Ave., Elizabeth, N. J.; b. Elizabeth, N. J. November 29, 1912; ed. Stevens Institute of Technology, Hoboken, N. J., married; interested in radio since 1930; professional experience, Engineering Publishers, McGraw-Hill Book Co., Electrical Manufacturing magazine, Electronics magazine, Sylvania Electric Products Inc., Walsh Engineering Company; member Institute of Radio Engineers, American Institute of Electrical Engineers, and Standards Engineers Society.

WALSH, LINCOLN (F) 1934 - Consulting Engineer, Walsh Engineering Company and Caledonia Electronics and Transformer Corp., 34 DeHart Pl., Elizabeth, N. J.; res. 34 DeHart Pl., Elizabeth 2, N. J.; b. R. I. November 3, 1903; ed. Stevens Institute of Technology, M.E. 1926, Post-Graduate Columbia, Brooklyn Polytechnic and Stevens; married; interested in radio since 1916; professional experience: Designer of transformers, high quality audio systems and radio receivers, Colonial (now Sylvania) Bell Telephone Laboratories and Hazeltine, RCA - Director - 1936; C.S. 1941.

WARE, PAUL (F) 1921 - Pres., Ware Marine Products, Inc., Miami, Fla.; b. East Orange, N. J. June 26, 1893; ed. M.E. Stevens Institute of Technology 1917; wife, Josephine Varney; interested in radio since 1906, starting with amateur station at East Orange, N. J.; professional experience, marine wireless operator 1907/1912; second Lieut. Signal Corps during World War 1; manufactured Ware Neutrodyne receivers; invented INDUCTUNER and INPUTUNER for Mallory and DuMont respectively; sailed Atlantic Ocean in 17 days on Yacht ALOHA in 1912 averaging 8.06 knots; invented and presently manufacturing the Ware Automatic Pilot used on boats; hobbies - yachting and treasure hunting; Radio Club of America Director 1939/40; 44/50 - V.P. 1941 Pres. - 1942/43.

WASHINGTON, GEORGE JR. (F) 1951 - Retired, res. 10 Harter Rd., Morristown, N. J.; b. N.Y.C. August 6, 1899; ed. High School; married; interested in radio since 1921; Inventor of Photo-Electric Engraver known as the Fairchild Scan-o-graver; Director RCA 1957/58; Chairman 50th Anniversary Year Book Committee.

WATSON, PAUL GRISTOCK (F) 1922 - Commander USNR Retired, res. 27 Price St., West Chester, Pa.; b. West Chester, Pa. January 6, 1900; ed. High School and 1923 Pratt Institute E.E.; widower; interested in radio since 1912; amateur 3VB spark and 2CJU in Brooklyn while attending Pratt, station 4ZD-4XX at Savannah working Dr. A. Hoyt Taylor at NKF; professional experience: commercial radio operator 1918/1923, Radio Inspector U. S. Shipping Board, N. Y., U. S. Radio Inspector Savannah, Ga. 1924/1926, Direction Finder Engineer RCA 1927/1928, Plant Engineer, Eastern Malleable Iron Co. Wilmington, Del. 1928/1940, Shop Superintendent U. S. Navy Yard Philadelphia with Bank of Commander USNR 1940/1946; about 30 articles in Radio News, Pacific Radio, QST during 1919/1925 period, dropped out of radio in 1928 and entered ship construction (engineer) and participated in building over 100 ships in Philadelphia Navy Yard during World War Two; Life member The American Legion, Military Order of the World Wars, The Society of American Military Engineers, member DeForest Pioneers, Society of Naval Architects and Marine Engineers, The U. S. Naval Institute; Hobby - Collecting of early vacuum tubes and old apparatus and parts; Awarded Navy Commendation Ribbon for "outstanding performance of duty" during World War Two.

