YEARM OOK
of the
Institute of Radio Engineers
1932

CONTENTS

Officers and Board of Directors, 1932 .......... 4
Past Officers of the Institute ................. 5
Institute Committees for 1932 ............... 6
Institute Representatives in Other Technical Bodies . .... 8
General Information ................. 9
History of the Institute .......... 9
Aims of the Institute .................. 9
Publications .......... 10
Awards for Meritorious Achievement ........ 10
Grades of and Qualifications for Membership .... 12
Institute Badges ........ 12
Indication of Membership Grade .......... 14
Certificates of Membership ............... 14
Meetings ....... 14
Institute Sections .......... 14
American Standards Association ....... 16
Report of the Secretary for 1931 ........... 18
Comparative Financial Balance Sheet ...... 30
Constitution of the Institute ............... 31
Amendments to the Constitution .......... 35
Constitution for Sections ............... 48
Annual Meetings of Sections .......... 51
Index to the Constitution .................. 52
Index to Section Constitution ........... 53
American Standards Association Radio Standards Report ... 54
Catalog of Membership, Alphabetically Listed .... 75
Catalog of Membership, Geographically Listed .... 237

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Supplement to the Proceeding for March, 1932
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H. C. Gawler
H. W. Houck
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Sectional Committee on Preferred Numbers: A. F. Van Dyck
Sectional Committee on Scientific Symbols and Abbreviations: A. E. Kennelly
Sectional Committee on Specifications for Dry Cells and Batteries: H. M. Turner
Subcommittee on Electrical Abbreviations—Including Radio: A. E. Kennelly, L. E. Whittemore (alternate)
Sectional Committee on Standards for Drawings and Drafting Room Practices: L. E. Whittemore
Sectional Committee on Definitions of Technical Terms: Haraden Pratt
Standards Council: Alfred N. Goldsmith, B. Dudley (alternate)

GENERAL INFORMATION

Institute History

Prior to the formation of the Institute of Radio Engineers, two other organized groups of radio enthusiasts held meetings in New York and Boston. These were the Wireless Institute and the Society of Wireless Telegraph Engineers.

On May 13, 1912, these two organizations were merged, taking the new name of the Institute of Radio Engineers. Headquarters were established in New York.

The Society of Wireless Telegraph Engineers had a membership of eleven on January 1, 1907, and forty-three on January 1, 1912. The Wireless Institute had fourteen members on January 1, 1909, and twenty-seven members on January 1, 1912. The Institute of Radio Engineers, at the time of its foundation, had less than fifty paid-up members.

Prominent in the early work of the Society of Wireless Telegraph Engineers were John Stone Stone, Lee de Forest, and Fritz Lowenstein. Those identified with the initial work of the Wireless Institute included: John S. Murphy, R. A. Somerville, Joseph D. Fountain, R. B. Reppress, R. A. Cleva, John Gregg, E. Barnwell, Philip Farnsworth, Sidney L. Williams, R. H. Marriott, G. W. Pickard, Harry Shoemaker, and Eugene Thurston. The consolidation of these two societies and the initial work of organizing the Institute of Radio Engineers were done by A. N. Goldsmith, J. V. L. Hogan, and R. H. Marriott.

Aims of the Institute

The Institute of Radio Engineers functions solely to advance the art and science of radio communication. It numbers among its members nearly all of the men who have been prominent in the development of radio in the United States, as well as many noted radio engineers and scientists in other countries.

The membership of the Institute consists of those persons who are qualified for any of its several grades of membership, either through their interest in radio communication, or by practice of some phase of radio engineering as a profession. The eligibility of an applicant to membership in any grade is finally determined by the Board of Directors of the Institute, in most cases on the recommendation of the Committee on Admissions.

Through the presentation and publication of original papers, by affording its members the opportunity of meeting to discuss radio prob-
lems, by awards of honors and prizes, and in other ways, the Institute fosters and encourages the development of this important means of communication, and particularly aids in the exchange of radio information of a technical and engineering nature.

Publications

The papers presented at the meetings of the Sections and of the Institute in New York, together with the discussions and other papers submitted by Institute members, are printed in the Proceedings of the Institute of Radio Engineers, published monthly. The Proceedings thus constitutes a continually growing store of information on all phases of radio engineering. Since the first issue in 1913, 917 papers discussions, and book reviews have been printed. The Proceedings is sent free to all Institute members of all grades. The subscription price to nonmembers is $10.00 per year.

Standardization reports giving definitions of terms and standard graphical symbols used in radio communication were issued in 1913, 1915, 1922, 1926, and 1929. The standardization report for 1928 was published in the 1929 Year Book, and that for 1931 in the 1931 Year Book. These standardization reports have become an important reference authority on terminology and symbols in radio practice.

This Year Book is the ninth the Institute has published; the first appearing in 1914, the second in 1916, the third in 1920, and subsequent issues each year.

Institute Awards for Meritorious Achievement in Radio

The Institute each year makes two awards to radio investigators in recognition of noteworthy inventions or other developments in radio technique.

One award, the Institute Medal of Honor, is a gold medal suitably engraved. The Medal of Honor is awarded to that person who has made public the greatest advance in the science or art of radio communication, regardless of the time of performance or publication of the work on which the award is based.

The advance may be an unpatented or patented invention which has been completely and adequately described in a scientific or engineering publication of recognized standing, and must be in actual operation. Preference will be given to widely used and widely useful inventions.

The advance may also be a scientific analysis or explanation of hitherto unexplained phenomena of distinct importance to the radio art, though the application thereof need not be immediate. Preference will be given analyses directly applicable in the art. Publication, in this case also, must be in full and approved form.

The advance may further be a new system of traffic regulation or control; a new system of administration of radio companies or of service of steamship, railroad, or other companies; a legislative program beneficial to the radio art, or any portion of the operating or regulating features of the art. It must be described publicly in clear and approved form and must, in general, be actually adopted in practice.

This medal has been awarded to the following:

E. H. Armstrong 1918 M. I. Pupin 1924
E. F. W. Alexanderson 1919 G. W. Pickard 1926
G. Marconi 1920 L. W. Austin 1927
R. A. Fessenden 1921 Jonathan Zennek 1928
Lee de Forest 1922 G. W. Pierce 1929
John Stone Stone 1923 P. O. Pedersen 1930
G. A. Ferrié 1931

The other award is known as the Morris Liebmann Memorial Prize. This award was made possible through the generosity of Emil J. Simon, a Fellow of the Institute. It is given to perpetuate the memory of the late Colonel Morris N. Liebmann. The award consists of the sum of five hundred dollars which is the annual income derived from the principal of the gift of ten thousand dollars.

The award is made by a special committee, appointed annually by the Board of Directors, to that member of the Institute who, in the opinion of this committee, shall have made the most important contribution to the radio art during the preceding calendar year.

The Morris Liebmann Memorial Prize has been awarded to the following:

L. F. Fuller 1919 Frank Conrad 1925
R. A. Wengant 1920 Ralph Bown 1926
R. A. Heising 1921 A. H. Taylor 1927
C. S. Franklin 1922 W. G. Cady 1928
H. H. Beverage 1923 E. V. Appleton 1929
J. R. Carson 1924 A. W. Hull 1930
Stuart Ballantine 1931

All members of the Institute are eligible as candidates for these highly valued prizes. Each year’s developments are carefully reviewed and examined by the Awards Committee, and by the Board of Directors, the awards being made by vote of the Board in the case of the
Institute Medal of Honor, and by vote of the committee appointed by the Board in the case of the Liebmann Memorial Prize.

Grades of and Qualifications for Membership

The several grades of membership in the Institute of Radio Engineers as well as the qualifications required for each, dues, fees, etc., are tabulated on page 13. Full details will be found in the Constitution under Articles II, III, and IV. All the benefits of membership are available to all new members of any grade, except that Juniors and Students are not eligible to vote. Membership means, also, that one is enrolled with others having a similar interest in radio, and that one is on record as being among those who are interested and active in the development of this new and useful branch of the electrical engineering industry.

The grades of Fellow and Member require a much higher degree of technical training and experience than the grade of Associate. In order to maintain a high standard of membership, the Board of Directors in each case very carefully scrutinizes the application for Fellow and Member grades.

Before applying for membership in any grade the applicant should carefully read the Constitution of the Institute to ascertain for which of the several grades he is eligible. An extract from the Constitution dealing with admissions, eligibility, fees, etc., is printed on the back of the application form obtainable from Institute Headquarters.

When filling in the application form, the applicant should submit the names of those persons who have knowledge of his professional experience, rather than those who have a high professional standing, but cannot vouch for him. The personal signatures of references are not required.

Institute Badges

All Institute badges are in the form of the emblem shown herewith, and are of 14-karat gold, finished in gold and enameled. The Fellow's badge is of blue lettering on a gold background while those of other grades of membership are reversed and show gold lettering on a colored enameled background. The background of the Member's badge is blue; the Associate's, maroon; the Junior's, white; and the Student's, green. Three forms of badges are available; a screw-back lapel button, a lapel pin, and a watch charm. The lapel button which is approximately half the size of the illustration may be obtained at $2.75 each. The lapel pin is of approximately the same size as the illustration and is priced at $3.00. The watch charm, finished on both sides, is provided with a ring to
permit its suspension from a watch fob or chain and is also of the same size as illustrated. It is supplied at $5.00. All badges may be obtained in any membership grade and should be ordered through the office of the Secretary.

**Indication of Membership Grade**

Institute members are authorized to use the following abbreviations or symbols indicating their grade of membership:

- Fellow—Fel. I.R.E.
- Member—Mem. I.R.E.
- Associate—Assoc. I.R.E.
- Junior—Jr. I.R.E.
- Student—Std. I.R.E.

All other methods of indicating grade of membership are contrary to the expressed opinion of the governing body of the Institute. The use of the Institute emblem upon personal and business stationary, cards, etc., is likewise not approved by the Board of Directors and members are requested to call this to the attention of the Secretary as directed in the By-Laws to the Constitution.

**Certificates of Membership**

Upon application to the Secretary's office membership cards are sent to all members each year, and diplomas are supplied to Members and Fellows. The membership cards are signed by the Secretary and the diplomas are signed by the President and the Secretary.

**Meetings**

New York meetings of the Institute of Radio Engineers are held on the first Wednesday of each month (except during July and August) at the Engineering Societies Building, 33 West 39th Street, New York City. On these occasions engineering papers are presented, describing recent developments in radio, and are the subject of general discussion on the part of those in attendance.

**Institute Sections**

The following Sections of the Institute, which in most cases meet once a month, have been organized in localities where there is a sufficient number of Institute members:

**Atlanta**—H. F. Dobbs, chairman; Philip C. Bangs, secretary, 23 Kensington Road, Avondale Estates, Georgia.

**Boston**—George W. Pierce, chairman; Melville Eastham, 30 State St., Cambridge, Mass.

**Buffalo-Niagara**—L. Grant Hector, chairman; E. C. Wand, secretary, 235 Huntington Ave., Buffalo, N.Y.

**Chicago**—J. Barton Hoag, chairman; Donald H. Miller, Mcfarland Publishing Company, 520 N. Michigan Ave., Chicago, Ill.

**Cincinnati**—D. D. Israel, chairman; H. G. Boyle, secretary, Crosley Radio Corporation, Cincinnati, Ohio.

**Cleveland**—E. L. Gore, chairman; Deane S. Kintner, secretary, 3622 Lindholm Rd., Cleveland, Ohio.

**Connecticut Valley**—L. F. Curtis, chairman; George Grammer, secretary, 334 South Quaker Lane, West Hartford, Conn.

**Detroit**—H. L. Byerlay, chairman; Samuel Firestone, secretary, Room 615, 2000 Second Avenue, Detroit, Mich.

**Los Angeles**—E. H. Schreiber, chairman; H. W. Andersen, secretary, 2332 Lake View Ave., Los Angeles, Calif.

**New Orleans**—Pendleton E. Lehigh, chairman; Anton A. Schiele, secretary, 1812 Masonic Temple, New Orleans, La.


**Rochester**—H. A. Brown, chairman; J. A. Wood, secretary, 175 Winauld Ave., Rochester, N.Y.

**San Francisco**—Ralph M. Heintz, chairman; Frederick E. Ternam, secretary, Stanford University, Calif.

**Seattle**—Leslie C. Austin, chairman; Herbert H. Bosson, secretary, Staff Headquarters, 13th Naval District, Joseph Vance Building, Seattle, Wash.

**Toronto**—P. K. Dalton, chairman; W. F. Chant, secretary, 355 King St. W., Toronto, Ont., Canada.

**Washington**—J. H. Dellinger, chairman; Hugh Mitchell, secretary, Signal Corps, Office Chief Signal Officer, Munitions Building, Washington, D.C.

In forming a Section of the Institute, the following is the approved procedure:

**Procedure to be Followed in Forming a Section**

a. Carefully read all portions of the Constitution and By-Laws concerning Sections together with the Constitution for Sections which appear elsewhere in this Year Book.
b. Make a tentative canvass of the members residing within the territorial limits of the proposed Section. If at least fifty (preferably seventy-five members, of whom five or more are Members or Fellows, favor and will support a Section, if established, obtain from Institute Headquarters a petition form. In making this tentative canvass effort should be made to obtain applications from desirable and eligible nonmembers. Wherever there are less than twenty-five members of the Institute, but it is felt that applications can be obtained from the necessary number of eligible nonmembers, this tentative canvass may be made, and the membership applications forwarded to the Institute office. In making this tentative canvass consideration should be given to the probable permanent chairman and other officers of the Section, if formed. Much of the success of a Section depends on the caliber of the chairman and the interest taken by him in the affairs of the Section. Institute Headquarters, therefore, would like information as to the probable candidates at the time the request is made for the petition forms.

c. On receipt of the petition forms and lists of members residing within the territorial limits, an organization meeting should be called for the purpose of obtaining signatures to the petition, and to form a temporary organization.

d. The petition form, properly signed by the required number of members and accompanied by the minutes of the temporary organization meeting, should then be forwarded to the Institute Headquarters for presentation to the Board of Directors.

e. Upon receipt of the approval of the Board of Directors of the Institute, a meeting should be called for the purpose of forming the permanent organization. At this meeting the officers of the Section should be elected and the several standing committees organized.

f. Thereafter not less than five meetings shall be held annually.

g. A full report of each meeting must be made to the Headquarters of the Institute on the form supplied by the Institute.

American Standards Association
The American Standards Association serves as a national clearing house for engineering and industrial standardization, and acts as the official channel of cooperation in international standardization. It conducts its work through the activity of Sectional Committees, the responsibility for each of the several hundred standardization projects being in the hands of one or more cooperating agencies known as "sponsors."
REPORT OF THE SECRETARY
INSTITUTE OF RADIO ENGINEERS
1931

The following report is submitted to the membership in order that they may become better acquainted with the more important details of the Institute's activities during 1931. The material which is contained therein has been obtained from a number of sources, and is the result of the efforts of over two hundred and fifty members who have been good enough to give of their time and efforts in behalf of the Institute, and who have comprised the many committees through which Institute operations are advanced.

General

There were 6734 members of the Institute on December 31, 1931, as compared to 6535 at the close of 1930. This increase in membership during the year of approximately two hundred is somewhat smaller than has been the gain in membership during the past few years, but in view of business conditions both within and without the radio industry is considered gratifying.

Our seventeen Sections have shown considerable activity and ability in maintaining uninterruptedly their normal operations. In addition to the Sixth Annual Convention, which was held under the auspices of the Chicago Section in June, the Rochester Section sponsored a fall meeting in November which was well attended.

Almost seventy-five meetings were held by the various standing and special committees, and in addition a considerable amount of committee work has been accomplished outside of such meetings. The Papers Committee and Board of Editors in particular did practically all of their work by correspondence so the number of meetings held gives no indication of their activities. Volume 19 of the Proceedings contained a few more pages than any of its predecessors, and the 1931 Year Book was more than 50 per cent larger than any which had been issued previously by the Institute.

Our new Constitution, which is the result of the efforts of the Constitution and Laws Committee and the Board of Directors, establishes for the first time a Student grade of membership which should be particularly appealing to those college students whose interest lies in the communications field.

An examination of the comparative balance sheet which appears at the end of this report discloses a small net gain from operation for the

year which, in view of the continued and unreduced service which has been rendered the membership, indicates that reasonable care is being exercised in handling Institute funds.

Board of Directors

The governing body of the Institute is known as the Board of Directors, and all general policies are established by it. During 1931 ten meetings were held, nine of which were regular meetings and the tenth, a special meeting called to consider the final draft of the new Constitution which was approved by the membership in a subsequent ballot. There was no meeting in June as would normally be the case because the annual convention was held then.

Annual Convention

Under the able chairmanship of Byron B. Minnium, the Chicago Section sponsored the Sixth Annual Convention, the headquarters of which were at the Hotel Sherman in Chicago, Illinois, on June 4, 5, and 6. The attendance at the convention totaled approximately four hundred, the large majority of whom were from outside the Chicago Section area. On the technical program there were eighteen papers on diverse subjects in addition to a special paper presented by Arthur H. Compton of the University of Chicago. An official luncheon was given on the opening day of the Convention and the annual banquet was held on the evening of the second day. An exhibition of component parts, measurement devices, and manufacturing aids served to ac-
quaint those in attendance with the latest developments in these fields. The group which served on the Convention Committee and through whose efforts its success was achieved deserve the thanks of all those in attendance, as well as those who could not attend, for their efforts have assisted the Institute greatly in becoming more valuable in the engineering field of radio.

Institute of Radio Engineers
Growth in membership since founded on August 23, 1912

Fig. 2

Rochester Fall Meeting

The Rochester Fall Meeting, which is rapidly becoming an annual affair, was held on November 9th and 10th, and was attended by three hundred and thirty. A dozen papers were presented in the informal fashion which has made these meetings of such interest in the past. In addition to the informal banquet which was held on the evening of the last day, group luncheons were arranged for both days and a group dinner for the first day of the meeting. It was, accordingly, unnecessary to leave the group activities of the Convention from the time of the first meeting in the morning to the close of the day's events. An exhibition of components, measuring instruments, and manufacturing aids was a part of this meeting. The arrangements were the work of a committee under the chairmanship of Virgil M. Graham, and sincere thanks are due to all who served for their efforts in our behalf.

New York Meetings

New York meetings of the Institute were held on the first Wednesday of each month during the year except in June, July, and August.

Comparison of receipts and disbursements for the period 1914-1931

Fig. 3

The June meeting was in conflict with the date of the Convention in Chicago and the meeting was omitted. No meetings are held in July or August because a large number of members are not available in the city during these summer months. Through the courtesy of the New York Section of the Society of Motion Picture Engineers, those members of the Institute residing in the New York area were invited to attend a meeting at which was given a demonstration and paper on recent developments in vertical cut records.

Committees

A number of standing committees whose duties are outlined in the Constitution or have been determined by past operation are appointed
Admissions

It is the duty of the Admissions Committee to examine critically each application which is submitted to the Institute for either the Member or Fellow grades of membership. Upon receipt of an application for either of these grades, suitable blanks are forwarded to the sponsors whose names are submitted by the applicant and when these are filled in and returned, all of the material is placed in the hands of the Admissions Committee for its consideration and determination as to the fitness of the applicant for the grade of membership desired. The responsibility of this committee in determining upon whether the qualifications of an applicant can be construed as being within the requirements of the Constitution is apparent, as it is through their efforts that the standards of the higher grades of membership are maintained. Under the chairmanship of C. M. Jansky, Jr., the committee held nine meetings and critically scrutinized one hundred applications for the two highest grades of membership. The distribution of these and the decisions reached are tabulated below. The committee does not normally examine applications for the Junior or Associate grades of membership.