WATTSON, HARRY B. (M) 1945 - res. 157 Prospect Pl., Rutherford, N. J.; ed. Columbia University A.B. 1925, M.S. Harvard 1928; Sperry Gyroscope Co. Garden City, 1945.

WEBB, HARRY R. (M) 1958 - Supervisor of Instrument Depr., a combination of design, modification, calibration, repair of $250,000 of equipment, former Radio QTV instructor, Radio Engineering Labs., 5 years; res. 141-46 253 St., Rosedale 22, L.I., N. Y.; b. January 8, 1918, Brooklyn, N. Y.; Military Service, 3-1/2 yrs., U. S. Army Signal Corps, Broadcast Engineer with Armed Forces Service; Amateur Call Letters, W2JOF, issued March 1936; Sports, Bowling, Amateur Radio, Ho Railroading.

WEED, EDGAR M. (F) 1950 - Technical Writer, Bell Telephone Laboratories, Whippany, N. J.; res. 53 Burnham Rd., Morris Plains, N. J.; b. Morris Township, N. J. March 15, 1907; ed. Morristown High School graduated 1925, Rutgers Extension Courses (Electronics); interested in radio since 1919; married; amateur W3JF in 1922, W3FSR and now K2BO; professional experience: Advertising Manager daily newspapers until 1943, Test Department Aircraft Radio Corp. Boonton, N. J. to 1945, Advertising Manager and Technical Writer Measurements Corp. Boonton, N. J. 1946/1952, joined Bell Labs. February 1, 1952; writer of many newspaper and magazine articles; member Morris Radio Club, former Northern District Director (Amateur radio) for N. J. Civil Defense; Hobbies - radio, fishing; Radio Club of America Chairman of the Advertising Committee, 1953.

WEINBERG, SIDNEY (M) 1950 - Chief Production Engineer, Plant Manager, United Scientific Laboratories, Inc. 35-15 37th Ave., Long Island City, N. Y.; res. 252-08 Cullman Ave., Little Neck, L.I., N. Y.; b. N.Y.C. January 2, 1909; ed. B.S. in E.E. Cooper Union, Electronics Colum-

bia University, Time and Motion Studies and Methods Polytechnic Institute of Brooklyn; married; interested in radio since 1923; amateur W2AMI since 1925, Quarter Century Wireless Association, New York Civil Defense; professional experience: engaged in manufacturing electronic equipment for more than 25 years with United Scientific Labs. at executive level, presently Vice President in Charge of Production Engineering; Senior Member IRE, member Radio and TV Square Club, Cooper Union Alumni Association, N. Y. Social Club, Mt. Scopus Lodge #1075 Free and Accepted Masons.

WHEELER, HAROLD A. (F) 1935 - Radio Engineer, Wheeler Laboratories, Inc., 122 Cutter Mill Rd., Great Neck, N. Y.; res. 18 Melbourne Rd., Great Neck, N. Y.; b. St. Paul, Minn. May 10, 1903; married; ed. George Washington University B.S. in Physics (with distinction), John Hopkins University, Physics Department (3 years); interested in radio since 1913; amateur station 3QK 1918/1922; professional experience: Hazeltine Corp. 1924/1945 Vice President and Chief Consulting Engineer Bayside and Little Neck Laboratories, Consulting Radio Physicist 1946 to date, President Wheeler Laboratories, Inc. 1947 to date; more than 150 U. S. patents and many foreign patents; Book "Wheeler Monographs Vol. 1" 1953; many technical papers in Proceedings IRE etc.; Fellow of IRE and AIEE, Director IRE 1940/1945; Morris Liebman Prize IRE 1940 for "Theory of Wideband Amplifiers and Paired Echos in Television."