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<td>0</td>
</tr>
<tr>
<td>Transfer Fellow grade</td>
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<td>7</td>
</tr>
<tr>
<td>Adm. Member grade</td>
<td>49</td>
<td>24</td>
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<tr>
<td>Transfer Member grade</td>
<td>40</td>
<td>26</td>
</tr>
</tbody>
</table>

The committee also reviewed the new application blanks and made a number of suggestions for their improvement.

Awards

It is the duty of the Awards Committee to recommend to the Board of Directors suitable candidates as recipients for the two awards issued annually by the Institute. These are the Institute Medal of Honor and the Morris Liebmann Memorial Prize. For 1931 the Medal of Honor was awarded to General G. A. Ferrié of Paris for his pioneer work in the up-building of radio communication in France and in the world, his long continued leadership in the communication field, and his outstanding contributions to the organization of international cooperation in radio. Because of his outstanding theoretical and experimental investigations of numerous radio and acoustic devices, the Morris Liebmann Memorial Prize was awarded to Stuart Ballantine of Boonton, N. J.

Mr. Ballantine received the Morris Liebmann Memorial Prize, which is a check for $500, at the annual banquet held in Chicago. It was unfortunate that General Ferrié was unable to be in attendance at this banquet but his duties as chairman of the International Consulting Committee on Radio meeting held in Copenhagen at about the same time prevented this. Arrangements were made whereby a dinner was given in honor of General Ferrié by a number of members of the Institute who attended the meeting in Copenhagen and the presentation made there.

Board of Editors

The Board of Editors have as their chief responsibility the determination of the fitness for publication in the Proceedings of all manuscripts submitted. Under the chairmanship of Alfred N. Goldsmith the committee examined one hundred and thirty-nine papers of which one hundred and twenty-six were approved for publication. It was not found necessary to hold any meetings of the Board of Editors during the year as the personnel was identical with that of the previous year.

Broadcast Committee

The Broadcast Committee under the chairmanship of L. M. Hull held seven meetings and continued with its consideration of a number of questions which were submitted to it by the Federal Radio Commission. Reports were made to the Board of Directors on Federal Radio Commission General Orders Numbered 91 and 97 on "The Power Rating of Broadcast Transmitters" and "Modulation Capabilities of Broadcast Transmitters," respectively. These reports were approved and forwarded to the Commission.

The committee was instructed by the Board of Directors to consider problems other than those submitted to it by the Federal Radio Commission and a study of broadcasting as a systems proposition was suggested.

Dr. Hull found that it would be impossible for him to carry on his duties as chairman of this committee and in November asked to be relieved of this work. In accepting his resignation the Board of Direc-
tors extended to him its thanks and appreciation for the efforts he has made during the past several years in guiding the committee in its successful consideration of the many important and involved problems which have been presented to it. E. L. Nelson of the Bell Telephone Laboratories was appointed to succeed Dr. Hull.

CONSTITUTION AND LAWS

This committee under the chairmanship of R. H. Marriott held two meetings, one of which was devoted to a consideration of a proposed uniform registration law for professional engineers and land surveyors being sponsored by the American Society of Civil Engineers and upon which the Institute was asked to comment. The other meeting was devoted to the preparation of a report for the Board of Directors on such bills concerning radio as were pending in Congress.

MEMBERSHIP

Although the net gain in membership for 1931 amounted to only 3 per cent this is not felt to be a poor showing when general conditions are taken into consideration.

In view of the changes made in the Constitution upon its recent revision, a new membership blank had to be prepared and the committee gave this matter careful thought. It was also necessary to draft a new blank for the Student grade of membership.

DISTRIBUTION OF INSTITUTE MEMBERSHIP

AS OF DECEMBER 31, 1931

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<td>Austria</td>
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<td>Australia</td>
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<tr>
<td>Denmark</td>
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<td>East Africa</td>
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<td>England</td>
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<td>Ireland</td>
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<td>Switzerland</td>
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<td>Tasmania</td>
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<td>Total</td>
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</table>
New York Program

Three meetings of the New York Program Committee were held under the chairmanship of Austin Bailey to determine upon programs for nine New York meetings of the Institute.

Nominations

The Nominations Committee held one meeting to prepare a list of candidates for officers for the forthcoming year. This meeting was held under the chairmanship of J. H. Dellinger, and the recommendations of the committee were submitted to the Board of Directors for its approval.

Papers

The Papers Committee, under the chairmanship of William Wilson found it necessary to hold but one meeting during the year. However, almost one hundred and fifty papers were forwarded to members of the committee throughout the year for their opinions as to the suitability of the manuscripts for publication in the Proceedings and for check on the technical accuracy and completeness of the material submitted. The following tabulation of the results of the efforts of the committee will give some idea of its accomplishments.

| Papers reviewed for publication | 139 |
| Papers published | 126 |
| Papers rejected | 13 |
| Papers returned for revision | 19 |
| Book reviews prepared and published | 16 |
| Discussions published | 7 |

* Of these 13 required translation into English.

Sections

The Sections Committee held four meetings, one of which was the annual meeting held during the Sixth Annual Convention in Chicago and another a special meeting held in Rochester during the Rochester Fall Meeting. It was thus possible for a considerable number of representatives of Sections to be present at the two special meetings and this helped considerably in maintaining a closer contact between the Sections and the committee.

A standard financial report form was prepared to simplify the work of Section treasurers and permit reports to be comparable over long periods of time. Although the new rebate system which allots to each Section $10.00 for each meeting held during the year and 50 cents for each paid member residing in the Section territory was only put

into operation on the first of the year, it appears to have assisted a number of the smaller Sections in their financial affairs. The following table lists some pertinent information regarding the seventeen Sections of the Institute.

| Membership | Meetings Held | Average Attendance | Per cent of Average Attendance to Total Membership |
| December 31, 1981 | 1929 | 1930 | 1931 | |

| Atlantic | 27 | 6 | 4 | 30 | 111 |
| Boston | 26 | 2 | 5 | 5 | 114 | 43 |
| Buffalo-Niagara | 55 | 10 | 7 | 3 | 27 | 50 |
| Chicago | 392 | 6 | 4 | 5 | 104 | 27 |
| Cincinnati | 105 | 4 | 8 | 10 | 52 | 50 |
| Cleveland | 118 | 10 | 8 | 9 | 92 | 78 |
| Connecticut Valley | 140 | 4 | 1 | 9 | 47 | 34 |
| Detroit | 132 | 10 | 10 | 10 | 136 | 103 |
| Los Angeles | 269 | 8 | 10 | 10 | 93 | 35 |
| New Orleans | 36 | 4 | 2 | 2 | 3 | 93 |
| Philadelphia | 497 | 7 | 9 | 8 | 136 | 31 |
| Pittsburgh | 99 | 8 | 9 | 7 | 105 | 106 |
| Rochester | 66 | 8 | 6 | 9 | 108 | 300 |
| San Francisco | 187 | 9 | 11 | 11 | 51 | 27 |
| Seattle | 65 | 9 | 7 | 10 | 66 | 101 |
| Toronto | 173 | 8 | 7 | 10 | 57 | 50 |
| Washington | 217 | 9 | 9 | 9 | 65 | 30 |

1 Joint meeting with A.I.E.E. March 25th—attendance 300.
3 Joint meeting with A.I.E.E. April 11th, May 10th, attendance 250 and 150, respectively.
5 Rochester Fall Meeting, November 9 and 10—attendance 300.

Standards

The last standards report was issued early in 1931 and it is anticipated that the next report will be available in 1933. The main Standards Committee is composed of about twenty-five members under the chairmanship of J. W. Horton. Six technical committees have been appointed. The names of these committees together with the chairmen are listed below:

Technical Committee on Electro-Acoustic Devices
E. D. Cook, Chairman

Technical Committee on Electro-Visual Devices
J. V. L. Hogan, Chairman

Technical Committee on Fundamental Units and Measurements
H. M. Turner, Chairman
Technical Committee on Radio Receivers
H. A. Wheeler, Chairman

Technical Committee on Radio Transmitters and Antennas
William Wilson, Chairman

Technical Committee on Vacuum Tubes
B. E. Shackelford, Chairman

These committees and a number of subcommittees which were appointed to consider specific problems held sixteen meetings during the year.

SECTIONAL COMMITTEE ON RADIO

The Sectional Committee on Radio is operated under the procedure outlined by the American Standards Association, and is sponsored jointly by the American Institute of Electrical Engineers and the Institute of Radio Engineers. The chairman of the committee is Alfred N. Goldsmith and there is operating under the committee a number of technical committees as follows:

Technical Committee on Electro-Acoustic Devices
Irving Wolff, Chairman

Technical Committee on Radio Receivers
Virgil M. Graham, Chairman

Technical Committee on Transmitters and Parts
Haraden Pratt, Chairman

Technical Committee on Vacuum Tubes
J. C. Warner, Chairman

These committees and their subcommittees held seven meetings during the year and have submitted for approval as American Standard, a report which appears elsewhere in this Year Book.

Deaths

With deep regret we inscribe below the names of those whose membership has been terminated by death.

Anderson, S. E.          Boesel, Loren L.
Bentz, Carl F.           Bohling, C. F.
Bernhard, Frederick S.   Burdett, Sam

Acknowledgment

In closing this report to the membership, I take this opportunity of acknowledging the loyal support and cooperation which has been my good fortune to receive from the Institute headquarters staff, without which the contents of this report would have been seriously abbreviated.
### COMPARATIVE BALANCE SHEET
December 31, 1931 and 1930

<table>
<thead>
<tr>
<th>Asset Description</th>
<th>Dec. 31, 1931</th>
<th>Dec. 31, 1930</th>
<th>Increase/Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CASH</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Fund—Corn Exchange Bank</td>
<td>$4,785.37</td>
<td>$14,831.01</td>
<td>$6,045.24</td>
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<tr>
<td>Special Fund—Corn Exchange Bank</td>
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<tr>
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<td>10,666.58</td>
<td>15,354.52</td>
<td>4,687.94</td>
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<tr>
<td><strong>ACCOUNTS RECEivable—CURRENT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior</td>
<td>55.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate</td>
<td>1,752.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Member</td>
<td>15.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrance Fee</td>
<td>3,076.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer Fee</td>
<td>651.55</td>
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<td></td>
</tr>
<tr>
<td>Advertising</td>
<td>107.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reprints</td>
<td>2,000.00</td>
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<td></td>
</tr>
<tr>
<td><strong>TOTAL ACCOUNTS RECEIVABLE—CURRENT</strong></td>
<td>6,362.11</td>
<td>5,422.35</td>
<td>939.76</td>
</tr>
<tr>
<td><strong>INVENTORY</strong></td>
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</tr>
<tr>
<td>Processed on Hand</td>
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<tr>
<td><strong>INVESTMENTS—AT COST</strong></td>
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<tr>
<td>(Market Value Dec. 31, 1931, $39,082.80)</td>
<td>57,607.02</td>
<td>47,403.00</td>
<td>10,214.02</td>
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<tr>
<td><strong>FURNITURE AND FIXTURES</strong></td>
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<td>Less Reserve for Depreciation</td>
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<td><strong>TOTAL INVESTMENTS</strong></td>
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<td><strong>ACCOUNTS PAYABLE</strong></td>
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<td>Account Payable</td>
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<td><strong>TOTAL LIABILITIES</strong></td>
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<tr>
<td><strong>LIABILITIES</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Junior</td>
<td>55.00</td>
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<td></td>
</tr>
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<td></td>
</tr>
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<td>Reprints</td>
<td>2,000.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL LIABILITIES</strong></td>
<td>6,362.11</td>
<td>5,422.35</td>
<td>939.76</td>
</tr>
<tr>
<td><strong>MORRIS LIBRMIANN MEMORIAL FUND</strong></td>
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<td></td>
</tr>
<tr>
<td>Principal</td>
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<tr>
<td>Unrestricted Income</td>
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<td></td>
</tr>
<tr>
<td><strong>TOTAL MORRIS LIBRMIANN FUND</strong></td>
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<td>10,077.37</td>
<td></td>
</tr>
<tr>
<td><strong>SURPLUS</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Balance, January 1</td>
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<td>55,662.67</td>
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<tr>
<td>Operating Profit for Year</td>
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<td>9,212.97</td>
<td>5,349.40</td>
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<tr>
<td><strong>TOTAL SURPLUS</strong></td>
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<td>64,875.64</td>
<td>6,713.57</td>
</tr>
<tr>
<td><strong>TOTAL LIABILITIES AND SURPLUS</strong></td>
<td>65,589.21</td>
<td>64,875.64</td>
<td>6,713.57</td>
</tr>
</tbody>
</table>

The Institute of Radio Engineers
(Incorporated May 13, 1912)

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**CONSTITUTION**

Adopted at the first meeting of the Institute of Radio Engineers May 13, 1912. Amended November 2, 1914 December 5, 1915, and October 7, 1931.

**ARTICLE I**

**NAME AND OBJECT**

Sec. 1—The name of this organization shall be The Institute of Radio Engineers, Incorporated.

Sec. 2—Its objects shall be the advancement of the theory and practice of radio and allied branches of engineering and of the related arts and sciences, their application to human needs, and the maintenance of a high professional standing among its members. Among the means to this end shall be the holding of meetings for the reading and discussion of professional papers and the publication of papers, discussions, communications, and such other matters as may be appropriate for the fulfillment of its objects.

**ARTICLE II**

**MEMBERSHIP**

Sec. 1—The membership of the Institute shall consist of:

a. Fellows, who shall be entitled to all rights and privileges of the Institute.

b. Members, who shall be entitled to all rights and privileges of the Institute except the right to hold the offices of President and Vice President.

c. Associates, who shall be entitled to all rights and privileges of the Institute except the right to hold any elective office specified in Article V.

d. Juniors, who shall be entitled to attend all meetings and to receive copies of all Institute publications.

e. Students, who shall be entitled to attend all meetings and to receive copies of all Institute publications.

Sec. 2—A Fellow shall not be less than thirty-two years of age and shall be either:

a. A radio engineer by profession. As such he shall have attained distinction in his profession and shall be eminently qualified to take responsible charge of important radio work and shall have been in the active practice of his profession for at least ten years, and shall have had responsible charge of important radio work for at least three years.

When the applicant holds in a principal national society of an allied branch of engineering or science membership in a grade for which the qualifications indicate a standing equal to that required for the grade of Fellow herein, such membership shall be considered equivalent to three years of the required ten years of active practice of the radio profession.
b. A professor of physical science or of electrical engineering. As such he shall have attained special distinction as an expounder of the principles of radio science and of radio engineering and shall have had at least ten years' experience as a teacher of physical or electrical subjects and shall have had responsible charge, for three years, of a radio course in a school of science or engineering of recognized standing. Any experience, as defined in paragraph "a," that the applicant may have had as a radio engineer shall be considered the equivalent of the same number of years of experience as "teacher of radio subjects."

c. A person who has done notable original work of service to radio engineering of a character to give him a recognized standing at least equivalent to that required for Fellow under paragraph "a" or "b."

d. A person regularly engaged in radio work for at least ten years, who, by invention or by special proficiency in contributions to the radio science or the radio arts or radio literature, has attained a standing at least equivalent to that required for Fellow under paragraph "a" or "b."

SEC. 3—A Member shall not be less than twenty-five years of age and shall be either:

a. A radio engineer by profession. As such, under general direction he shall have designed and taken responsibility for important radio engineering work or science and shall have been in the active practice of his profession for at least four years.

When the applicant holds in a principal national society of an allied branch of engineering, membership of a grade for which the qualifications indicate a standing equal to that required for the grade of Member herein, such membership shall be considered equivalent to two years of the requisite four years of active practice of the radio profession.

b. A teacher of physical science or of electrical engineering. As such he shall have had at least four years experience as a teacher of radio subjects in a school of recognized standing. Any years of experience the applicant may have had as a radio engineer shall be considered the equivalent of the same number of years' experience as a "teacher of radio science or of radio engineering."

c. A person regularly employed in radio or closely allied work for at least four years, who by invention or proficiency in radio science, the radio arts, or radio literature, or as an executive of any radio enterprise of large scope, has attained a standing equivalent to that required for Member under paragraph "a" or "b." In case of such an executive the applicant must be qualified to take responsible charge of the broader features of radio engineering involved in the work under his direction.

d. A person at least twenty-eight years of age who is an engineer by profession in work closely allied to radio. As such, under general direction, he shall have taken responsibility in important engineering work in his field, or science, and shall have been in active practice of his profession for at least seven years.

SEC. 4—An Associate shall be not less than twenty-one years of age and shall be a person who is interested in or connected with the study or application of radio science or the radio arts.

SEC. 5—A Junior shall have attained the sixteenth anniversary of his day of birth but shall not have passed the twenty-first anniversary thereof, and shall be a person who is interested in the study or application of radio science or the radio arts.

ARTICLE III

ADMISSIONS AND EXPULSIONS

SEC. 1—Applications may be made for admission or transfer to any grade of membership as required by the By-Laws.

The Board of Directors may refuse to elect or transfer any applicant whose character, reputation, or professional conduct has been such as would make him, in the opinion of the Board of Directors, an undesirable member.

SEC. 2—An affirmative vote, oral or written, of at least two-thirds of the Board members voting at any regular meeting of the Board shall elect or transfer an applicant for any grade.

SEC. 3—A rejected applicant may renew his application for membership or transfer at any time after the expiration of one year from the date of the ballot rejecting his previous application.

SEC. 4—All elected candidates shall be duly notified. If acceptance of election by payment of admission fee and dues is not received within six months from the notification, such election shall be considered void, unless for special reasons the time shall be extended by the Board of Directors. Membership of any person shall date from the date of his election. If such date is subsequent to July 1st, only one-half of the annual dues are payable for that year. The applicant shall receive the publications of the Institute, if available, for the period for which dues are paid. But if such publications are not available he shall receive a proportionate refund.

SEC. 5—Any member may be expelled from the Institute by a unanimous vote of the Board of Directors.

SEC. 6—A member may resign his membership by a written communication to the 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 FEES AND DUES

Sec. 1—The entrance fees, transfer fees, and annual dues shall be as follows:

Entrance Fees

- Fellow: $10.00
- Member: 5.00
- Associate: 3.00
- Junior: 1.00
- Student: 1.00

The transfer fee from one grade of membership to another shall be the difference between the corresponding entrance fees.

Annual Dues

- Fellows: $15.00
- Members: 10.00
- Associates: 6.00
- Juniors: 4.00
- Students: 3.00

Sec. 2—The annual dues shall be payable in advance on the first day of January. It shall be the duty of the Secretary to notify each member of the amount due.

Sec. 3—The Board of Directors may temporarily excuse any member from payment of annual dues and may waive in whole or in part dues in arrears.

Sec. 4—Every person admitted to the Institute shall be considered as belonging thereto and liable for the payment of all membership dues until his connection therewith shall have terminated.

ARTICLE V

OFFICERS

Sec. 1—The governing body of the Institute shall be broadly representative of the membership. It shall be known as the Board of Directors and shall consist of the President, Vice President, Secretary, Treasurer, nine elected Directors, five appointed Directors, and the past Presidents of the Institute for the preceding two years.

Sec. 2—The terms of all officers, except the nine elected Directors and the past Presidents, shall be one year each. The President and the Vice President shall not be eligible for immediate renomination to the same office.

Sec. 3—Three Directors shall be elected by the membership annually and shall serve for three years each. At the first election under this Constitution, additional Directors shall be elected, one for one year and one for two years.

Sec. 4—The five appointed Directors shall be chosen by the Board of Directors to serve for terms of one year each.

Sec. 5—The Board of Directors is authorized to appoint a successor to any officer to fill an unexpired term caused by death or resignation.

CONSTITUTION

Sec. 6—No officer shall receive, directly or indirectly, any salary, compensation, or emolument from the Institute, either as such officer, or in any other capacity, unless authorized by a vote of a majority of the entire Board of Directors, except as authorized by the By-Laws.

ARTICLE VI

MANAGEMENT

Sec. 1—The President shall have general supervision of the affairs of the Institute. He shall preside at meetings of the Institute and of the Board of Directors at which he may be present and shall be an ex officio member of all committees.

The Vice President shall assume the duties of the President in event of the absence or incapacity of the President.

In the event that the President or Vice President cannot personally act as Chairman of the Board of Directors, the Board shall elect a Chairman from the Board membership who is so situated relative to the executive office that he can perform any or all of the duties of the President and he is hereby authorized to perform such duties.

Sec. 2—The Board of Directors shall manage the affairs of the Institute in conformity to the laws under which the Institute is organized and the provisions of the Constitution and By-Laws. It shall direct the investment and care of the funds of the Institute, make appropriations for specific purposes, act upon applications for membership as herein provided, take measures to advance the interests of the Institute, appoint all its employees, and generally direct its business. The Board of Directors shall make an annual report to the membership of the Institute, transmitting digests of reports of the Treasurer and of the other officers and of committees. Six members of the Board of Directors shall constitute a quorum.

Sec. 3—The Board of Directors may make, amend, or revoke such By-Laws as are necessary from time to time. To make, amend, or revoke the By-Laws, the proposed changes and reasons therefor shall be prepared in written form and mailed to all members of the Board of Directors thirty days or more before the stipulated meeting at which the vote of the Directors on the proposed changes shall be counted. A two-thirds majority of all Directors' voices either in writing or in person, received at the stipulated meeting, shall be required to adopt any new By-Laws, amendments, or revocations.

Sec. 4—The Treasurer shall see that all monies are deposited in the name of the Institute. He shall invest all funds not needed for current disbursements, as shall be ordered by the Board of Directors. He shall see that all bills are paid when approved as provided by the Board of Directors. He shall make an annual report and such other reports as may be prescribed by the Board of Directors. A digest of the annual report shall be published for the information of the membership of the Institute.

The Board of Directors shall secure a surety bond on the Treasurer.

Sec. 5—The Secretary shall attend all meetings of the Board of Directors and principal meetings of the Institute, prepare the business thereof, and duly record the proceedings thereof. He shall see that all monies due the Institute are carefully collected, and without loss transferred to the custody of the Treasurer. He shall carefully scrutinize all expenditures and use his best endeavor to secure
CONSTITUTION

Fellows, Members, and Associates shall vote for the officers whose names appear on the list of nominees, by written ballots in plain sealed envelopes, enclosed within mailing envelopes marked "Ballot" and bearing the member's written signature. No ballots within unsigned outer envelopes shall be counted. No votes by proxy shall be counted. Only ballots arriving at the executive office prior to October 25th shall be counted. Ballots shall be checked, opened, and counted under the supervision of a Committee of Tellers, between October 25th and the first Wednesday of November. The result of the count shall be reported to the Board of Directors at its first meeting in November and the nominees for President and Vice President and the three nominees for Directors receiving the greatest number of votes shall be declared elected. In the event of a tie vote the Board shall choose by lot between the nominees involved.

Sec. 2—The Treasurer, Secretary, and five appointive Directors shall be appointed by the Board of Directors at its annual meeting for a term of one year or until their successors be appointed.

ARTICLE VIII
MEETINGS

Sec. 1—There shall be an annual meeting of the Board of Directors as soon as practicable after January 1st and before February 1st, at which newly elected officers shall begin their terms of service, and the Board shall make necessary appointments. There shall be a meeting of the Board of Directors in November or after the first Wednesday to receive the report of the Tellers Committee.

Sec. 2—There shall be an annual meeting of the Institute as soon as practicable after the annual meeting of the Board of Directors at which newly appointed Directors, officers, and committees shall begin their terms of service and at which general reports of the Secretary and Treasurer shall be made, and at which the retiring and incoming Presidents shall be requested to present addresses in person or by proxy.

Sec. 3—Additional business meetings and meetings for the reading and discussions of papers shall be held as prescribed in the By-Laws.

Sec. 4—The Institute may adopt, from time to time, rules for the order of business at its meetings.

Sec. 5—In addition to the annual and November meetings of the Board of Directors, meetings of the Board shall be held at such times as are necessary to carry out the provision of this Constitution and may be held at such other times as any three members of the Board may determine, but only on notice to all members of the Board.

ARTICLE IX
INSTITUTE SECTIONS

Sec. 1—Whenever, in the judgment of the Board of Directors, a sufficient number of Fellows, Members, and Associates shall petition, in writing, these members may form, subject to the Constitution and all By-Laws and regulations which may be hereafter prescribed by the Board of Directors, a Section of the Institute of Radio Engineers for the purpose of more effectively carrying out the aims of the Institute.
Sec. 2—Any member may become a member of such Section, but no such member shall be entitled to vote, or hold office, in more than one Section at a given time.

Sec. 3—The Board of Directors may at any time terminate the existence of any section when in its judgment the interests of the Institute make such action desirable.

ARTICLE X
AMENDMENTS

Sec. 1—Amendments to this Constitution may be proposed by means of a petition signed by not less than thirty-five (35) Fellows, Members, or Associates, or by means of a resolution adopted by the Board of Directors. Such proposed amendment or amendments shall be submitted to legal counsel by the Board of Directors, and if, in the opinion of such counsel, they are in accordance with the laws under which the Institute is organized, a copy shall be mailed, with a letter ballot, to each member.

Sec. 2—Constitutional amendment ballots shall be mailed to the membership sixty days before the date set for counting the ballots, and the ballots shall carry a statement of the time limit for delivery to the executive office. The Secretary shall hand these ballots to a Committee of Tellers, which shall count such votes and make a sealed report in duplicate to the Board of Directors at the next meeting of the Board, one copy of which shall forthwith be filed with the Secretary, while the other copy shall remain in possession of the chairman of the committee, who shall hand this report to the presiding officer. In the absence of this report by the chairman of the committee the Secretary shall produce the duplicate copy and hand the same to the presiding officer of the meeting. The presiding officer shall then cause the report to be read. If the total vote be not less than twenty per cent (20%) of the total membership of the Institute, and if seventy-five per cent (75%) or more of all the Fellows, Members, and Associates voting shall declare themselves in favor of the proposed amendment or amendments, the same shall become a part of the Constitution.

Sec. 3—Amendments shall take effect thirty (30) days after their adoption, but officers and officers-elect of the Institute at the time any amendment becomes effective shall continue in office until the end of the terms for which they were elected.

Sec. 4—The Secretary shall print copies of the amendments as soon as practicable after adoption, and distribute the same to the membership.

Sec. 5—A complete history of amendments shall be kept in the files of the Institute.

BY-LAWS
OF THE INSTITUTE
OF RADIO ENGINEERS

Article VI, Sec. 3, of the Constitution provides for By-Laws as follows:
"The Board of Directors may make, amend, or revoke such By-Laws as are necessary from time to time. To make, amend, or revoke the By-Laws, the proposed changes and reasons therefore shall be prepared in written form and mailed to all members of the Board of Directors thirty days or more before the stipulated meeting at which the vote of the Directors on the proposed changes shall be counted. A two-thirds majority of all Directors' votes either in writing or in person, received at the stipulated meeting shall be required to adopt any new By-Laws, amendments, or revocations."
suitable grade may give the names, occupations, and addresses of responsible nonmembers to complete the required number of references.

Sec. 5—No application for admission or transfer shall be acted upon by the Admissions Committee until the number of replies prescribed above is received, except where requirements have been waived as provided in the foregoing Section.

Sec. 6—An applicant for admission to the Institute, who, in the judgment of the Admissions Committee, is not eligible for the grade applied for, but is eligible for admission to a lower grade, may be so notified, and be given the opportunity of changing his application accordingly.

Sec. 7—The names of applicants for admission, or, transfer to, in the Institute after approval by the Admissions Committee or other authority shall be posted in the Proceedings with a request that any member objecting to the election or transfer of any candidate shall make written communication to the Secretary, who shall refer such communication to the Board of Directors at the time of submission of the name of such candidate.

Sec. 8—Transfer of an Associate or Member to a higher grade may be proposed by any member acting as sponsor, in which case the sponsor shall fill out the application blank and provide letters of reference for submission to the Admissions Committee. If the application is favorably acted upon, the sponsor shall secure the candidate’s signature to a duplicate application blank after which the application shall be posted and submitted to the Board of Directors with other applications as specified in Section 7.

Sec. 9—The Membership Committee shall, each year, select from the membership list the names of all members whom they think are entitled to a higher rank in membership, and shall act as sponsors as prescribed in Section 8 of these By-Laws.

Sec. 10—Objection to the admission or transfer of any candidate to any grade must be accompanied by reasons for such objection. All such statements shall be treated as confidential.

Sec. 11—The privileges attaching to membership in the Institute, shall not be accorded to applicants for admission until they have been duly elected, and have paid their entrance fees and current dues.

Sec. 12—A prompt notification of his election, accompanied by a statement of his initiation fee (if unpaid) and dues, shall be mailed to each candidate by the Secretary. A second notice of his indebtedness shall be sent by mail one month later to every candidate remaining in arrears in the continental United States and Canada and two months later to all other candidates. The Secretary may, at his discretion, cancel the election of any candidate who has not paid his initiation fee and remains in arrears three months after the mailing of the second notice.

Sec. 13—Any member who has resigned in good standing may be reinstated without payment of entrance fee.

If such applicant so desires he may be reinstated, retaining his original date of membership or transfer, by payment of all dues which have accrued during the interim, and he will then be entitled to such Institute publications issued during this period as may be available and a rebate for such publications as are not available.

Sec. 14—Any member who has been dropped as delinquent may upon payment of the dues for which he was in arrears be reinstated or he may at his option be reflected to that grade of membership previously held upon payment of the entrance fee and current dues for that grade.

Sec. 15—The institute rights and privileges of each member shall be personal to himself, and shall not be transferable or transmissible by his own act or by operation of law.

Sec. 16—A member whose membership shall terminate for any cause of his own right or interest in any property of the Institute or any claim or privilege in or against the Institute or pertaining thereto.

Sec. 17—Any member whose dues are more than two months in arrears shall be notified by the Secretary. Should his dues not be paid when they become three months in arrears, he shall lose the right to vote or to receive the publications of the Institute. Should his dues become six months in arrears, he shall be again notified in form prescribed by the Board of Directors, and if such dues become ten months in arrears, he shall forfeit his connection with the Institute. The Board of Directors may, however, for cause deemed by it sufficient, extend the time for payment and for the application of these penalties.

Sec. 18—The mailing of bills or statements to the most recent address received from a member shall be considered a valid notice of indebtedness.

Sec. 19—Allied vocation, work, art, and science shall be construed largely upon the interest in the Proceedings of this Institute and upon the present and future applications of radio developments. Any work, art, or science which in its present state is obviously dependent on past, present, or probable future radio developments, any work, art, or science from which there is an obvious demand for the Proceedings of the Institute, and any work, art, or science which obviously contributes to the development of radio engineering shall be considered as an allied branch of engineering or of the related arts or sciences.

In each individual case the decision as to whether or not a candidate’s occupation is sufficiently closely related to the purpose of the Institute shall be made by the Board of Directors in cooperation with the Admissions Committee.

ELECTION OF OFFICERS

Sec. 20—In January the Board of Directors shall select three of its members to serve as a Nominations Committee who shall select a chairman from their number and two or more additional committee members, if they deem it desirable.

As soon as practicable the Nominations Committee shall meet to select nominees and shall present its selections to the Board of Directors before April 15th. They shall suggest three or more names for each office and shall avoid naming persons who would presumably not accept the nominations, insofar as may be practicable.

Sec. 21—The Secretary, appointed as prescribed in Article VII, Sect. 2 of the Constitution shall be paid a salary, the amount of which shall be determined by the Board of Directors.

BOARD OF DIRECTORS

Sec. 22—Meetings of the Board of Directors shall be held the first Wednesday of each month in the office of the Institute in New York City except that in July and August meetings may be omitted.

Minutes of all meetings of the Board of Directors shall be sent to each member of the Board of Directors.
INSTITUTE MEETINGS

Sec. 23—Meetings shall be held by the Institute on the first Wednesday of each month except July and August and at such other times and places as the Board of Directors may elect.

Sec. 24—There shall be one or more general conventions of the Institute each year. Regional conventions may also be held. The location and dates of all conventions shall be determined by the Board of Directors.

Sec. 25—The President shall appoint a Convention Committee for each convention. The duties of this committee shall consist in making all necessary local arrangements for the convention, in cooperation with the Secretary and the Papers Committee. The chairman of the Convention Committee shall appoint such subcommittees as he deems necessary, as, for example, Committees on Publicity, Finance, Technical Sessions, Inspection Trips, Entertainment Features, Hotel Arrangements, etc.

SECTIONS

Sec. 26—A petition for the formation of a Section shall be signed by not less than twenty-five (25) Fellows, Members, and Associates residing within the territorial limits hereinafter prescribed. The Board of Directors may decline to authorize the formation of a Section when in its judgment such an organization would not be compatible with the interests of the Institute.

Sec. 27—All Sections will conform to a Constitution for Sections provided by the Institute. The Constitution for Sections will be found following these By-Laws.

Sec. 28—In the initial Section organization only petitioners shall have the right to vote.

Sec. 29—A Section of the Institute may cooperate with other local organizations in the holding of joint meetings, and may invite members of such organizations and the public to its meetings.

Sec. 30—The territory of a Section shall include the locality naturally tributary thereto, but shall not include territory so remote or inaccessible that members cannot readily attend meetings. For the purpose of determining the maximum amount to which the Section is entitled under these By-Laws, points more than sixty miles from the regular meeting place of the Section shall not be considered a part of that Section, except that, when special conditions warrant such action, additional territory within a reasonable distance may be authorized by the Board of Directors, upon approval of the Sections Committee. If adjacent Sections are so situated that the sixty-mile limit embraces common territory, the question as to which Section may claim such members as reside within this common territory shall, if possible, be decided by agreement between the Sections concerned, otherwise by the Sections Committee.

Sec. 31—The Board of Directors may at any time terminate the existence of any Section when in its judgment the interests of the Institute make such action desirable.

Sec. 32—Papers and discussions presented before a Section shall be the property of the Institute, and may be published only on authorization by the Board of Editors.

CONSTITUTION

Sec. 33—Each Section shall conduct its affairs in such a manner as to demand for its maintenance a minimum of financial support by the Institute consistent with the activities carried on by that Section.

The appropriation of Institute funds during any fiscal year for aid in Section maintenance shall be the sum determined as follows: Fifty cents for each Fellow, Member, and Associate residing within the territory of the Section at the beginning of the fiscal year, namely, January 1st, plus ten ($10.00) dollars for each meeting up to and including the tenth meeting held during the year.

Sections shall have no authority to contract debts, pledge the credit, or in any way bind the Institute.

Sec. 34—Section Secretaries shall forward to the Secretary of the Institute a report of each meeting held by the Section for the presentation or discussion of papers, and on January 1st of each year a statement of the past year's accounts.

SECTION DELEGATES

Sec. 35—The Section delegates attending a convention shall be members of the Institute. The duties of these delegates shall be as follows:

a. To attend such meetings of the Sections Committee as may be held during the convention.

b. To exchange views and experiences in connection with Section activities and management and to make recommendations of an advisory nature upon such matters to the Board of Directors.

c. To exchange and discuss ideas regarding subjects for inclusion in technical programs of future Section meetings.

d. To advise the chairman of the Sections Committee at least sixty days in advance of the convention of questions of interest to the Institute Sections which, in their opinion, should be discussed by the delegates at the meetings of the Sections Committee during the convention. The chairman of the Sections Committee shall appoint a subcommittee of three, who with the chairman, ex-officio, shall prepare in advance of the convention a program of such questions for discussion.

e. Past chairman or chairmen-elect of Sections, if in attendance at the convention, shall have the privilege of attending all meetings of the Sections Committee but each Section shall be entitled to one vote only, which shall be cast by the chairman of the Section or other official delegate of the Section.

STUDENTS

Sec. 36—Each application for enrollment as a Student shall be endorsed by a member of the faculty of the school which he attends.

Sec. 37—The period of Student enrollment shall not exceed three years, nor shall it extend more than one and one-half years beyond the date of award of the baccalaureate degree or leaving the university or technical school. The period of enrollment shall date from the first of January nearest the date of filing application.

Sec. 38—The annual fee paid by each Student shall be applied as a subscription to the Proceedings for the year covered by such payment.

Sec. 39—A Student changing his mailing address without notifying the Secretary shall be entitled to duplicate copies of the Proceedings when available upon payment of fifty cents each.
COMMITTEES AND THEIR DUTIES

Sec. 40—The standing committees to be appointed by the President shall include the following:

Admissions Committee
Awards Committee
Board of Editors
Constitution and Laws Committee
Membership Committee
New York Program Committee
Nominations Committee
Papers Committee
Publicity Committee
Section Committee
Standards Committee
Tellers Committee

The President shall appoint the members and designate the chairman of each committee, who shall select a Vice Chairman and a Secretary. Copies of minutes of all meetings and actions of committees shall be forwarded promptly by the committee secretary to the Secretary of the Institute for his file.

Standing committees shall serve from annual meeting to annual meeting.

The President or the Board of Directors may appoint additional members to any committee at any time.

Sec. 41—The Admissions Committee shall consist of five or more Fellows and Members of the Institute. The duties of this Committee are indicated in Article III of the Constitution and under “Membership” in the foregoing By-Laws.

Sec. 42—The Awards Committee shall consist of the Chairman of the Papers Committee, acting as Chairman, together with the Chairmen of the Constitution and Laws Committee, the Papers Committee of the previous year, and the Chairmen of such other committees as the Board of Directors may designate. The Committee shall designate the members of the Board of Directors.

Sec. 43—The Board of Editors shall consist of four or more appointed members and the Secretary ex-officio. The Chairman shall be selected from the Board of Directors.

This Committee shall have supervision of the Proceedings, and other publications of the Institute, including matters pertaining to the format of these publications, decisions regarding the publication of papers, discussions, and all other material available for publication, and the formulation and carrying out of plans for bringing into practice the policies regarding Institute publications that may be determined from time to time by the Board of Directors.

Sec. 44—The Constitution and Laws Committee shall consist of five or more members of the Institute, one of whom is a lawyer. It shall consider and investigate all matters relating to the Constitution and By-Laws of the Institute, the duties and jurisdiction of its officers and committees, its legal status and responsibilities, and like legal and cognate questions referred to it by the Board of Directors for action thereon. The Committee shall consult legal and technical counsel with reference to any question before it.

CONSTITUTION

Sec. 45—The Membership Committee shall consist of five or more members, and the chairman of the Membership Committees of the Sections of the Institute, ex-officio.

This Committee shall bring the advantages of membership to the attention of desirable candidates for admission to the Institute. The Committee may enlist the cooperation of the Sections in its work or take such other measures as it may consider advisable to interest prospective members of the standing and qualifications specified for the various grades of membership.

Sec. 46—The New York Meetings Program Committee shall consist of five or more members and shall prepare the programs for New York meetings of the Institute.

Sec. 47—The Nominations Committee shall consist of five or more members who shall recommend to the Board of Directors on or before the May meeting of the Board of Directors, a list of nominees for the offices of President, Vice President, and three Directors.

Sec. 48—The Papers Committee of five or more members shall be appointed for their ability to obtain, examine, and select papers.

This Committee shall cooperate with the Convention Committees. The Committee shall receive and consider all papers and in addition shall arrange directly for papers relating to subjects within the scope of Institute activity.