WILLIAMS, ROGER (F) 1930 - Patent Attorney, 34 Park Row, N.Y.C.; b. Providence, R. I., U.S.A. August 13, 1892; ed. Brown University Ph.B.; married; interested in radio since 1906; amateur 1CPX after World War One, coherer, electrolytic detector, crystals, spark coils; professional experience: First commercial license in Rhode Island, Operator on S.S. Mount Hope 1915, Consulting Radio Engineer, Chief Engineer Ceco Co. (electronic valves) and of Trico Co. (electronic valves) 1925/1929, Chemical Engineer 1915/1922; Registered Patent Attorney in Foreign Patents; Hobbies - Philologist, Linguist, Life Member Providence Engineering Society.

WORTHEN, CHARLES E. (F) 1936 - Publicity Manager, General Radio Co., West Concord, Mass.; res. West Newton, Mass.; b. Haverhill, Mass. 1906; ed. S.B. M.I.T. 1928; married; interested in radio since 1918; amateur 1AYB and 1DX 1921/1925; professional experience: development engineering, sales engineering and sales promotion, also technical writing and publishing, Editor "General Radio Experimenter."

YELLEN, ANTHONY F. (M) 1957 - Technical Writer, Radio Engineering Labs. 3-1/2 yrs.; res. 84-19 106 St., Richmond Hill 18, L.I., N. Y.; b. February 10, 1930, New York, N. Y.; ed. St. Johns Preparatory, St. Johns College, Brooklyn Polytechnic Institute, U. S. Navy Class "A" Electronics School; Military Service, U. S. Navy, 4 yrs., served on U.S.S. Charles R. Ware (DD865), 3 yrs., Electronics Maintenance; Amateur Call Letters W2EDA; Clubs, etc. ARRL, I.R.E.

YOKUM, CHARLES H. (F) 1937 - Sales Engineer, Eastern Sales Manager for San Fernando Electric Manufacturing Co., 1509 First St., San Fernando, Calif.; res. 421 Franklin Ave., Hasbrouck Heights, N. J.; b. Deposit, N. Y. July 13, 1906; ed. East Orange Grammar School and High School and B.S. 1927 Princeton University; married; interested in radio since 1937; Major Signal Corps Sig. O 23 HQ.

ZARET, MATTHEW E. (M) 1950 - Professor, Electrical Engineering, The Cooper Union, Cooper Square, N.Y.C.; res. Nutley, N. J.; b. N.Y.C. September 13, 1909; ed. B.S. College of the City of New York 1931, Sc.M. New York University 1936; married; interested in radio since 1922; professional experience: Fada Radio Co. 1928, Sonotone Corp. (Electroacoustic Research Engineer) 1942/1946, Polytechnic Research and Development Co. (Project Engineer) 1947, Teaching of Electronics and related fields Newark College of Engineering, Columbia, Cooper Union 1947 to date; publications "Development of Midget Earphones for Military Use" Journal of the Acoustical Society of America October 1946, "Electroacoustics," Newark College of Engineering Press 1949, "Electron Tube Circuits Laboratory Manual" NCE Press 1949; Senior Member IRE, Charter Member Audio Engineering Society, Fellow American Association for the Advancement of Science, Member Acoustical Society of America, Member American Association of University Professors, Member, American Society for Engineering Education; Hobby - Music, President of Nutley Symphony Society (1953/1954), Chairman, Nutley Council of Music, Drama & the Arts 1958/59.

ZAYAC, FRANK R. (M) 1948 - Vice President, Ballantine Laboratories, Inc., Boonton, N. J.; res. Boonton, N. J.; b. Boonton, N. J. March 28, 1911; ed. Boonton, High School; married; interested in radio since 1929; amateur W3FYY 1938, now W2FYY; member IRE and ARRL; Director, Radio Club 1955.

ZBODULA, JOHN W. (M) - res. 4 Michigan Rd., Bellerose 26, N. Y.

ZITNIAK, WALTER (M) 1941 - Electronic Laboratory Supervisor, Kearfott Manufacturing Corp. 125 Sussex Ave., Newark, N. J.; res. 515 Grove St., Irvington 11, N. J.; b. Newark, N. J. June 25, 1906; ed. Czechoslovakia; interested in radio since 1920; professional experience: Radio Servicing, Television Servicing and Airborne Equipment Manufacturing; Hobby - radio and television experimenting.