Sec. 49—The Publicity Committee shall consist of five or more members and shall give such publicity through the public press of Institute activities as will contribute to the growth and usefulness of the Institute.

Sec. 50—The Sections Committee shall consist of five or more appointed members and the chairman of each Section, ex-officio, or his representative.

This Committee shall have the general supervision and management of the Sections of the Institute. The Committee shall confer with the Section officers and it shall consider, investigate, and make recommendations to the Board of Directors for action upon all matters regarding or involving the interests and welfare of Sections.

Sec. 51—The Standards Committee shall consist of ten or more members with such additional members as may be necessary to bring the plan of organization adopted by the Standards Committee.

This Committee shall consider and investigate all matters relating to units and standards appertaining to or applicable in radio engineering and in the allied engineering arts and sciences. The Committee shall make reports and recommendations to the Board of Directors for action thereon.

Sec. 52—The Tellers Committee shall consist of the Secretary and at least one Associate, one Member, and one Fellow.

Sec. 53—The functions of temporary committees shall be defined by the Board of Directors. At the beginning of each administrative year the Secretary shall transmit to all the members of each temporary committee whose duties may be continued, copies of the original resolutions constituting such temporary committee.

Sec. 54—Committees shall be listed in alphabetical order in Institute publications.
CONSTITUTION

SEC. 64.—A reinstated or new member shall be entitled to receive single copies of the Proceedings issued during the period covered by his payment of dues when copies are available, and shall be entitled to a rebate of twenty-five cents per copy when such Proceedings are not available.

SEC. 65.—An alphabetical and geographical list of members shall be published annually. The grade of each member shall be indicated in either list, or both, by a difference in type or otherwise, at the Secretary’s discretion. This list, usually in the form of a Year Book, shall be sent to all members without charge. The list of members shall be corrected to January 1st and mailed as soon thereafter as practicable.

PUBLICITY

SEC. 66.—Officers and committees, who consider that publicity regarding any Institute activities under their jurisdiction should be given in the daily or technical press, are urged to prepare such announcements as they may deem desirable, which should then be forwarded, with recommendations, to the Secretary. The Secretary will promptly refer them to the Publicity Committee. If the Secretary or the Publicity Committee is in doubt as to the propriety of publication the question may be referred to the Board of Directors. If the subject is a matter of news, the news value may be retained by discussing the matter over the telephone with as many committee members as are available.

PUBLICATIONS

SEC. 61.—The regular publications of the Institute shall include the Proceedings, to be published monthly.

SEC. 62.—The Proceedings may have two principal divisions:

a. For current matter and Institute news.

b. For technical papers, discussions, and other matter of engineering character.

SEC. 63.—The Secretary is authorized to receive annual subscriptions to the monthly Proceedings at the rate of $10.00 per annum with an extra postage charge sufficient to cover the mailing cost to all countries to which the bulk rate of postage does not apply. A discount of fifty per cent from the subscription price of $10.00 will be allowed to colleges, public libraries, and libraries of learned organizations or institutions of standing upon direct subscription to Institute headquarters. Members, publishers and subscription agencies may be allowed a discount of twenty-five per cent.
CONSTITUTION FOR SECTIONS

(NAME OF PLACE OR GEOGRAPHICAL DISTRICT SECTION OF)

THE INSTITUTE OF RADIO ENGINEERS

CONSTITUTION

ARTICLE I

NAME AND OBJECT

Sec. 1—This organization shall be known as the ................................ Section of the Institute of Radio Engineers.

Sec. 2—The Section shall strive for the advancement of the theory and practice of radio engineering and of the allied arts and sciences, and the maintenance of a high professional standing among its members, all in consonance with the Constitution and By-Laws of the Institute and with special attention to such aims within the territory of the Section as are hereinafter defined.

Sec. 3—The Section shall aid in promoting close cooperation and good fellowship among its members and to this end shall hold meetings for the transaction of the regular business of the Section and for the presentation of papers and their discussion.

ARTICLE II

MEMBERSHIP

Sec. 1—All members of the Institute residing within the territory of the Section are automatically members of this Section. There shall be no other grades of membership.

Sec. 2—All Fellows, Members, and Associates of the Institute residing within the territory of the Section shall be entitled to attend meetings, vote, and hold office.

Sec. 3—Junior and Student members of the Institute shall be entitled to attend meetings but shall not have the right to vote or hold office.

ARTICLE III

TERRITORY

Sec. 1—The territory of the Section shall comprise (counties and State or States).

ARTICLE IV

DUES

Sec. 1—There shall be no Section dues.

ARTICLE V

OFFICERS

Sec. 1—The officers of the Section shall be a Chairman, a Vice Chairman and a Secretary-Treasurer.

Sec. 2—Terms of all officers shall be for one year beginning at the close of the annual meeting at which election is held and continuing until their successors are duly elected and take office.

ARTICLE VI

MANAGEMENT

Sec. 1—There shall be an Executive Committee consisting of the officers, the Junior Past Chairman, the Chairman of the Meetings and Papers Committee, the Chairman of the Membership Committee, the Chairman of the Publicity Committee, and, if desired by the Executive Committee, one additional member to be appointed by the Chairman.

Sec. 2—The Chairman, responsible to the Executive Committee, shall have general supervision of the affairs of the Section. He shall preside at meetings of the Section and the Executive Committee and have such other powers and perform such other duties as may be provided for in the By-Laws, or as may be delegated to him by vote of the Section. In his absence his duties shall be performed by the Vice Chairman.

Sec. 3—The Secretary-Treasurer shall receive and deposit all monies in the name of the Section in such depository as shall be determined by the Executive Committee. He shall make only such disbursements as shall be ordered by the Executive Committee.

Sec. 4—The Secretary-Treasurer shall send out notices, prepare the agenda for, and record the minutes of all meetings of the Section and of the Executive Committee. He shall make such reports of his activities as may be required by the Executive Committee of the Institute.

Sec. 5—The Chairman, as soon as expedient after the annual meeting, shall appoint the following standing committees:

Meetings and Papers Committee
Membership Committee
Publicity Committee

Members appointed shall serve until their successors are appointed or the committee dissolved.

Other Committees may be authorized by vote of the Section at any regular meeting, and shall be appointed by the Chairman of the Section.
ARTICLE VII
NOMINATION AND ELECTION OF OFFICERS

Sec. 1—All officers shall be elected at the annual meeting of the Section upon nomination by a nominating committee of three members not then officers of the Section, duly appointed by the Chairman of the Section two months before the annual meeting. These nominations shall be announced in the notice of the annual meeting. Nominations may also be made from the floor.

Sec. 2—Vacancies in office occurring during the year shall be filled by the Executive Committee for the remainder of the unexpired term unless otherwise provided for.

Sec. 3—If for any reason the best interests of the Section seem to require a change in the governing body during the year, the matter shall be duly and carefully considered by the Executive Committee. Upon not less than two-thirds vote of the Executive Committee, or upon receipt by the Executive Committee of a petition signed by fifteen (15) members of the Section, recommendation shall be made to the Section for action at a special meeting to be duly called by the Executive Committee for the sole purpose of considering and voting upon such a change.

A two-thirds vote of the members present shall be necessary to declare an office vacant. Upon a two-thirds vote of the members present the vacant office may be filled for the unexpired term upon nomination from the floor.

ARTICLE VIII
MEETINGS

Sec. 1—The Section shall not hold less than five regular meetings during the year, one of which shall be an annual meeting.

Sec. 2—These meetings shall be held at some specific time in the year as prescribed in the Section By-Laws.

Sec. 3—The fiscal year of the Section shall correspond with the fiscal year of the Institute. (Calendar year.)

Sec. 4—Fifteen members shall constitute a quorum at all meetings of the Section called for the transaction of regular business and requiring a vote to be taken.

Sec. 5—A plurality vote of the members present is necessary for the election of officers.

Sec. 6—Meetings of the Executive Committee shall be held at such times as shall be found necessary. Executive Committee meetings may be called by the Chairman of the Section at his own discretion or shall be at the request of three members of the committee.

Sec. 7—Four members shall constitute a quorum at all meetings of the Executive Committee except as otherwise provided herein.

Sec. 8—A majority vote of the Executive Committee shall be necessary, in the conduct of its business except as otherwise provided in this Constitution or in the Section By-Laws.

CONSTITUTION

Sec. 9—The Secretary-Treasurer shall send out notices of all regular Section meetings to all Institute members in the territory of the Section at least one week prior to the date of meeting. These notices shall contain a full statement of the time, place, and business of the meeting.

ARTICLE IX
AMENDMENTS

Sec. 1—This Constitution may be amended by a two-thirds vote of all members present at any annual meeting of the Committee on Sections provided that notices of the proposed meeting and the proposed change has been sent to all members of the Committee on Sections at least one month in advance of the meeting. Such action shall be subject to the approval of the Board of Directors of the Institute.

Sec. 2—In the event of absence of any member of the Committee on Sections, he may vote by proxy on amendments to this constitution.

Sec. 3—Suitable By-Laws to this constitution may be adopted by a two-thirds vote of the Section provided they are consonant with the Constitution and By-Laws of the Institute and this Constitution. A copy of these By-Laws shall be filed in the Institute office.

ANNUAL MEETINGS

The annual meeting at which officers for the succeeding year are elected is usually a regular monthly meeting. The particular month chosen by each of the Sections is tabulated below.

<table>
<thead>
<tr>
<th>Sections</th>
<th>Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlanta</td>
<td>January</td>
</tr>
<tr>
<td>Boston</td>
<td>December</td>
</tr>
<tr>
<td>Buffalo-Niagara</td>
<td>June</td>
</tr>
<tr>
<td>Chicago</td>
<td>December</td>
</tr>
<tr>
<td>Cincinnati</td>
<td>December</td>
</tr>
<tr>
<td>Cleveland</td>
<td>December</td>
</tr>
<tr>
<td>Connecticut Valley</td>
<td>Last regular meeting of calendar year</td>
</tr>
<tr>
<td>Detroit</td>
<td>December</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>December</td>
</tr>
<tr>
<td>New Orleans</td>
<td>June</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>June</td>
</tr>
<tr>
<td>Pittsburgh</td>
<td>May</td>
</tr>
<tr>
<td>Rochester</td>
<td>Last spring meeting</td>
</tr>
<tr>
<td>San Francisco</td>
<td>June</td>
</tr>
<tr>
<td>Seattle</td>
<td>December</td>
</tr>
<tr>
<td>Toronto</td>
<td>May</td>
</tr>
<tr>
<td>Washington</td>
<td>December</td>
</tr>
</tbody>
</table>
INDEX TO CONSTITUTION AND BY-LAWS

Roman numerals refer to Articles; arabic numerals, to Sections; and numbers in parentheses, to By-Laws.

<table>
<thead>
<tr>
<th>Article</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amendments, By-Laws</td>
<td>VII, 3</td>
</tr>
<tr>
<td>Constitution</td>
<td>X, 1</td>
</tr>
<tr>
<td>Ballot</td>
<td>X, 2</td>
</tr>
<tr>
<td>Election</td>
<td>X, 5</td>
</tr>
<tr>
<td>Publication</td>
<td>X, 4</td>
</tr>
<tr>
<td>Applications</td>
<td>III, 1</td>
</tr>
<tr>
<td>Change of grade</td>
<td>(60)</td>
</tr>
<tr>
<td>Publishing</td>
<td>(7)</td>
</tr>
<tr>
<td>Renewal</td>
<td>III, 3</td>
</tr>
<tr>
<td>Associate, Abbreviation</td>
<td>(1)</td>
</tr>
<tr>
<td>Due</td>
<td>IV, 1</td>
</tr>
<tr>
<td>Entrance Fee</td>
<td>IV, 1</td>
</tr>
<tr>
<td>Privileges</td>
<td>II, 1</td>
</tr>
<tr>
<td>When Obtained</td>
<td>II, 1</td>
</tr>
<tr>
<td>Requirements</td>
<td>(4)</td>
</tr>
<tr>
<td>Sponsors</td>
<td>(2)</td>
</tr>
<tr>
<td>Transfer Fee</td>
<td>IV, 1</td>
</tr>
<tr>
<td>Board of Editors</td>
<td>(40)</td>
</tr>
<tr>
<td>Awards Committee</td>
<td>(10)</td>
</tr>
<tr>
<td>Badges, Improper Use of</td>
<td>(3)</td>
</tr>
<tr>
<td>Board of Directors</td>
<td>V, 1</td>
</tr>
<tr>
<td>Chairman</td>
<td>VI, 1</td>
</tr>
<tr>
<td>Duties</td>
<td>VI, 2</td>
</tr>
<tr>
<td>Minutes</td>
<td>VIII, 5, (22)</td>
</tr>
<tr>
<td>Annual</td>
<td>VIII, 1</td>
</tr>
<tr>
<td>Minutes of</td>
<td>(22)</td>
</tr>
<tr>
<td>Quorum</td>
<td>(2)</td>
</tr>
<tr>
<td>By-Laws</td>
<td>VI, 3</td>
</tr>
<tr>
<td>Committees, Appointment of</td>
<td>VI, 6, (10)</td>
</tr>
<tr>
<td>Listing in Publications</td>
<td>(5)</td>
</tr>
<tr>
<td>Secretaries</td>
<td>(10)</td>
</tr>
<tr>
<td>Standing</td>
<td>(9)</td>
</tr>
<tr>
<td>Temporary</td>
<td>(53)</td>
</tr>
<tr>
<td>Terms of Members</td>
<td>(40)</td>
</tr>
<tr>
<td>Vice Chairmen</td>
<td>(40)</td>
</tr>
<tr>
<td>Constitution, Nonretrievable and Law Committee</td>
<td>(40)</td>
</tr>
<tr>
<td>Conventions</td>
<td>(3)</td>
</tr>
<tr>
<td>Committees</td>
<td>(24)</td>
</tr>
<tr>
<td>Directors</td>
<td>V, 1</td>
</tr>
<tr>
<td>Appointed</td>
<td>V, 3</td>
</tr>
<tr>
<td>Elected</td>
<td>V, 5</td>
</tr>
<tr>
<td>Duties</td>
<td>IV, 1</td>
</tr>
<tr>
<td>Awards</td>
<td>V, 1</td>
</tr>
<tr>
<td>Notice of</td>
<td>(18)</td>
</tr>
<tr>
<td>Waived</td>
<td>IV, 3</td>
</tr>
<tr>
<td>When Payable</td>
<td>IV, 2</td>
</tr>
<tr>
<td>Election of Officers</td>
<td>VII, 1</td>
</tr>
<tr>
<td>Expense of Representatives</td>
<td>(56)</td>
</tr>
</tbody>
</table>

Expulsion | III, 5 |
| Entrance Fee | IV, 1 |
| Election, Notification of | IV, 1 |
| Fiscal Year | VI, 7 |
| Fellow, Abbreviation | (1) |
| Due | IV, 1 |
| Entrance Fee | IV, 1 |
| Privileges | II, 1 |
| When Obtained | II, 2 |
| Requirements | (4) |
| Sponsors | (4) |
| Transfer Fee | IV, 1 |
| Junior, Abbreviation | (1) |
| Due | IV, 1 |
| Entrance Fee | IV, 1 |
| Privileges | II, 1 |
| When Obtained | II, 6 |
| Requirements | (4) |
| Sponsors | (2) |
| Transfer Fee | IV, 1 |
| Management | VIII, 23 |
| Meetings | VIII, 23 |
| Member, Abbreviation | II, 1 |
| Due | IV, 1 |
| Entrance Fee | IV, 1 |
| Privileges | II, 1 |
| When Obtained | II, 6 |
| Requirements | (4) |
| Sponsors | (2) |
| Transfer Fee | IV, 1 |
| Membership, Grades | II, 1 |
| List | (65) |
| Alphabetic | (65) |
| Geographical | (65) |
| Claims | (10) |
| Committees | (9) |
| Limitations | (18) |
| School Credit | II, 7 |
| Use of Terms | II, 9 |
| Temporary | VI, 5 |
| Terms of | VI, 5 |
| Due | IV, 1 |
| Election, Officers | VII, 1 |
| Executive Committee | VII, 1 |
| Notice of | VIII, 1 |
| Special | VII, 2 |
| Time of | VII, 2 |
| Vote on | VII, 2 |
| Membership | VI, 5 |
| Privileges | II, 3 |
| Name | I, 1 |
| Nomination, Officers | VII, 1 |
| Object | I, 2 |
| Officers | VII, 3 |
| Change of | VII, 3 |
| Election | VI, 3 |
| Nomination | VII, 3 |
| Terms of | VII, 3 |
| Vacated | VII, 3 |
| Secretary-Treasurer | V, 1, VI, 3, VIII, 9 |
| Treasurer | V, 1, VI, 3, VIII, 9 |
| Treasurer | V, 1, VI, 3, VIII, 9 |
| Treasurer | V, 1, VI, 3, VIII, 9 |

INDEX TO SECTION CONSTITUTION AND BY-LAWS

Roman numerals refer to Articles; arabic numerals, to Sections; and numbers in parentheses, to By-Laws.

<table>
<thead>
<tr>
<th>Article</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amendments</td>
<td>IX, 1</td>
</tr>
<tr>
<td>Executive Committee</td>
<td>VII, 1</td>
</tr>
<tr>
<td>Notice of</td>
<td>VIII, 1</td>
</tr>
<tr>
<td>Special</td>
<td>VII, 1</td>
</tr>
<tr>
<td>Time of</td>
<td>VII, 1</td>
</tr>
<tr>
<td>Vote on</td>
<td>VII, 1</td>
</tr>
<tr>
<td>Membership</td>
<td>VI, 5</td>
</tr>
<tr>
<td>Privileges</td>
<td>II, 1</td>
</tr>
<tr>
<td>Name</td>
<td>I, 1</td>
</tr>
<tr>
<td>Nomination, Officers</td>
<td>VII, 1</td>
</tr>
<tr>
<td>Object</td>
<td>I, 2</td>
</tr>
<tr>
<td>Officers</td>
<td>VII, 1</td>
</tr>
<tr>
<td>Election</td>
<td>VII, 1</td>
</tr>
<tr>
<td>Nomination</td>
<td>VII, 1</td>
</tr>
<tr>
<td>Terms of</td>
<td>VII, 1</td>
</tr>
<tr>
<td>Vacated</td>
<td>VII, 1</td>
</tr>
<tr>
<td>Secretary-Treasurer</td>
<td>V, 1, VI, 3, VIII, 9</td>
</tr>
<tr>
<td>Treasurer</td>
<td>V, 1, VI, 3, VIII, 9</td>
</tr>
<tr>
<td>Treasurer</td>
<td>V, 1, VI, 3, VIII, 9</td>
</tr>
</tbody>
</table>

Constitution | 53 |
SECTIONAL COMMITTEE ON RADIO
AMERICAN STANDARDS ASSOCIATION

The conception of the American Standards Association was made in 1919 by a group of technical societies, who took the initiative to establish an authoritative channel through which nationally acceptable standards might be promulgated. The organization formed was first known as the American Engineering Standards Committee, and its purpose was to serve as a clearing house through which trade associations, technical societies, or governmental departments might develop national standards. In 1929 the Committee was reorganized to include a broader industrial scope and its name was changed to the American Standards Association.

The ASA is now essentially a federation of forty-five national technical societies, trade associations, and Federal Government departments. Under its procedure, standards on practically any subject may be initiated by any responsible, authoritative group. The organization of the ASA is such as to provide adequate means for the appointment, by the various groups concerned, of broadly representative committees whose function it is to study and formulate standards. Since these committees, known as Sectional Committees, are made up of individuals officially appointed by the organizations concerned with the subject under consideration, there is assurance, when the preponderance of committee opinion is favorable, that the standard recommended by the Sectional Committee has the extensive approval necessary to make it an American Standard.

In December, 1922, the A.E.S.C. received a request from the National Bureau of Standards asking that a Sectional Committee on Radio be formed for the purpose of establishing standards in the field of radio communication. A conference for the discussion of the project was held in January 1923, and upon the recommendation of the representatives attending this conference, joint sponsorship for the Sectional Committee on Radio was assigned to the Institute of Radio Engineers and the American Institute of Electrical Engineers.

In July, 1929, a standard covering dimensions and arrangements of terminals on four-prong vacuum tube bases was submitted to the American Standards Association and approved as an American Tentative Standard.

In October, 1929, a meeting was held to reorganize the work of the Committee and to apportion the work among four technical committees. Dr. Alfred N. Goldsmith was elected chairman, and Dr. C. H. Sharp, vice chairman of the Committee. The details confronting the Sectional Committee were assigned to the Technical Committee on Transmitters and Parts, under the chairmanship of Haraden Pratt; the Technical Committee on Radio Receivers and Parts, under the chairmanship of V. M. Graham; the Technical Committee on Vacuum Tubes, under the chairmanship of J. C. Warner; and the Technical Committee on Electro-Acoustic Devices, under the chairmanship of Irving Wolff. The division of the work before the Sectional Committee, into four groups corresponding to the four technical committees provided a satisfactory set-up for the establishing of standards on radio matters. During 1930 and the early part of 1931 these four technical committees worked in close cooperation with the similar technical committees of the I.R.E. Committee on Standardization, and during June, 1931, a 44-page pamphlet on "Proposed American Standards on Radio" was forwarded to the members of the Sectional Committee on Radio for ballot vote. The material contained in the "Proposed American Standards on Radio" was based principally on the standards set up by the Institute of Radio Engineers and Radio Manufacturers Association, and contained "Standard Definitions of Terms Used in Radio", "Standard Tests of Broadcast Radio Receivers", "Standard Vacuum Tube Base and Socket Dimensions", and "Manufacturing Standards Applying to Broadcast Receivers".

On November 18, 1931, a meeting of the Sectional Committee was held and the "Standard Vacuum Tube Base and Socket Dimensions" and "Manufacturing Standards Applying to Broadcast Receivers" appearing in the following sixteen pages were unanimously approved by the Committee. Since then this material has been approved by both sponsor bodies and now awaits final approval by the American Standards Association before its adoption as an American Standard.
STANDARD VACUUM TUBE BASE AND SOCKET DIMENSIONS

**Small Four-Pin Base**

- Nominal: 3/4 in.
- Center: 0.122 in. 0.125 in. 0.128 in.
- Max.: 0.153 * 0.156 * 0.159 *

**Dimensions**

- A. Length of Pins
- B. Diameter of Small Pins
- C. Diameter of Large Pins
- D. Diameter of Base: 1 1/16 in.
- E. Diameter of Pin Circle: 0.440 *
- F. Spacing Between Small Pins: 0.457 *
- G. Spacing Between Large Pins: Pins are rigid, not split.

**Large Four-Pin Base with Bayonet Pin**

- Nominal: 3/4 in.
- Center: 0.122 in. 0.125 in. 0.128 in.
- Max.: 0.153 * 0.156 * 0.159 *

**Dimensions**

- A. Length of Pins
- B. Diameter of Small Pins
- C. Diameter of Large Pins
- D. Diameter of Base
- E. Distance from Top of Bayonet Pin to Bottom of Contact Pin: 1 1/16 in.
- F. Diameter of Bayonet Pin: 0.640 *
- G. Length of Bayonet Pin
- H. Diameter of Pin Circle: 0.458 *
- I. Spacing Between Large Pins: 0.437 *
- J. Spacing Between Small Pins: Pins are rigid, not split.
### Large Four-Pin Base, without Bayonet Pin

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Min.</th>
<th>Center</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Length of Pins</td>
<td>0.122 in.</td>
<td>0.125 in.</td>
<td>0.128 in.</td>
</tr>
<tr>
<td>B. Diameter of Small Pins</td>
<td>0.113 in.</td>
<td>0.150 in.</td>
<td>1.377 in.</td>
</tr>
<tr>
<td>C. Diameter of Large Pins</td>
<td>0.150 in.</td>
<td>0.150 in.</td>
<td>1.377 in.</td>
</tr>
<tr>
<td>D. Diameter of Base</td>
<td>0.125 in.</td>
<td>0.128 in.</td>
<td>1.377 in.</td>
</tr>
<tr>
<td>E. Diameter of Pin Circle</td>
<td>0.640 in.</td>
<td>0.437 in.</td>
<td>0.468 in.</td>
</tr>
<tr>
<td>F. Spacing Between Small Pins</td>
<td>0.437 in.</td>
<td>0.468 in.</td>
<td>0.468 in.</td>
</tr>
<tr>
<td>G. Spacing Between Large Pins</td>
<td>0.468 in.</td>
<td>0.468 in.</td>
<td>0.468 in.</td>
</tr>
</tbody>
</table>

Pins are rigid, not split.

### Large Five-Pin Base

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Min.</th>
<th>Center</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Length of Pins</td>
<td>0.122 in.</td>
<td>0.125 in.</td>
<td>0.128 in.</td>
</tr>
<tr>
<td>B. Diameter of Pins</td>
<td>0.113 in.</td>
<td>0.150 in.</td>
<td>1.377 in.</td>
</tr>
<tr>
<td>C. Diameter of Pin Circle</td>
<td>0.640 in.</td>
<td>0.437 in.</td>
<td>0.468 in.</td>
</tr>
<tr>
<td>D. Angular Separation of Pins</td>
<td>90 deg.</td>
<td>60 deg.</td>
<td>30 deg.</td>
</tr>
<tr>
<td>E. Angular Separation of Pins</td>
<td>2-3 and 4-5</td>
<td>2-3 and 4-5</td>
<td>2-3 and 4-5</td>
</tr>
<tr>
<td>F. Angular Separation between Line and Pins 3 and 4</td>
<td>30 deg.</td>
<td>30 deg.</td>
<td>30 deg.</td>
</tr>
</tbody>
</table>

Pins are rigid, not split.
**Terminal Cap**

**Terminal Cap for Receiving Tubes**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Min.</th>
<th>Center</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Diameter of Cap</td>
<td>0.346 in.</td>
<td>0.353 in.</td>
<td>0.370 in.</td>
</tr>
<tr>
<td>B. Length of Cap</td>
<td>0.56 in.</td>
<td>0.563 in.</td>
<td>0.576 in.</td>
</tr>
</tbody>
</table>

**Terminal Cap for Transmitting Tubes**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Min.</th>
<th>Center</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Diameter of Cap</td>
<td>0.550 in.</td>
<td>0.563 in.</td>
<td>0.576 in.</td>
</tr>
<tr>
<td>B. Length of Cap</td>
<td>0.56 in.</td>
<td>0.563 in.</td>
<td>0.576 in.</td>
</tr>
</tbody>
</table>

**Four-Pin Transmitting Tube Base**

**Large Transmitting Tube Base**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Min.</th>
<th>Center</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Width of Flat Pin</td>
<td>0.14 in.</td>
<td>0.138 in.</td>
<td>0.14 in.</td>
</tr>
<tr>
<td>B. Depth of Slot</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
</tr>
<tr>
<td>C. Distance from End of Slot to End of Flat Pin</td>
<td>0.14 in.</td>
<td>0.14 in.</td>
<td>0.14 in.</td>
</tr>
<tr>
<td>D. Width of Slot</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
</tr>
<tr>
<td>E. Distance from End of Flat Pin to Shell</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
</tr>
<tr>
<td>F. Distance from End of Round Pin to Shell</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
</tr>
<tr>
<td>G. Length of Round Pins</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
</tr>
<tr>
<td>H. Spacing Between Pins</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
</tr>
<tr>
<td>J. Thickness of Flat Pin</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
</tr>
<tr>
<td>K. Diameter of Round Pins</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
<td>0.12 in.</td>
</tr>
</tbody>
</table>

Round pins are rigid, not split.

**Terminal Cap of Large Transmitting Tube**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Min.</th>
<th>Center</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Diameter of Contact</td>
<td>0.254 in.</td>
<td>0.254 in.</td>
<td>0.254 in.</td>
</tr>
<tr>
<td>B. Length of Contact</td>
<td>0.254 in.</td>
<td>0.254 in.</td>
<td>0.254 in.</td>
</tr>
</tbody>
</table>
### STANDARD CONNECTIONS FOR VACUUM TUBE BASES

In directly-heated receiving triodes, it shall be standard to connect the grid to pin 1, the plate to pin 2, and the filament terminals to pins 3 and 4 of the standard four-pin base.

In indirectly-heated receiving triodes, it shall be standard to connect the grid to pin 1, the plate to pin 2, the heater terminals to pins 3 and 4, and the cathode to pin 5 of the standard five-pin base.

In the directly-heated full-wave hot-cathode rectifying tube, it shall be standard to connect the anodes separately to pins 1 (grid) and 2 (plate) and the filament terminals to pins 3 and 4 of the standard four-pin base.

In a directly-heated half-wave hot-cathode rectifying tube, it shall be standard to connect the anode to pin 2 (plate), and the filament terminals to pins 3 and 4 of the standard four-pin base.

In the directly-heated receiving screen-grid tube, it shall be standard to connect the screen grid to pin 1 (grid), the plate to pin 2 (plate), and the filament terminals to pins 3 and 4 of the standard four-pin base. The control grid is to be connected to the cap at the top of the envelope.

In the indirectly-heated receiving screen-grid vacuum tube, it shall be standard to connect the screen grid to pin 1 (grid), the plate to pin 2 (plate), the heater terminals to pins 3 and 4 (heater), and the cathode to pin 5. The control grid is connected to the cap at the top of the envelope.
MANUFACTURING STANDARDS APPLYING TO BROADCAST RECEIVERS

1. Battery Operated Radio Receiver. A radio receiver designed to operate from primary and/or storage batteries shall be known as a battery operated radio receiver.

2. Socket-Powered Radio Receivers. A radio receiver of the battery operated type, when connected to a power unit operating from the electric light line, supplying both filament and plate potentials to the tubes of the receiver, shall be known as a socket-powered radio receiver.

3. Electric Radio Receiver. A radio receiver operating from the electric light line, with a built-in power unit, shall be known as an electric radio receiver.

4. A-C Electric Radio Receiver. An electric radio receiver employing tubes which obtain their operating power from an alternating-current electric light line shall be known as an a-c electric radio receiver.

5. D-C Electric Radio Receiver. An electric radio receiver employing tubes which obtain their operating power from a direct-current electric light line shall be known as a d-c electric radio receiver.

6. Selector (Station Selector.) The manual adjustment means by which the user of a broadcast receiver is enabled to bring one or more of its circuits into resonance with any desired signal within the range of the receiver. There are three general methods of manual station selection. In these the mechanical means used in any of the three methods may consist of direct connected drives, with or without auxiliary close adjustment means, or may consist of close adjustment means only.

Note—The use of the word “control” as applying specifically to manual tuning adjustments is not approved.

7. Multiple Selector. That method of manual tuning adjustment in which mechanical means are provided for setting independently each of two or more tuned circuits or groups of tuned circuits to resonance at any frequency within the range of the device.

8. Master Selector. That method of manual tuning adjustment in which one mechanical means is used to bring all the tuned circuits simultaneously into approximate resonance with any desired frequency within the range of the device, and additional auxiliary means are provided to bring one or more of the tuned circuits into exact resonance.

9. Single Selector. That method of manual tuning adjustment in which one and only one mechanical means is provided to the user for bringing all tuned circuits into practical resonance at any desired frequency within the range of the receiver, there being no additional separate means for resonance adjustment and no other controls which appreciably affect the calibration of the single selector.

10. Direct Selectors. Direct selectors are those in which the motion ratio between the knob, dial, or other actuating means and the device is unity.

11. Close Selectors. Close selectors are those in which the motion ratio between the knob, dial, or other actuating means and the driven device is greater than unity.

Note—The auxiliary tuning adjustments in master selector arrangements will ordinarily be “close” in their effect and may be so referred to regardless of the actual mechanical motion ratio which they employ.

12. Volume Control. The manual adjusting means by which the user of a broadcast receiver is enabled to adjust the sound volume delivered by the sound reproducing device on any signal input, within limits depending on the strength of the signal and the sensitivity of the receiver and the sound reproducing device.

13. Range Control. The manual adjusting means by which the user of a broadcast receiver may produce changes in the circuit to obtain two or more degrees of sensitivity. This may also be called “local-distance switch.”

14. On-Off Switch. The manual means for connecting and disconnecting a source or sources of power which are supplied to the receiver.

15. On-Off Switches. When the lever of an “on-off” switch in a radio receiver operates with an up-and-down motion it shall be standard to have the “up” position for “on.”

When the lever of an “on-off” switch in a radio receiver operates in a horizontal plane it shall be standard to have the “on” position to the right facing the switch.

When an “on-off” switch of the push-pull type is used in a radio receiver it shall be standard to have the “out” position for “on.”

When an “on-off” switch of a radio receiver operates with a rotary motion with a limited angular movement of the knob, it shall be
standard to reach the “on” position with clockwise rotation of the knob and to reach the “off” position with counterclockwise rotation.

When an “on-off” switch of a radio receiver operates with a rotary motion in one direction reaching “on” and “off” positions alternately, it shall be standard to have the knob rotate in a clockwise direction.

16. broadcast receivers—frequency range. The frequency range of standard broadcast receivers shall be the broadcast frequency band from 550 kilocycles (345.1 meters) to 1500 kilocycles (199.9 meters).

17. Design and Rating of Socket Power Devices and Electric Radio Receivers. It shall be standard to rate and design socket-power devices and electric radio receivers for operation on voltages from 105 to 125 volts.

When means for adapting a socket power device or electric radio receiver to the line voltage is provided, it shall be standard to design the low range from 105 to 115 volts and the high range from 115 to 125 volts. Normal rating for the low range will be 110 volts and for the high range 120 volts.

18. Nomenclature—Antenna Parts. The standard nomenclature to apply to broadcast radio receiving antenna parts shall be as follows:

(a) Antenna wire.
(b) Lead-in wire.

That wire extending from an outdoor antenna to a window lead-in strip, or through a wall insulation directly to the radio set.

(c) Ground wire.

1. Receiver ground wire.
2. Protective ground wire.

The ground wire shall be separately designated as to whether the wire shall run from the receiving set ground binding post to a grounded fixture within the building or whether it run from the receiving set to the outdoor ground, as the conductor may be different.

(d) Insulation.

1. Antenna insulator.
2. Lead-in insulator.
3. Wall insulator.

(e) Ground clamp.
(f) Lead-in connector.

This is the device which is used to fasten or connect the lead-in wire to the antenna wire.

(g) Protective device.

This refers to the lightning arrester, regardless of type.

(h) Supporter of antenna.

This refers to any mast or other rigging to which the antenna wire is attached.

19. Antenna Installation Instructions. It shall be standard for manufacturers of receiving sets requiring an outside antenna and for manufacturers of outside antenna material sold in unit packages to include in the instruction book or instruction card accompanying the radio receiving set or antenna unit package, reasonably complete instructions for erecting the antenna containing two statements, one cautioning the user that the installation should be made in accordance with these instructions and in accordance with the National Electrical Code and the National Electrical Safety Code, and the other as follows: When erecting the antenna be careful not to allow any wire or rope to come in contact with any electric power or light wires. Such contact is DANGEROUS.

20. Soldering Tests—Cord Terminals. The standard test for quality of soldering of cord tips or terminals to radio cords shall be a straight pull of 5 pounds applied to the cord tip or terminal.

21. Cord Tip—Cylindrical Type. The standard cylindrical type cord tip for use on the ends of cords connecting to headsets and loud speakers, where concealed binding post connections are employed in the headset or loud speaker, shall have the following dimensions:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Minimum</th>
<th>Tolerance</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.3125 (7/16)</td>
<td>0.0625 (7/16)</td>
<td>0.375 (7/16)</td>
</tr>
<tr>
<td>B</td>
<td>0.151</td>
<td>0.010</td>
<td>0.161</td>
</tr>
<tr>
<td>C</td>
<td>0.20 (No. 31 D. G.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>1/16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Diagram of cylindrical cord tip]
22. Cord Tip—Pin Type. The standard cord tip for use on the plug or receiving set end of headset and loud speaker cord conductors shall be of the pin type with important dimensions as listed in the following table:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Minimum in inches</th>
<th>Tolerance in inches</th>
<th>Maximum in inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.9580</td>
<td>0.0620</td>
<td>1.0200</td>
</tr>
<tr>
<td>B</td>
<td>0.4900</td>
<td>0.0200</td>
<td>0.5100</td>
</tr>
<tr>
<td>C</td>
<td>0.4680</td>
<td>0.0420</td>
<td>0.5100</td>
</tr>
<tr>
<td>D</td>
<td>0.1510</td>
<td>0.0100</td>
<td>0.1610</td>
</tr>
<tr>
<td>E</td>
<td>0.0800</td>
<td>0.0020</td>
<td>0.0820</td>
</tr>
<tr>
<td>F</td>
<td>0.120 (No. 31 D. G.)</td>
<td></td>
<td>1/16</td>
</tr>
</tbody>
</table>

23. Binding Posts—Drilling Dimensions. Standard dimensions for the cord tip openings and the fastening screw locations of binding posts to accommodate the standard pin and cylindrical types of cord tip are as follows:

FOR PIN TYPE CORD TIPS:

FOR CYLINDRICAL TYPE CORD TIPS:

24. Cable Terminal—Spade Type. The standard cable terminals for the outer end of battery connecting conductors on radio receiving sets shall have the following dimensions:

25. Radio Plugs—Dimensions. The important dimensions of standard radio plugs for use in connection with the standard radio spring jacks are as follows:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Minimum in inches</th>
<th>Tolerance in inches</th>
<th>Maximum in inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.179</td>
<td>0.020</td>
<td>1.190</td>
</tr>
<tr>
<td>B</td>
<td>0.959</td>
<td></td>
<td>0.959</td>
</tr>
<tr>
<td>C</td>
<td>0.863</td>
<td></td>
<td>0.863</td>
</tr>
<tr>
<td>D</td>
<td>0.248</td>
<td>0.002</td>
<td>0.250</td>
</tr>
<tr>
<td>E</td>
<td>0.243</td>
<td>0.002</td>
<td>0.245</td>
</tr>
<tr>
<td>F</td>
<td>1/16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

26. Radio Jacks—Dimensions. The important dimensions of standard radio spring jacks for use in connection with the standard radio plugs are as follows:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Minimum in inches</th>
<th>Tolerance in inches</th>
<th>Maximum in inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.000</td>
<td>0.040</td>
<td>1.040</td>
</tr>
<tr>
<td>B</td>
<td>0.770</td>
<td>0.020</td>
<td>0.790</td>
</tr>
</tbody>
</table>
27. Pilot Lamp, Radio Receiver—Base. The standard base for an incandescent lamp to be used for receiver panel illumination shall be the standard miniature screw base, as shown in standard 28 below, with additional important dimensions as follows:

28. Edison-Type Screw Shells, Miniature Size—Standard Form and Dimensions

Diameter Dimensions.