Total Membership December 1959 376

Note CM - Charter Member
LM - Life Member
F - Fellow
M - Member

DECEASED MEMBERS
THE RADIO CLUB OF AMERICA, INC.

Aceves, Julius G.
Allen, George Y.
Armstrong, Edwin H.
Ayer, Oliver G.
Baker, Thomas S.
Ballantine, Stuart
Bingham, Wilbur Fisk
Brett, Harold M.
Brown, David Seymour
Browne, Walram
Burlingame, Bruce O.
Capen, William H.
Clark, Herbert A., Jr.
Clark, LeRoy
Cooney, J. K.
DeVine, Alexander A.
Dunn, Gano
Ehrmann, Gustav J.
Eltz, George J.
Ferris, Malcom
Forbes, Henry C.
Glavin, Edward F.
Godfrey, Dr. Charles C.
Goulden, Stantley W.
Grebe, Alfred H.
Grinan, John F.
Guggenheim, Dr. Sigmund
Guilfoyle, Thomas James
Hass, John G.
Hebert, Auther A.
Hoppenberg, Joseph A.
Horle, Lawrence C. F.
Hubley, Warren F.
Huffman, Charles E.
Hutchens, Ray
Inman, Walker P.
Jackson, Samuel Jr.
Jacobs, Charles
Jenkins, Victor F.
Knapp, Joseph F.
Lacault, Robert E.
Lidbury, F. A.
Logwood, Charles V.
Loughlin, William D.
Lovejoy, D. Ross
MacKay, John R.
Marriot, Robert H.
McCann, John
Moulton, Albert B.
Murdock, Daniel R. W.
Nicholas, Edwin A.
Pacent, Louis G.
Pickard, Greenleaf W.
Potts, John H.
Roos, Oscar C.
Rosenthal, Leon W.
Seibt, Dr. George
Shonhale, Charles L.
Silver, McMurdo
Simmons, M. Theodore
Singer, Benjamin
Smith, Luther C., Jr.
Snyder, Harvey C.
Stewart, Charles H.
Stone, John Stone
Taussig, Charles W.
Thompson, Sylvester T.
Tunick, Harry
Trube, Carl E.
Tsubouchi, Akira
Vansize, William B.
Vanghan, Wilbur Southwood
Weare, John
Weber, Victor J.
Whiting, Donald F.
Winterbottom, William A.
Wise, Roger M.
Yokachi, Shin-ichi
Zenneck, Jonathan A. W.

CONSTITUTION
OF
THE RADIO CLUB OF AMERICA, INC.

ARTICLE I

NAME, OBJECT AND EMBLEM

SECTION 1. The name of this organization shall be The Radio Club of America, Inc.

SEC. 2. Its object shall be the promotion of cooperation among those interested in scientific investigation and amateur operation in the art of radio-communication.

SEC. 3. The emblem of the Club shall be that shown in the margin. This emblem shall be made in the form of a pin and may be purchased from the Treasurer.

ARTICLE II

MEMBERSHIP

SECTION 1. The membership shall consist of:

(a) Members
(b) Fellows
(c) Honorary Members

Fellows, Members or Honorary Members shall be entitled to all privileges of the Club except that Fellows only may hold office or be elected to the Board of Directors.

Honorary Members shall be presented with the Club pin.

SEC. 2. A Member shall be a male or female person, not less than seventeen years of age, who has been interested in the investigation of the principles of radio communication and in radio operation, either in its commercial or amateur aspects, for a period of at least one year.

SEC. 3. An Honorary Member shall be a person of high professional standing who is interested in the activities of the Club.