<table>
<thead>
<tr>
<th></th>
<th>Lamp Holder Shell</th>
<th>Lamp Base Shell</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Go” gauge, top of thread</td>
<td>0.3775 in.</td>
<td>0.3750 in.</td>
</tr>
<tr>
<td>“Not Go” gauge, top of thread</td>
<td>0.3835 in.</td>
<td>0.3700 in.</td>
</tr>
<tr>
<td>“Go” gauge, bottom of thread</td>
<td>0.3375 in.</td>
<td>0.3350 in.</td>
</tr>
<tr>
<td>“Not Go” gauge, bottom of thread</td>
<td>0.3435 in.</td>
<td>0.3300 in.</td>
</tr>
<tr>
<td>Threads per inch</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Depth of thread</td>
<td>0.020 in.</td>
<td>0.020 in.</td>
</tr>
</tbody>
</table>

29. Pilot or Panel Lamp—Radio Receiver. The standard radio receiver pilot lamp shall have the following dimensions:

30. Magnetic Pick-up Jack—Connection. When a jack is used for connecting a magnetic pick-up into the input of the audio amplifier of a radio receiving set, it shall be standard to have the sleeve of the jack grounded or connected to the low side of the circuit.
CATALOG of MEMBERSHIP

ARRANGED ALPHABETICALLY

and

GEOGRAPHICALLY
CATALOG OF MEMBERSHIP
(This list is corrected only to December 31, 1931)

LIST OF MEMBERS OF ALL GRADES
Arranged Alphabetically
(See note on page 74)

A

ABBOTT, WILLIAM H. (A'28), Professor of Physics, Texas Technological College, Lubbock, Tex.

ABBOTT, DONALD (A'30), Radio Engineer, Radio Pictures, Inc., 41 Park Row, New York, N.Y. For mail: 34-41-79th St., Jackson Heights, L.I., N.Y.

ABBOTT, HAROLD W. (A'38), Director of Laboratories, Sper Scientific Company, St. Marys, Pa. For mail: 110 N. St. Michael St., St. Marys, Pa.

ABEL, ADAM E., JR. (A'31), Graduate Student, Electrical Engineering Department, University of Illinois, Urbana, Ill. For mail: 208 N. Harvey St., Urbana, Ill.

ABELSON, LESTER S. (A'31), President, Stellite Manufacturing Company, 8406 S. Chicago Ave., Chicago, Ill.

ABERCROMBIE, JULIUS B. (A'27), Manager, Abbercrombie Radio Service, 1619 Frederick Ave., St. Joseph, Mo. For mail: 1810 Crescent Dr., St. Joseph, Mo.

ABEY, ROBERT E. (A'37), Proprietor, Radio Shop, 365 W. Magnolia Ave., Fort Worth, Tex. For mail: 1651 Eastern Pk., Fort Worth, Tex.


ABSHIRE, LIBURNE O. (A'28), General Delivery, Boise City, Okla.

ACETO, LOUIE (A'31), Radio Engineer, RCA Victor Company, Inc., Camden, N.J. For mail: 212 Euclid Ave., Haddonfield, N.J.

ACHATER, RAYMOND V. (A'26), Secretary and General Manager, Southern Indiana Telephone Company, Aurora, Ind.

ACHISON, MARCUS A. (A'29), Design Engineer, General Electric Company, Bldg. 37, Schenectady, N.Y. For mail: 1132 Baker Ave., Schenectady, N.Y.

ACKERMAN, E. K. (A'27), Engineer, Audionics Engineering, 7133 Euclid Ave., Cleveland, Ohio.

ACKERMAN, MILTON J. (A'35), Development Engineer, Test Engineering Division, RCA Victor Company, Inc., Camden, N.J. For mail: 308 Pennington Ave., Pennington, N.J.

ACKERMAN, RUDOLPH W. (A'28), Engineer, Arcturus Radio Tube Company, 720 Paterson Ave., Newark, N.J. For mail: 46 N. Arlington Ave., East Orange, N.J.


ACTON, EDWARD H. (A'26), Superintendent, Aluminum Company of Canada, Ltd., Box 100, Shawinigan Falls, P.Q., Canada.

ACUNA, SEGUNDO P. (A'36), Technical Editor, Revista Telegrafo, Peru 115, Buenos Aires, Argentina. For mail: Navarro, 4159, V. Devote, Buenos Aires, Argentina.

ADACHI, WILLIAM Y. (A'26), Chief, Brooklyn Edison Company, 385 Pearl St., Brooklyn, N.Y. For mail: 1569 Ocean Ave., Brooklyn, N.Y.

ADAIR, SAMUEL E. (A'19-M'19), Treasurer and Director, Engineering Department, Jenkins and Adams, Inc., 333 Belmont Ave., Chicago, Ill.

ADAMS, CHARLES H. (A'30), Statistician, Shell Company of Australia, Ltd., Green St., Adelaide, South Australia. For mail: 33 Hewitt Ave., Rose Park, Adelaide, South Australia.


ADAMS, GEORGE G. (A'27), Engineer, Pan American Airways, Inc., Miami, Fla. For mail: P.O. Box 1005, Miami, Fla.


ADAMS, JOHN C. (A'30), Radio Service and Repair Laboratory, 196 Main St., Gloucester, Mass. For mail: 64 Grove St., Gloucester, Mass.

ADAMS, MARTYN S. (A'31), Technical Supervisor, Radio Station KFUD, Culver City, Calif. For mail: 8931 B Hubbell St., Culver City, Calif.

ADAMS, QUINTON (M'28), National Broadcasting Company, Inc., 715 7th Ave., New York, N.Y.


ADAMS, WALTER L. (A'31), Designer and Builder, Condenser Microphones and Sound Equipment, 609 W. 104th St., Los Angeles, Calif.

ADAMS, WILLIAM E. (A'27), Service Engineer, Elliot Engineering Company, 215 Washington St., Binghamton, N.Y.

ADCOCK, S. E. (A'28), General Manager, Stuart Broadcasting Corporation, 1823 S.W. Cumberland Ave., Knoxville, Tenn. For mail: P.O. Box 1565, Knoxville, Tenn.

ADKISBERGER, PAUL J. (A'29), Manager, Radio Department, Lyric Electric Company, 114 Wayne Ave., Wayne, Pa. For mail: 18 Louise Ct., Wayne, Pa.

ADBONRF, GERALD V. (M'28), Consulting Engineer, Hilliards Chambers, Church St., Cape Town, South Africa.

ADLER, BENJAMIN (A'29), Broadcast Transmitter Sales Engineer, RCA Victor Company, Inc., 914 Santa Fe Blvd., Dallas, Tex.

APPEN, HERMAN A. (‘‘A74), Engineer, Department of Development and Research, American Telephone and Telegraph Company, 885 Broadway, New York, N.Y. For mail: 827 Morris Avenue, Ridgewood, N.J.


AGUSTY, JOAQUIN (A25), Station WAD, Radio Corporation of America, Puerto Rico, San Juan, Puerto Rico. For mail: P.O. Box 668, San Juan, Puerto Rico.

AIKEN, CHARLES B. P. (A25), Radio Engineer, Bell Telephone Laboratories, Inc., 463 Pearl Street, New York, N.Y.

AINSWORTH, A. L. (A22), Vice President, DeForest Radio Corporation, 245 Carlyle Ave., Berkeley, Calif.

AINSWORTH, HAROLD A. (A31), Engineering Department, DeForest Crosley Co., 243 Pape Ave., Montreal, Ont., Canada.


AIKIN, J. A. H. (A25), Chief Engineer, Station WXAD, Akron, Ohio. For mail: 222 Twin Oaks Rd., Apartment 28, Akron, Ohio.

AKAMATSU, KAWORU (A30), Engineer, Broadcasting Corporation of Japan, 4-7-1 Hibiya, Chiyoda-ku, Tokyo, Japan.

AKERS, DALLAS C. (A26), Salesman, Henderson Broadcasting Corporation, 2700 S. Broadway, Los Angeles, Calif. For mail: 181 Greenwood Ave., East Orange, N.J.

AKERS, WILLIAM P. (A30), A.P. Sound Engineer, Radio Station WBBK, Radio Air Service, 45 Grand Ave., Cleveland, Ohio. For mail: 1928 S. 17th St., Cleveland, Ohio.

AKIN, ROBERT M., JR. (A25), Director, Westchester Radio Laboratories, 62 Water St., Tarrytown, N.Y. For mail: 636 East 116th St., New York, N.Y.


AKUTSU, SHIUJI (A27), Haraomachi, Fukuushima, Japan.

AKIYAMA, SIRO (A31), Radio Engineer, Hirsima Broadcasting Station, Hiroshima, Japan. For mail: 6-7-1 Takeda, Nagakumamachi, Nagoya, Aichi, Japan.

ALBEE, NORMAN E. (A41), Manager, Electrical Products Department, General Electric Company, 1910 Euclid Ave., Cleveland, Ohio. For mail: 423 S. Taylor Ave., Oak Park, Ill.

ALBEE, ANDREW M. (A30), Proprietor, A.C. Electric Radio Shop, 652 E. 2nd St., Indianapolis, Ind.

ALBERT, ARTHUR L. (A40), Assistant Professor, Electrical Engineering, Oregon State College, New, Valla, Ore.

ALBERT, WILLIAM H. (A25), Laboratory Assistant, Radio Frequency Laboratories, Inc., Houston, Texas. For mail: 151 Mandeville Ave., Boonsboro, N.J.

ALBERT, WILLIAM W. (A15), Electrical Engineer, 4th Chem. Corps, Ont., Canada. For mail: 1111 32nd Ave., Chicago, Ill.

ALBET, FREDERICK G. (A20), Assistant Transmission Engineer, United Artists Studio Corporation, 1041 N. Formosa, Hollywood, Calif. For mail: 1630 S. Arapahoe St., Los Angeles, Calif.


ALBRIGHT, HAROLD D. (A31), Student University of Arkansas, Fayetteville, Ark. For mail: A.L.T. House, Fayetteville, Ark.

ALBRIGHT, ARTHUR W. (A10), Radio Operator, WSPR, New York, N.Y. For mail: Paterson Plank Rd., Carlstadt, N.J. For mail: 204 President St., Passaic, N.J.

ALBRIGHT, GORDON E. (A30), Service Instructor, Stromberg-Carlson Telephone Manufacturing Co., 1050 Carl Rd., Rochester, N.Y. For mail: 62 Minnesota St., Rochester, N.Y.

ALBERT, ROBERT B. (A11), 212 Euclid Ave., Haddonfield, N.J.


ALEXANDER, LOUIS (A28), Sales Engineer, American Wireless Corporation, 71 Washington St., Brooklyn, N.Y.

ALEXANDER, WAYNE (A29), Experimental Worker, Hedman Manufacturing Company, 1158 Center St., Chicago, Ill. For mail: 4535-3rd Ave., Chicago, Ill.


ALLAIN, JOSEPH A. (J29), Plant Engineer, Tube Plant, Grigsby-Grumman Company, 208 N. Austin Blvd., Chicago, Ill. For mail: 4720 Dover St., Chicago, Ill.

ALLAN, ERNEST J. (A24), Radio Engineer, E. J. Allan and Company, Netherne, Dung- port, Scotland. For mail: 8 Westfield Pl., Grand Trianon, New York, N.Y.


ALLAWAY, G. N. P. (A28-M30), Radio Engineer, Phillips South African Electric Corporation, P.O. Box 1219, Durban, South Africa.

ALLCUTT, E. BURTON (A10), Physician, 1 W. 36th St., New York, N.Y. For mail: Rm. 212, Hotel Woodstock, 127 W. 43rd St., New York, N.Y.

ALLEN, ARTHUR (A27), Research Engineer, Atlantic Precision Company, 60 Federal St., Boston, Mass. For mail: 16 Wildwood St., West Brookfield, Mass.

ALLEN, FORREST G. (A30), Second Lieutenant, U.S. Army Air Corps, Chantilly, Va. For mail: 411 W. Fifth St., New York, N.Y.


ALLEN, JAMES G. (A28-M31), Radio Engineer, Duquesne Light Company, 800 Duquesne Blvd., Pittsburgh, Pa. For mail: 123 Harrison Ave., Avon Park, N.Y.


ALLEN, JOHN H. (J31), Radio Engineer, Prest-O-Lite, Inc., 1011 Lexington Blvd., Baltimore, Md.

ALLEN, JAMES G. (A26), Chief Engineer, Radio Station KFRC, San Francisco, Calif. For mail: 1129 S. Harvard Blvd., Los Angeles, Calif.


AMBROZICH, JOHN (A72-A73), Electric Inspector and Superintendent of Fire Alarm, Village of Chisholm, Minn. For mail: 417 W. Spruce St., Chisholm, Minn.


AMOS, WILLIAM G. (J31), Standardizer, Radio Valve Company of Canada, 189 Dufferin St., Toronto, Ont., Canada.

AMY, ERNEST V. (A20-M27), President, Amy, Aztec and King, Inc., H. W. 42nd St., New York, N.Y.

ANAZAWA, CHUHUI (A25), Radio Engineering Section, Department of Communications, Tokyo, Japan. For mail: 202 Truncom, Yosanobashichi, Tokyo, Japan.

ANDERSEN, DONALD (J31), Graduate Student, Physics Department, Iowa State College, Ames, Iowa. For mail: 910 Lincoln Way, Ames, Iowa.


ANDERSON, A. D. (A31), Chief Radio Instructor, Dulehle College, Anza Ave., Auckland, New Zealand. For mail: 1 Seddon Ter., Oshabhi, Auckland, New Zealand.

ANDERSON, ADOLPH (A30), 904 Division St., Navin, Mich.

ANDERSON, C. ALBIN (A31), Sound Research Engineer and Assistant to Dr. P. T. Seaborg, Ralston Labs., Cleveland, Ohio.

ANDERSON, CLIFFORD N. (A19), Radio Telephone, Universal Telephone and Telegraph Co., 195 Broadway, New York, N.Y.

ANDERSON, EDWARD R. (A26), Technician, Bloch Brown Radio Shop, 4353 S. Figueroa, Los Angeles, Calif. For mail: 625 S. Wilcox Ave., Bel Air, Calif.

ANDERSON, EDWIN C. (A20), Instructor, R.C.A. Institutes, Inc., 85 Broadway, New York, N.Y. For mail: 220 W. 24th St., New York, N.Y.


ANDERSON, GILBERT J. C. (J51-A29), Superintendent, Anderson Radio Laboratory, 101
MEMBERSHIP (Alphabetical)

ANDREW, VICTOR J. (A'25-M'30), Graduate Student, Ryerson Physical Laboratories, 620 E. 60th St., Chicago, Ill. For mail: 144 E. 82nd St., Chicago, Ill.

APKOFF, SEYMOUR A. (A'43), Professor of Electrical Engineering, New York University.

ARMSTRONG, EDWIN H. (A'44-F'57), Lockheed-Georgia Research Laboratory, Columbus, Ohio. For mail: The Research, 211 Central Park West, New York, N.Y.


ARMSTRONG, Herbert M. (A'23), Engineer, Research Department, Kellogg Switchboard and Supply Company, 1060 W. Adams St., Chicago, Ill. For mail: 145-45th St., Cicero, Ill.


ARNOLD, John W. (A'29), Engineering Department, Western Union Telegraph Company, 66 Hudson St., New York, N.Y.

ARNOLD, Prescott N. (A'29), Instructor in Phonetics, Laboratory, Harvard University, Cambridge, Mass.

ARNOLD, Robert M. (A'31), Chief Engineer, General Motors Corporation, 3601 Dickens Ave., Chicago, Ill.

ARNOLD, THOMAS E. (A'27), Instructor, Communications Department, Illinois Institute of Technology, Chicago, Ill. For mail: 2616 28th St., S.E., Washington, D.C.

ARTZ, MAURICE (A'20), Engineer, RCA Victor Company, Inc., Camden, N.J.

ASH, MARCUS A. (A'29), Chief Recording Engineer, Metropolitan Studios, 1600 Broadway, New York, N.Y. For mail: 531-32nd Ave., Woodside, L.I., N.Y.

ASH, Moe (A'27), Chief Radio Engineer, Radio Laboratories, 734 W. 5th St., New York, N.Y. For mail: 240 W. 57th St., New York, N.Y.

ASHBAUGH, EDWIN C. (A'27), Mount Gilead, Ohio.

ASHBROOK, ROY B. (A'26), Communication Engineer, Southern California Edison Company, 3rd and Broadway, Los Angeles, Calif. For mail: 60 Commerce Dr., San Gabriel, Calif.

ASHBY, A. L. (A'31), Vice President and General Attorney, National Broadcasting Company, 801 Third Ave., New York, N.Y.

ASHENDEN, G. K. J., Jr. (A'29), Radio Operator, Radiometer Corporation of America, 475 Atlantic Ave., Boston, Mass. For mail: 120 George St., Roxbury, Mass.


ARMSTRONG, EDWIN H. (A'44-F'57), Lockheed-Georgia Research Laboratory, Columbus, Ohio. For mail: The Research, 211 Central Park West, New York, N.Y.


ARDWIN, W. H. (A'28), Assistant Managing Editor, Electrical World and Electronics, 214 South Wacker Dr., Los Angeles, Calif.


ANDREWS, Edward F. (A'26), President and Engineer, Andrews-Hammond Corporation, 420 Shurtle, Chicago, Ill.

ANDREWS, Howard L. (A'29), Instructor, Brown University, Providence, R.I. For mail: 154 Walnut St., East Providence, R.I.

ANDREWS, Paul D. (A'29), Associate Editor, "Electrical World," New York, N.Y. For mail: 203-2nd Ave., New York, N.Y.

ANDREWS, Paul D. (A'29), Radio Engineer, Radio Engineering Department, General Electric Company, 1 River Rd., Schenectady, N.Y. For mail: 9 N. Ferry St., Schenectady, N.Y.

ANDREWS, W. A. (A'20), Lecturer, University of Bristol, Superintendant, Merchant Marine, and University Teachers' College, Bristol, England.

ANDRATI, NICHOLAS D. (A'20), Service Engineer, Mosaic Wholesalers, 90 Elm St., Buffalo, N.Y. For mail: 245 Bird Ave., Buffalo, N.Y.

ANDREY, ROY E. (A'29), Manager, Radio Department, Carlisle-Alloy Company, Ashtabula, Ohio. For mail: R.D. No. 2, Ashtabula, Ohio.

ANGELOU, James (A'20), President, R.C.A. Victor Company, Inc., Camden, N.J.

ANGELOU, G. B. (A'29), Tropical Telegraph Company, P.O. Box 488, Hialeah, Fla.


ANKERSEN, G. J. (J'27-A'28), 927 Montana St., Chicago, Ill.

ANNO, Louis M. (A'30), Vice-President, American Telephone and Telegraph Company, 209 W. 18th St., New York, N.Y. For mail: 75 Rockefeller Ave., White Plains, N.Y.

ANTIN, ALFRED A. (A'23), Engineer, The Pacific Cable Board, Bar Harbor, West Indies.

ANTISU, IWA (A'31), First Lieutenant, Technical University, Sendai, Japan. For mail: 28 Naka-unguyamori, Sendai, Japan.

ARMAGOST, HARRY J. (A'26), Chief Engineer, General Motors Corporation, 3601 Dickens Ave., Chicago, Ill.

ARMSTRONG, John W. (A'29), Engineering Department, Western Union Telegraph Company, 66 Hudson St., New York, N.Y.

ARMSTRONG, L. J. HEATON (A'28), Laboratory, Standard, 46 Ave. de Bretagne, Paris 7, France.


ARNOLD, ROBERT M. (A'31), Chief Engineer, General Motors Corporation, 3601 Dickens Ave., Chicago, Ill.
MEMBERSHIP (alphabetical)

AUSTIN, OTTO C. (A'27), Distribution Engineer, Madison Gas and Electric Company, 280 W. Madison St., Madison, Wis. For mail: 49 Pollard Rd., Madison, Wis.

AVERY, ROBERT D. (J'29), Assistant Broadcast Engineer, Radio Station WJES, P.O. Box 299, Reading, Pa. For mail: 280 Virginia Ave., Virginia Heights, Reading, Pa.

AYRES, FRED J. (J'30), 303 Ocean Front, Jersey City, N.J.

AX, LELAND S. (A'30), Electrical Engineer, Lincoln Electric Co., 2219 Carson St., St. Louis, Mo.

AYRES, BERNARD J. (A'26), Engineer, Technical Director, Standard Telephone and Telegraph Co., 40 W. St., New York, N.Y.

AYERS, OLIVER G. (A'27), Box 640, Asbury, N.J.

AVER, RAYMOND B. (A'26), Vacuum Tube Development, General Electric Co., 414 River Rd., Schenectady, N.Y. For mail: 211 Hanover St., Schenectady, N.Y.


AYMAR, EDWIN (A'26), 50 Le Claire Hotel, Moline, Ill.


BAHCOCK, STUART M. (A'30), Member of Technical Staff, Bell Telephone Laboratories, Inc., 263 Hudson St., New York, N.Y.

BACCHI, CESARE (A'29), General Director of Allied Radio and subsidiary companies, Como, Milan, Italy.

BACH, ROY O. (A'19), Engineer, Pacific Telephone, 820 California St., San Francisco, Calif.

BACHMAN, EDWIN J. (A'28), Manager, Radio Service Department, Bell, Inc., 622 Linden St., Allentown, Pa. For mail: 1064 California St., Parkersburg, W. Va.

BACHOFER, C. LEONARD (J'26-A'27), Radio Engineer, Stromberg-Carlson Telephone Manufacturing Company, 100 Colt Blvd., Rochester, N.Y. For mail: 292 Woodlawn Ave., Rochester, N.Y.


BACON, DANA H. (A'31), Radio Engineer, 41 Sherman Ave., Lancaster, N.Y. For mail: 1257 Selden St., Malverne, Mass.

BADEN, MARTIN W. (A'30), Research Engineer, 1010 Heliways, Chicago, Ill. For mail: Box 520, Winfield, Kans.


BAGGS, A. D. (A'30), District Telegraph Engineer, Post and Telegraph Department, P.O. Box 515, Fargo, N.D.

BANHAND, VERNON B. (A'30), Communications Engineer, Long Lines Engineering Department, American Telephone and Telegraph Company, 15 East St., New York, N.Y. For mail: 17 Webster Pl., East Orange, N.J.


BAIER, ARTHUR H. (A'27), President, H. J. Barger and Son, Inc., 3241 War Center Rd., Warrenville, Ohio. For mail: 13110 Cedar Rd., Cleveland Heights, Ohio.

BAILEY, ALLAN K. (A'30), Radio Service Manager, T. Eaton Company, Ltd., Hamilton, Ont., Canada. For mail: 15 Hume Ave., Hamilton, Ont., Canada.

BAILEY, ARNOLD B. (A'27), Radio Engineer, Bell Telephone Laboratories, Inc., 643 West St., New York, N.Y.

BAILEY, AUSTIN (A'22-M'25), Telephone Engineer, Bell Telephone and Telegraph Company, Wm. 121b, 198 Broadway, New York, N.Y.

BAILEY, E. G. (A'31), Development Engineer, Amalgamated Wireless Association, Sydney, Australia. For mail: 11 Ocean St., Kogarah, New South Wales, Australia.

BAILEY, NEIL (A'30), Foreman, Radio Division, Cardo Phononics Corporation, Jackson, Mich. For mail: 1506 E. North St., Jackson, Mich.

BAILEY, STUART L. (A'28), Consulting Engineer, Kanisky and Bailey, 927 National Press Blvd., Washington, D.C.


BAILEY, WILLIAM B. (A'31), Radio Officer, U.S. Navy, c/o Postmaster, San Diego, Calif.

BAIN, GEORGE W. (A'21), Chief Engineer, National Radio, 505 W. Washington Blvd., White Plains, N.Y.

BAILEY, J. C. (N'30), Technical Staff, Bell Telephone Laboratories, Inc., Rm. K-55, 46 West St., New York, N.Y.

BAINBIDGE, B. L. (H'26), Radio Research Station, Slough, Bucks, England. For mail: 63 Locenhall Lane, Dalkeith, Midlothian, Scotland.

BAIRD, RALPH S. (A'21), Radio Engineer, 3877 Hendry Rd., St. Petersburg, Fla.


BAIRD, HOLLIS S. (A'28), Chief Engineer, I. Shortwell and Telephone Laboratory, 78 Brookline Ave., Boston, Mass.

BAIRD, ROBERT E. (A'30), Inspection Engineer, Operado Manufacturing Company, St. Charles, Ill. For mail: 303 W. Main St., St. Charles, Ill.

BAKER, CARL I. (M'31), Vacuum Tube Engineer, Bell Telephone Laboratories, Inc., 366 Hudson St., New York, N.Y. For mail: 30 Villard Ave., Hastings-on-Hudson, N.Y.

BAKER, THOMAS S. (A'22), Engineer, Press Wireless, Inc., Chicago, Ill. For mail: P.O. Box 262, Hickey Bldg., Chicago, Ill.


BALKS, J. A. (A'17), President, Mutual Telephone Company, P.O. Box 2200, Honolulu, Hawaii.

BALDWIN, ARTHUR V. (A'27), Radio Engineer, Johnsbury Telephone Company, John- sbury, Pa. For mail: 316 High St., John- sbury, Vt.

BALDWIN, CHARLES O. (A'31), Engineer, Phileas Products, Ltd., 134 Water St., Toronto, Ont., Canada. For mail: 21 Pinewood Ave., Toronto, Ont., Canada.

BALDWIN, CHESTER PAUL (A'30), Radio Service Manager, Arctic Union Company, 708 E. 18th St., St. Louis, Mo. For mail: 121-04-19th St., St. Alberts, Ill., N.Y.

BALDWIN, FRANK H. (A'31), 9 Joy St., Boston, Mass.

BALDWIN, GEORGE (A'27), Radio Service Manager, North Shore Station, 121 9th St., quartle Island, N.Y.

BALDWIN, JOHN M. (A'26), Chief Engineer, Radio Station KXLY, East Thompson Blvd., Salt Lake City, Utah.

BALDWIN, PRESTON D. GRAWM (J'27-A'29), Installation and Service Engineer, RCA Photophone, Inc., 7500 Ely Ave., Cleveland, Ohio.


BALL, GEORGE F. (A'20), 27 Stanley Rd., East Chitt, Colorado, N.Y.


BALLANTINE, STUART (A'17-M'27), Radio Frequency Laboratories, Inc., Boon- ton, N.J.

BALLARD, RANDALL C. (A'29), Television Engineer, RCA Victor Company, Inc., Camden, N.J. For mail: 660 W. Maple Ave., Merchantville, N.J.

BALLARD, WILLIAM C. (A'16-M'27), Instructor, Rochester Institute, Cornell University, Ithaca, N.Y.


BALLING, ALFRED W. (A'23), Chief Transmitter Operator, Radio Station WHAM, Victor, N.Y. For mail: 1625 Clinton Ave., Rochester, N.Y.

BOYER, WILLIAM P. (A'28), Engineer, Stevenson Radio Syndicate, Harr Bldg., 916-17 Third Ave., New York, N.Y.

BOYLAN, E. BRANDT (A'28), President, Radio Service Laboratories, 2055 Orange St., Philadelphia, Pa.

BOYLE, FREDERICK W. (A'31), Engineer, Department of Electrical Engineering, University of California, Berkeley, Calif.

BOYLE, FRANK A. (A'29), Proprietor, Frank J. Boyle Company, Manchester Rd., North Hempstead, L.I., N.Y. For mail: P.O. Box 241, Pt. Washington, Rockville Center, N.Y.

BRADLEY, JOHN T. (A'26-M'31), President, Special Radio Service Company, 1062 Howard St., San Francisco, Calif. For mail: 2250 Lyon St., San Francisco, Calif.

BRADSHAW, DAVID Y. (A'31), Sound Engineer, ABC Radio Broadcasts, 704 University Ave., Chicago, Ill.

BRECKIN, S. H. (A'28), Laboratory Engineer, Dr. W. Katz, Frankfort, Germany.


BRIDGWEL, C. C. (A'30), Engineer, Radio Engineer, 1413 Broadway, New York, N.Y.

BRENNAN, J. W. (A'31), Field Engineer, General Electric Company's District Office, Bridgeport, Conn. For mail: 2248 Tabor Ave., Hackensack, N.J.


BRENNER, FRANK C. (A'30), 267-41-43-45 Park Ave., New York, N.Y. For mail: 1501 Park Ave., New York, N.Y.

BRENNER, RICHARD H. (A'31), Student, Dodge Radio Institute, Valparaiso, Ind.

BRISTOW, FREDERICK R. (A'23), Vice President, R.C.A. Western Division, 203 Ninth Ave., New York, N.Y.

BRITISH, ALBERTO R. (M'19), Captain, Jornal de Intelligenz, Vila, Belford, New York.

BRICK, FREDERICK W. (A'31), Engineer, Department of Electrical Engineering, University of California, Berkeley, Calif.

BRICKILL, G. A. (A'28), Chief Engineer, 877-41-43-45 Park Ave., New York, N.Y.

BRICKILL, H. L. (A'28), Chief Engineer, RCA Victor Company, Inc., Camden, N.J.

BRICKMAN, EMILE (A'30), Editor, 416 W. 22nd St., New York, N.Y.


BROOKS, JAMES T. (A'28), Chief Engineer, 320 Grove St., Haddonfield, N.J.

BROOKS, JULIUS (A'26), Sales Manager, Maclay Radio Manufacturing Co., 465-41-43-45 Park Ave., New York, N.Y.

BROOKS, PHILIP (A'28), Chief Engineer, 446 E. Randolph St., Chicago, Ill.

BROOKS, WILLIAM C. (A'20), President, W. C. Brooks Company, 563 W. Randolph St., Chicago, Ill. For mail: P.O. Box 389, Chicago, Ill.

BROOKS, W. C. (A'29), Engineer, RCA Victor Company, Inc., Camden, N.J.

BROOKS, W. R. (A'20), Engineer, 465 E. Randolph St., Chicago, Ill.

BROOKS, W. W. (A'20), President, Western Electric Manufacturing Company, 446 E. Randolph St., Chicago, Ill.

BROOKS, W. W. (M'30), President, Western Electric Manufacturing Company, 446 E. Randolph St., Chicago, Ill.

BROOKS, W. W. (M'30), President, Western Electric Manufacturing Company, 446 E. Randolph St., Chicago, Ill.

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BROOKS, W. W. (M'30), President, Western Electric Manufacturing Company, 446 E. Randolph St., Chicago, Ill.

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BROOKS, W. W. (M'30), President, Western Electric Manufacturing Company, 446 E. Randolph St., Chicago, Ill.

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BROOKS, W. W. (M'30), President, Western Electric Manufacturing Company, 446 E. Randolph St., Chicago, Ill.

BROOKS, W. W. (M'30), President, Western Electric Manufacturing Company, 446 E. Randolph St., Chicago, Ill.
CHALLENGE, ANSEL J. (A25), Radio Engineer, Bell Telephone Laboratories, Inc., 806 Great River Blvd., 190 Varick St., New York, N.Y.

CHALLENGER, GEORGE A. (A30), Control Man, Radio Station WKBW, Hotel Canada, 1721 St. Nicholas Ave., New York, N.Y.


CHAMBERLAIN, PAUL A. (A31), Forward, Wink Art Design, Cordy Radiophonic Corporation, 5050 W. Balmore Ave., Chicago, Ill. For mail: 2930 Coleraine Ave., Cincinnati, Ohio.

CHAMBERLAIN, R. A. (A25), Associate Radio Engineer, Munitions Bldg., Signal Corps, Washington, D.C. For mail: 3140 48th St., N.W., Washington, D.C.


CHAMBERS, JOSEPH A. (A29-M30), Technical Supervisor of Broadcasting, Crosby Radio Corporation, 11265 Archer St., Cincinnati, Ohio.

CHAPPEL, THOMAS J. (A31), Service Manager, Western Superior Co., 25 23rd St., Long Beach, C.I., N.Y. For mail: 25-23rd St., Astoria, L.I., N.Y.

CHANG, GEORGE S. (A31), Senior in Electrical Engineering, Electrical Engineering Training School, Chicago, Ill. For mail: 1957 W. Monroe St., Chicago, III.


CHANG, TING CHIN (A30), Professor of Communications and Dean, National University, College of Electrical Engineering, Nanking, China, For mail: 18 Shao Yu St., Nanking, China.


CHAPMAN, DAVID E. (J29), Student, University of Illinois, Urbana, Ill. For mail: 1201 W. Springfield St., Urbana, Ill.


CHAPMAN, ROBERT T. (A21), Photographic Engineer, Chapman and Rappe, Cincinnati, Ohio. For mail: Hunt Rd. and Cook Ave., Columbus, Ohio.

CHAPMAN, THOMAS J. (A25), Macome Foundation of America, 117 Madison Ave., New York, N.Y.

CHAPMAN, THOMAS M. (A21), Assistant Radioman, 2012 W. Springfield Rd., 3224 Alachua, Florida. For mail: 3 Temple Chambers, Calcutta, India.

CHAPMAN, THOMAS R. (A27), Assistant Radio Inspector, Rm. 321, Brownlow Louis Ullage, Los Angeles, Calif. For mail: 731 S. Figueroa, Los Angeles, Calif.


CHARRIER, GEORGE M. (A30), Lamplighter.

CHARTON, PAUL W. (A29), Research Engineer, Microwave Radio Company, 220 Elizabethtown, Newark, N.J. For mail: 71 Orange Rd., Montclair, N.J.

CHARTON, R. T. (A31), Associate Engineer, Chicago Telephone Company, 111 N. Canal St., Chicago, Ill. For mail: 431 N. Lombard Ave., Oak Park, Ill.

CHATEAU, ARTHUR (A27), Proprietor, Chateau Radio Sales and Service Company, 311 Louisiana Avenue Pkwy., New Orleans, La.

CHAVIN, STANLEY (A30), DeForest Radio Co., 366 South Pearl St., Buffalo, N.Y. For mail: 1184 S. Pear St., Upland, Calif.

CHEFFEL, ALEXIS M. (A29), Consulting Engineer, 42 Rue du Cite, Paris 16, France.

CHENG, C. C. (A28), Electrical Engineer, 48-40 41st St., Long Island City, N.Y.

CHEN, C. F. (A30), Electrical Engineer, 48-40 41st St., Long Island City, N.Y.

CHID, J. C. (A30), Proprietor, 910 A. V. Beech, Chlevision, N.Y.

CHINN, HOWARD A. (A27), Research Assistant, Massachusetts Institute of Technology, Round Hill, South Dartmouth, Mass.

CHOMAN, STUART EVANS (A31), Graduate Student, University of Michigan, Ann Arbor, Mich.

CHUTE, LLoyd (A29), Standardizing Laboratory, General Radio Company, 30 State St., Cambridge, Mass. For mail: 17 Cliff Ave., Lexington, Mass.

COFFIARY, BERNARD (A30), Engineer, RCA Victor Company, Inc., Camden, N.J. For mail: Station Avenue Apartments, Reader Heights, N.J.

COHAN, TUNISY (A31), Student Engineer, Columbia University, 520 Fifth Ave., New York City.

COHAN, WILLIAM F. (A25), Radio Sales Manager, 1923 W. Lake St., Chicago, Ill.

COHAN, SHELTON (A25), Radio Station, Temple of Heaven, Peking, China.


COKER, AARON (A24), Director, P.O. Box 735, Johannesburg, Transvaal, South Africa.

COHERN, LEO J. (A29), Proprieter, Cerne Radio Shop, 1234 N. Kedzie Ave., Chicago, Ill. For mail: 1529 N. Irving Ave., Chicago, Ill.

COHERN, MORRIS (A27), Chief Engineer, Polyworld Engineering Company, 182 W. 158th St., New York, N.Y. For mail: 1163 W. 158th St., New York, N.Y.

COHRS, HENRY, ALEXANDER (A30), Professor of Polytechnic Institute, Leiden, Neth.

COKER, RICHARD O. (A29), Research Associate, Natural History Library, University of Melbourne, Melbourne, Australi.


COKER, EDMUND H. (A31), Real Estate Department, 1204 Bank Blvd., New York, N.Y. For mail: 1331 Colson St., New Orleans, La.

COKER, RICHARD H. (A25), Proprietor, Radio Service, 2215 Central St., Evanston, Ill.

COKER, EDMUND H. (A31), Real Estate Department, 1204 Bank Blvd., New York, N.Y. For mail: 1331 Colson St., New Orleans, La.

COKER, RICHARD H. (A25), Proprietor, Radio Service, 2215 Central St., Evanston, Ill.

COKER, EDMUND H. (A31), Real Estate Department, 1204 Bank Blvd., New York, N.Y. For mail: 1331 Colson St., New Orleans, La.