SEC. 4. A Fellow shall have been a member in the Club for five years or one whose contributions to the Radio Art are of such a nature as to qualify him. In addition, the application for membership as "Fellow" shall be left to the discretion of the Board of Directors.

SEC. 5. The emblem for Fellow shall be the reverse of that for Member i.e., black insignia on a gold background.

ARTICLE III

ADMISSIONS, EXPULSIONS AND RESIGNATIONS

SECTION 1. An applicant for admission to membership shall present the prescribed application, properly filled out, to the Corresponding Secretary. The application shall contain the names of three Fellows or Members to whom the applicant is personally known.

SEC. 2. Applications for membership shall be acted upon at the discretion of the Board of Directors.

SEC. 3. The Corresponding Secretary shall notify an elected candidate of his election and forward to him a statement of entrance fee and initial dues.

SEC. 4. Members found delinquent in their duties may be tried by the Board of Directors, and upon decision of the Board their names shall be submitted to the Club to determine their suspension or expulsion. A three-quarters vote of the Club will be necessary to ratify such action of the Board.

SEC. 5. A member may resign his membership by a written communication to the Corresponding Secretary, who shall present the same to the Board of Directors; when, if all his dues have been paid, his resignation shall be accepted.

ARTICLE IV

ENTRANCE FEE AND DUES

SECTION 1. The annual dues payable by Members shall be Three Dollars; for Fellows, Five Dollars. The entrance fee payable by Members on election to membership shall be One Dollar. Honorary Members shall be exempt from payment of any dues or fees.

SEC. 2. The Annual dues shall be payable on the first day of each calendar year, in advance for the ensuing year. It shall be the duty of the Treasurer to notify each Member or Fellow of the amount due.

SEC. 3. Every Member or Fellow, upon payment of his annual dues, shall be furnished with a membership card bearing the signature of the Treasurer.

SEC. 4. Persons elected to membership after July 1st of any year shall pay only one-half of the dues for that year.

SEC. 5. Any Member or Fellow whose dues become two months in arrears shall be notified by the Treasurer. Should his dues then become four months in arrears, he shall again be notified by the Treasurer. Should his dues then become six months in arrears he shall forfeit his connection with the Club. The Board of Directors may, however, for sufficient cause temporarily excuse from payment of annual dues any Member or Fellow or extend the time for payment.

SEC. 6. Every person admitted to the Club shall be considered as belonging thereto and liable for the payment of all dues (except as per Sec. 7 of this Article) until he shall have resigned, been expelled, or have been relieved therefrom by the Board of Directors.

SEC. 7. Any Member or Fellow not in arrears, upon payment of One Hundred Dollars shall be exempt for life from the payment of annual Dues.

ARTICLE V

OFFICERS

SECTION 1. The governing body of the Club shall be a President, a Vice-President, a Treasurer, a Corresponding Secretary, a Recording Secretary and thirteen Directors, who shall together constitute the Board of Eighteen Directors.

SEC. 2. The terms of all officers named in the preceding section shall be one year, shall begin at the first regular meeting of each year at which the results of the Annual Election are announced, and shall continue until successors are duly elected.

ARTICLE VI

GOVERNMENT

SECTION 1. The President shall have general supervision of the affairs of the Club. He shall preside at meetings of the Club and of the Board of Directors at which he may be present, and shall be an ex-officio member of all committees.

SEC. 2. The Vice-President shall assume all the duties of the President during the President's absence from meetings or whenever the President is otherwise unable to perform such duties. In the event of the Vice-President's inability to assume these duties a Chairman pro tem shall be appointed by those present at any meeting.

SEC. 3. The Treasurer shall collect and receive all dues and fees and shall have custody of all funds of the Club. He shall issue membership cards to Members or Fellows upon payment to him of their dues. He shall make such payments for the Club as are provided for in the Constitution or such as shall be ordered by the Board of Directors. He shall make an annual report of such at each meeting of the Board of Directors.

SEC. 4. The Corresponding Secretary shall conduct the correspondence of the Club other than that conducted by the Treasurer. He shall keep full records of the correspondence conducted by him and make a report of such at each meeting of the Board of Directors.

SEC. 5. The Recording Secretary shall duly record all proceedings of all meetings of the Club and the Board of Directors. He shall have custody of all application blanks of persons admitted to membership and all other records of the Club.

SEC. 6. The Board of Directors shall manage the affairs of the Club in conformity with the provisions of the Constitution. It shall direct the care and appropriation of the funds of the Club; act upon applications for membership as heretofore provided; recommend Honorary Members; exercise discretionary power in the election to the grade of Fellow of Members or original applicants having the qualifications therefor (Art. II, Sec. 4); take measures to advance the interests of the Club, and generally direct its business. Six members of the Board of Directors shall constitute a quorum.

SEC. 7. The President, within fourteen days after the conclusion of the Annual Election, shall appoint from the membership the following standing committees:

Committee on Papers,
Committee on Publications,
Membership Committee,
Publicity Committee,
Entertainment Committee,
Committee on Affiliation,
Year Book and Archives Committee.

ARTICLE VII

NOMINATION AND ELECTION OF OFFICERS

SECTION 1. At the Annual Meeting nominations for the offices of President, Vice-President, Treasurer, Corresponding Secretary, Recording Secretary and seven Directors shall be called for from the entire membership. Members unable to attend in person the Annual Meeting at which the above nominations are called for may obtain from the Corresponding Secretary a prescribed blank form on which they may nominate candidates for any or all of the above offices. Such nominations must be in the possession of the Corresponding Secretary within ten days after the Annual Meeting at which nominations were called for. Nominations made in this way must be three in number for any nominee to have him considered as such provided he has not already been nominated at the prescribed meeting. At least twenty-one days before the first regular meeting of the calendar year the Corresponding Secretary shall submit to the membership the list of nominees for each office. The membership shall then submit a written ballot voting for officers and seven directors from the list of nominees submitted. A majority vote up to the time of the closing of the polls (forty-eight hours before the opening of the first regular meeting of the calendar year), shall elect.

SEC. 2. Six additional Directors, three of whom shall not have previously held office in the Club, nor have served on the Board of Directors, shall be elected by a majority vote of the newly constituted Board of Directors at its first meeting.

ARTICLE VIII

MEETINGS

SECTION 1. The Annual Meeting of the Club shall be held within the first week in December, or as near thereto as may be possible, of each year.

SEC. 2. Regular monthly meetings shall be held as ordered by the Board of Directors. If possible such meetings shall be held on the second Wednesday evening of each month excluding July and August. At the first

regular meeting of each calendar year the results of the election of Officers and seven Directors shall be announced and elected Officers shall be installed, and the Annual Reports of the previous year shall be read.

SEC. 3. The Board of Directors shall meet as soon as possible following the Annual Election and at such other times as are considered expedient by the President.

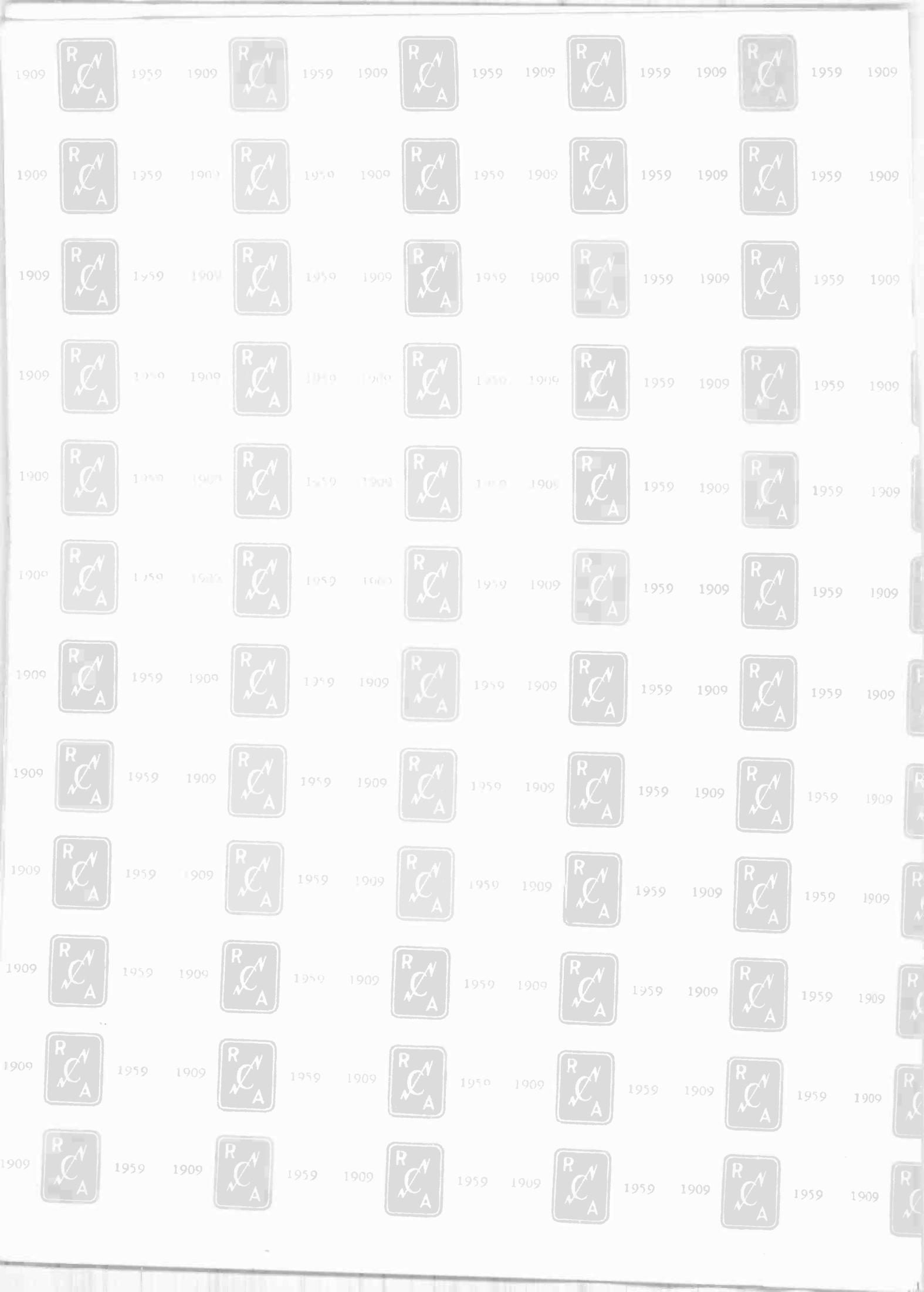
SEC. 4. At the regular monthly meetings of the Club items of interest from the minutes of the Board of Directors may be read but no other business shall be conducted but that ordered by the Board of Directors. Any business of Club interest may be informally discussed after the formal adjournment of any meeting.

SEC. 5. At any meeting of the Board of Directors suggestions from the membership on matters appertaining to the welfare of the Club may be considered. Such suggestions shall at all times be encouraged by the Directors and they should be submitted in writing to the Corresponding Secretary, who will present the same at the Directors' meeting next following their receipt by him.

ARTICLE IX

AMENDMENTS

SECTION 1. Proposed amendments to this Constitution must be reduced to writing and signed by not less than twelve Members or Fellows and be submitted to the membership who shall vote thereupon by letter ballot. The amendment shall be adopted if seventy-five per cent of the votes received are in favor of such action, the polls having been open for at least one month after mailing to the qualified membership notices of the proposed amendments.


1909
RCA
1959