COKER, RICHARD H. (A25), Proprietor, Radio Service, 2215 Central St., Evanston, Ill.
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloy, Howard L. (A'30)</td>
<td>Electrical Engineer, Boonton Research Corporation</td>
<td>1041 Hamilton St, Boonton, N.J.</td>
</tr>
<tr>
<td>Clavier, A. G. (M'30)</td>
<td>Sales Engineer, Wire &amp; Cable Co.</td>
<td>30 Madison St, Glen Ridge, N.J.</td>
</tr>
<tr>
<td>Claycomb, Hugh (A'26)</td>
<td>Manager, Radio Station WJAR, Goodwill Station</td>
<td>200 Fisher Blvd, Detroit, Mich.</td>
</tr>
<tr>
<td>Clayton, John M. (A'23-M'26)</td>
<td>Manager, Sales Department, Radio Corporation</td>
<td>311 California St., San Francisco, Calif. For mail: 251 Madison St, Palo Alto, Calif.</td>
</tr>
<tr>
<td>Clapp, A. P. (A'29)</td>
<td>Manager, Radio Division, Taylor, Pearson and Carson, Ltd.</td>
<td>250-16th Ave, W., Calgary, Alta., Canada</td>
</tr>
<tr>
<td>Clear, K. Y. (A'29)</td>
<td>Engineer, Radio Station WJAR</td>
<td>250-16th Ave, W., Calgary, Alta., Canada</td>
</tr>
<tr>
<td>Clemons, W. S. Y. (M'15)</td>
<td>Engineer, National Broadcasting Company</td>
<td>124-4th St, Lachine, P.Q., Canada</td>
</tr>
<tr>
<td>Clement, Lewis M. (A'21)</td>
<td>Manager, Columbia Pictures Corporation</td>
<td>4224aster St., Hollywood, Calif. For mail: 426 Lexington Dr., Glendale, Calif.</td>
</tr>
<tr>
<td>Clement, Lewis M. (A'36)</td>
<td>Manager, Federal Telephone Company</td>
<td>2100 West Pleasant Ave, Newark, N.J.</td>
</tr>
<tr>
<td>Clements, Wallace A. (A'22)</td>
<td>Engineer, College Radio School, Radio Station KGB, 113 Broadway, Pembroke, Colo.</td>
<td>824 Howard Ave, Newark, N.J.</td>
</tr>
<tr>
<td>Clifton, B. S. Y. (M'15)</td>
<td>Engineer, R.C.A. Communications, Inc.</td>
<td>Rock Point, I.L., N.Y.</td>
</tr>
<tr>
<td>Clipp, Robert W. (A'23)</td>
<td>Commercial Engineer, National Broadcasting Company</td>
<td>124-4th St, Lachine, P.Q., Canada</td>
</tr>
<tr>
<td>Clipsham, R. M. (A'30)</td>
<td>Engineer, Canada Wire and Cable Company</td>
<td>357 Baths Ave., Toronto 6, Ont., Canada</td>
</tr>
<tr>
<td>Colossos, Luke E. (A'29)</td>
<td>Research Engineer, Stelco Manufacturing Company</td>
<td>North Tonawanda, N.Y. For mail: Central Apartments, North Tonawanda, N.Y.</td>
</tr>
<tr>
<td>Clough, Kathleen (A'27)</td>
<td>Engineer, National Broadcasting Company</td>
<td>2409 N. Ashland St, Chicago, Ill.</td>
</tr>
<tr>
<td>Cluff, Harold D. (A'35)</td>
<td>Captain, Royal Canadian Corps of Signals, Camp Borden</td>
<td>4253 South St, Chicago, Ill.</td>
</tr>
<tr>
<td>Clure, W. (M'30)</td>
<td>Engineer, Radiotelevision Corporation</td>
<td>413 W. 14th St, Oklahoma City, Okla. For mail: Box 36, Tulsa, Okla.</td>
</tr>
<tr>
<td>Crane, Frank M. (A'23)</td>
<td>Manager, WJAR</td>
<td>1095 Orris St, Bingo, Calif. For mail: 2494 9th Ave, Bingo, Calif.</td>
</tr>
<tr>
<td>Couch, F. Arthur (A'26-M'28)</td>
<td>Manager, Radio Station WJAR</td>
<td>250-16th Ave, W., Calgary, Alta., Canada</td>
</tr>
<tr>
<td>Couch, Howard L. (A'30)</td>
<td>Electrical Engineer, Boonton Research Corporation</td>
<td>1041 Hamilton St, Boonton, N.J.</td>
</tr>
<tr>
<td>Cohen, Theodore (J'27-A'30)</td>
<td>Chief Engineer, Lake Research Laboratories, 1222 S. Wood St, Chicago, Ill.</td>
<td>185-7th Ave, New York, N.Y.</td>
</tr>
<tr>
<td>Cohn, Hugo (A'26)</td>
<td>Manager, Radio Station WHRM, Andrews Hotel, Minneapolis, Minn. For mail: 595 Window Ave, St. Paul, Minn.</td>
<td></td>
</tr>
<tr>
<td>Cole, Neil B. (A'30)</td>
<td>Director, Radio Station WHRM, Andrews Hotel, Minneapolis, Minn. For mail: 595 Window Ave, St. Paul, Minn.</td>
<td></td>
</tr>
<tr>
<td>Cole, Charles B. (A'30)</td>
<td>Representative, Engineering Service, Reliable Life Assurance Society, 570-7th Ave, New York, N.Y.</td>
<td>132 64th St, Brooklyn, N.Y.</td>
</tr>
<tr>
<td>Colby, Edward H. (A'22)</td>
<td>Radio Operator, Radio Station WGB, Radio Station WGB, Nebraska Radio, 470 Atlantic Ave, Boston, Mass.</td>
<td>1202 State St., New York, N.Y.</td>
</tr>
<tr>
<td>Coe, Alfred J. (A'25)</td>
<td>Director, Coe Institute, 75-80 Cortlandt St, New York, N.Y. For mail: 917 Newkirk Ave, Brooklyn, N.Y.</td>
<td></td>
</tr>
<tr>
<td>Coe, James C. (A'25)</td>
<td>Assistant Radio Engineer, Signal Corps Airborne Radio Laboratory, 917 Newkirk Ave, Brooklyn, N.Y.</td>
<td></td>
</tr>
<tr>
<td>Coe, Robert S. (A'29)</td>
<td>Broadcast Operator, Radio Station WJAR, Travelers Broadcasting Service, Hartford, Conn.</td>
<td>351-1st St, Newark, N.J.</td>
</tr>
<tr>
<td>Bogeshall, Ivan S. (A'26-M'29) General Manager, Western Union Telegraph Company, 60 Hudson St, New York, N.Y.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colewell, W. B. (P'30)</td>
<td>Vice President, Radio Station WHRM, Andrews Hotel, Minneapolis, Minn.</td>
<td>595 Window Ave, St. Paul, Minn.</td>
</tr>
<tr>
<td>Colwell, W. B. (P'30)</td>
<td>Vice President, Radio Station WHRM, Andrews Hotel, Minneapolis, Minn.</td>
<td>595 Window Ave, St. Paul, Minn.</td>
</tr>
<tr>
<td>Colwell, W. B. (P'30)</td>
<td>Manager, WJAR</td>
<td>1095 Orris St, Bingo, Calif. For mail: 2494 9th Ave, Bingo, Calif.</td>
</tr>
<tr>
<td>Collin, P. (A'25-M'28)</td>
<td>Engineer, WJAR</td>
<td>1095 Orris St, Bingo, Calif. For mail: 2494 9th Ave, Bingo, Calif.</td>
</tr>
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<td>Collin, P. (A'25-M'28)</td>
<td>Engineer, WJAR</td>
<td>1095 Orris St, Bingo, Calif. For mail: 2494 9th Ave, Bingo, Calif.</td>
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<tr>
<td>Collins, Francis A. (A'29)</td>
<td>Member, Technical Staff, Bell Telephone Laboratories, Inc. 63 West St, New York, N.Y.</td>
<td></td>
</tr>
<tr>
<td>Coller, George H. (M'15)</td>
<td>Operating Engineer, Bell Telephone Laboratories, Inc. 63 West St, New York, N.Y.</td>
<td></td>
</tr>
<tr>
<td>COBBS, HOWARD L. (A’30)</td>
<td>Electrochemical Engineer, Boonton Research Corporation, Boonton, N.J.  For mail: Fairview Ave, Boonton, N.J.</td>
<td></td>
</tr>
<tr>
<td>COBB, HOWARD L. (A’30)</td>
<td>Electrochemical Engineer, Boonton Research Corporation, Boonton, N.J.  For mail: Fairview Ave, Boonton, N.J.</td>
<td></td>
</tr>
<tr>
<td>COBY, STANLEY W. (A’31)</td>
<td>Radio Technician and Proprietor, Stanley W. Cobb Radio Service Laboratory, 22 Angel Ave, South Portland, Maine.</td>
<td></td>
</tr>
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<td>Radio Technician and Proprietor, Stanley W. Cobb Radio Service Laboratory, 22 Angel Ave, South Portland, Maine.</td>
<td></td>
</tr>
<tr>
<td>COBLENTZ, ORRAN R. (A’30)</td>
<td>Radio Production Manager, Columbia Broadcasting System, 254 Rano St, Buffalo, N.Y. For mail: 410 S. Catalina St, Butterfly, Calif.</td>
<td></td>
</tr>
<tr>
<td>COCHRANE, WILLIAM S. (A’31)</td>
<td>Radio Engineer, Columbia Broadcasting System, 22 Angel Ave, South Portland, Maine.</td>
<td></td>
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<td>Radio Engineer, Columbia Broadcasting System, 22 Angel Ave, South Portland, Maine.</td>
<td></td>
</tr>
</tbody>
</table>
GILMAN, GEORGE W. (A’29), American Telephone and Telegraph Company, Radio Station, Lawrenceville, N.J.

GLIMOUR, PETER (A’19), Electrical Engineer, Matison Company, Johannesburg, South Africa.

GIDDY, NORMAN H. (A’26), Radio Sales, General Electric Company, Bridgeport, Conn.

GIODA, PETER C. (A’26), Recorder, Columbian Instrument Corp., Redfern, Conn.

GIOVANNI, FRANK (A’28), Member of Technical Staff, Bell Telephone Laboratories, Inc., 435 Main St., W. New York, N.Y.


GELHAUG, JOHN A. (A’17), County Surveyor and Civil Engineer, Baudette, Minn.

GLADKOV, CYRIL A. (A’29), Chief of the Physics-Technical Division, Scientific Research Institute of Motion Picture Industries, Moscow 39, Moscow, U.S.S.R.

GLASS, ROBERT E. (A’28), Proprietor, Pub- lic Address Service Company, 2005 East 16th St., Dallas, Tex. For mail: 55520 East 16th St., Dallas, Tex.

GLASSCOCK, RICHARD (A’28), Industrial Automation Engineer, Standard Oil Company, 323 S. Howell Ave., New York, N.Y.

GODFREY, JAMES S. (A’30), Operator, Radio Station WJZ, West Orange, N.J.

GODLEY, PAUL F. (A’14), Secretary-Treasurer, Chalmers-Goddard Corporation, 870 W. 6th St., Chicago, III. For mail: 10 Marion Rd., Upper Montclair, N.J.

GOGEL, EUGENE S. (A’26), Secretary and Treasurer, Western Michigan Music Conference, Muskegon, Grand Rapids, Mich.

GOERING, RYAN A. (A’20), Radio Service Station, Corner Book Store, 28 S. Main St., Canandaigua, N.Y. For mail: 195 S. St., Canandaigua, N.Y.

GOLDHAMER, SAUL A. (A’31), Toronto District Manager, American Tin Plate Company, 1431 Simcoe St., Toronto, Ont., Canada. For mail: 1 Starr Ave, Toronto, Ont., Canada.

GOLDIN, HYMAN C. (A’33), Eastern Division Operating Supervisor, Northern Electric Company, Ltd., 639 St. S.W., Montreal, P.Q., Canada. For mail: 4590 Clark St., Montreal, P.Q., Canada.


GOLDSMITH, STANLEY T. (A’27), Radio Service Manager, Lexington Telephone and Cable Company, 3377 Madison St., Chicago, Ill. For mail: 3507 W. Adams St., Chicago, III.

GOLDSTEIN, HENRY R. (A’29), Police Radio Service, Lackawanna and Wyoming Company, 45 Pearl St., Long Island City, L.I., N.Y.

GOLDWYN, ALFRED N. (M’12-F’15), Vice President and Treasurer, RCA, Carbon and Brass, New York, N.Y.

GOLDWYN, T. (A’18), Engineer, Transmission Department, Warner Brothers Pictures, Inc., Burbank, Calif. For mail: 4617 Plantside Ave., Hollywood, Calif.

GOLDSWORTHY, HENRY J. (A’29), Radio Sales and Service, 632 S. Peters St., New Orleans, La.

GOLDSWORTHY, MAXWELL K. (A’30), E. Lamont, 4200 W. 68th St., Chicago, III.

GOLDSMITH, HALLAN E. (A’29), Radio Transmitter Design Engineer, Radio Corporation of America, Radio Central, Rocky Point, L.I., N.Y.

GOLTE, J. N. (A’27), Field Engineer, Stratford, Conn. For mail: 323 Tivoli Rd., Stratford, Conn.

GOODFELLOW, RICHARD C. (A’20), Research Director, Radio Corporation of America, 233 Franklin Ave., New York, N.Y.

GOODHART, R. (A’20), Proprietor, Public Address Service Company, 2005 East 16th St., Dallas, Tex. For mail: 55520 East 16th St., Dallas, Tex.

GOODALL, WILLIAM M. (A’30), Member of Technical Staff, Bell Telephone Laboratories, Inc., 1431 Simcoe St., Toronto, Ont., Canada. For mail: 1 Starr Ave, Toronto, Ont., Canada.

GOODBERG, EDWARD J. (A’31), Proprietor, Proprietor, Radio Service, 688 Main St., Rivermont, N.J. For mail: 331 La- mont Ave., Detroit, Mich. For mail: 4617 Plantside Ave., Hollywood, Calif.

GOODHART, HENRY C. (A’27), Proprietor, Proprietor, R.C.A. Communications, Inc., Rocky Point, L.I., N.Y. For mail: 112 Cypress Ave., Woodside, L.I., N.Y.

GOODWIN, EDWIN A. (A’30), Assistant Radio Engineer, Pacific Telephone and Telegraph Company, 1010 Pennsylvania Ave., Washington, D.C. For mail: 112 Cypress Ave., Woodside, L.I., N.Y.

GOODWIN, WILSON, NELSON, JR. (A’15-M’29), Chief Electrical Engineer, Western Electric Company, Inc., 101 West Washington St., Chicago, Ill. For mail: 30 Sherwin Ave., Newark, N.J.

GOORD, R. V. (A’27), First Wireless Telegraph Station, 530 W. 53rd St., Chicago, Ill. For mail: 10 Marion Rd., Upper Montclair, N.J.

GORDON, H. (A’25), Assistant to Wireless Telegraph Station, 1669 W. 53rd St., Chicago, Ill. For mail: 10 Marion Rd., Upper Montclair, N.J.

GORDON, HARRINGTON (A’25), Chief Engineer, Telephone, 97 Broadway, New York, N.Y.

GORDON, HARRY E. (A’29), Equipment Engineer, Rochester Telephone Corporation, 20 North St., Rochester, N.Y. For mail: 2000 W. 6th St., Chicago, Ill.

GORDON, MALCOLM J. (A’31), Radio Serviceman, General Electric Company, 45 Pearl St., Long Island City, L.I., N.Y.

GORDON, NATHAN (A’20), Proprietor, Public Address Service Company, 2005 East 16th St., Dallas, Tex. For mail: 55520 East 16th St., Dallas, Tex.

GORDON, MALCOLM J., JR. (A’29), Transmission Research Department, Bell Telephone Laboratories, Inc., 467 West 57th St., New York, N.Y. For mail: 215 Broad St., Newark, N.J.

GORECKI, JOSEPH M. (A’31), Student, East Technical High School, Cleveland, Ohio. For mail: 3082 E. 61st St., Cleveland, Ohio.

GORHAM, ROBERT (A’26), Assistant Professor of Electrical Engineering, University of Pittsburgh, Pittsburgh, and O’Hara College, Pittsburgh, Pa.


GOTTHEIL, ALBERT N. (A’30), Engineer, Telegraph, Hufschleks (U.S.) 13 Berlin, S.W. 11, Germany.


GOULD, GEORGE M. (A’27), 124 Park St., San Francisco, Calif.

GOULD, HOWARD S. (A’25), University of Michigan, Detroit, and 214 E. 8th St., Ann Arbor, Mich.

GOULD, WILLIAM B., III (A’26), 84 Stonington Ave., Hyde Park, Mass.

HERRMAN, ALBERT JR. (J-29) Engineer, Wausau Sound Laboratories, Wausau, Ill. For mail: 531 Mill City, Wausau, Ill.
HERRMAN, FRANK (A-20) Chief Engineer and Treasurer, KXRN Broadcasting Association, Oklahoma City, Oklahoma. For mail: Oklahoma City, Okla.
HERROLD, GEORGE V. (A-20) Radio Propaganda Manager, U.S. Army Signal Corps, Fort Monmouth, N.J.
HERSHEY, ARTHUR W. (A-28), Bell Telephone Laboratories, Inc., 180 Varick St., New York, N.Y.
HERSHEY, J. B. (A-28), Instructor, Indiana University, Bloomington, Ind.
HENSEL, CHARLES C. (A-21-M-29), Salamanca, Americal Radio Tube Company, North Tonawanda, N.Y.
HEVESY, JOHN P. (A-27), Croy Laboratory, Harvard University, Cambridge, Mass.
HESSELTON, CHARLES C. (A-21-M-29), Salesman, American Telephone & Telegraph Company, 720 Prudential Ave., Newark, N.J.
HESS, HENRY H., Jr. (A-31), Radio Science Station, University of California, Berkeley, Calif.
HIGGINS, PERCY V. (A-31), Engineer, Workshops and Designs, Post and Telegraph Department, Kula Lumper, Federated States of Micronesia.
HIGGINS, ROBERT C. (A-26), Director, Broadcasting Station WEAO, Ohio State University, Columbus, Ohio.
HIGHT, STUART C. (A-31), Research Engineer, United Research Corporation, 180 Varick St., New York, N.Y.
HIGGONETTE, JACQUES (A-31), Techniques de Material Telephonique, 26 Rue de Severs, Boulogne, France.
HIGHT, STUART C. (A-31), Research Engineer, United Research Corporation, 180 Varick St., New York, N.Y.
HILL, EDWARD W. (A-20), RCA Radiotron Company, Inc., 415 S. 5th St., Department 52, Philadelphia, Pa. For mail: 53 Union Ave, Newark, N.J.
HILDEBRAND, JONES (A-21), Manager, American Radio Manufacturing Company, New York, N.Y.
HILDEBRAND, JONES (A-21), Manager, American Radio Manufacturing Company, New York, N.Y.
HILDEGARD, W. C. (A-29), Supervisor, 6/4 Western Union Telegraph Company, New Orleans, La.
HILL, ERNEST M. (A-28), Public Address Engineer, Mollard Wireless Service Company, 120 West 42nd St., New York, N.Y.
HILL, P. F. (A-27), Chief Engineer, United Radio Corporation, Chicago, Ill.
HILL, W. B. (A-28), Chief Inspector Engineer, Stewart-Warner Alemite Corporation, 392 Broadway, New York, N.Y.
HICKLEY, THOMAS J. (A-30), Laboratory Assistant, Bell Telephone Laboratories, Inc., 180 Varick St., New York, N.Y.
HICKMAN, C. NICHOLS (A-29), Research Physicist, American Radio Company, 29 W. 57th St., Chicago, Ill.
HICKS, ERNEST (J-27), Radio Instructor, Hadley Vocational School, Sheridan, School St., St. Louis, Mo. For mail: 1371 Chamberlain Ave., St. Louis, Mo.
HIGGINS, PERCY V. (A-31), Engineer, Workshops and Designs, Post and Telegraph Department, Kula Lumper, Federated States of Micronesia.
HIGGINS, ROBERT C. (A-26), Director, Broadcasting Station WEAO, Ohio State University, Columbus, Ohio.
HIGHT, STUART C. (A-31), Research Engineer, United Research Corporation, 180 Varick St., New York, N.Y.
HIGGONETTE, JACQUES (A-31), Techniques de Material Telephonique, 26 Rue de Severs, Boulogne, France.
HIGHT, STUART C. (A-31), Research Engineer, United Research Corporation, 180 Varick St., New York, N.Y.
HILDEBRAND, JONES (A-21), Manager, American Radio Manufacturing Company, New York, N.Y.
HILDEGARD, W. C. (A-29), Supervisor, 6/4 Western Union Telegraph Company, New Orleans, La.
HILL, ERNEST M. (A-28), Public Address Engineer, Mollard Wireless Service Company, 120 West 42nd St., New York, N.Y.
HILL, P. F. (A-27), Chief Engineer, United Radio Corporation, Chicago, Ill.
HILL, W. B. (A-28), Chief Inspector Engineer, Stewart-Warner Alemite Corporation, 392 Broadway, New York, N.Y.
HICKLEY, THOMAS J. (A-30), Laboratory Assistant, Bell Telephone Laboratories, Inc., 180 Varick St., New York, N.Y.
HICKMAN, C. NICHOLS (A-29), Research Physicist, American Radio Company, 29 W. 57th St., Chicago, Ill.
HICKS, ERNEST (J-27), Radio Instructor, Hadley Vocational School, Sheridan, School St., St. Louis, Mo. For mail: 1371 Chamberlain Ave., St. Louis, Mo.
HIGGINS, PERCY V. (A-31), Engineer, Workshops and Designs, Post and Telegraph Department, Kula Lumper, Federated States of Micronesia.
HIGGINS, ROBERT C. (A-26), Director, Broadcasting Station WEAO, Ohio State University, Columbus, Ohio.
HIGGONETTE, JACQUES (A-31), Techniques de Material Telephonique, 26 Rue de Severs, Boulogne, France.
HIGHT, STUART C. (A-31), Research Engineer, United Research Corporation, 180 Varick St., New York, N.Y.
HIGGONETTE, JACQUES (A-31), Techniques de Material Telephonique, 26 Rue de Severs, Boulogne, France.
HIGGINS, RICHARD (A-26), Lien trayteur, L. N. Sassoon, I.C.S., Hounfma, 6/4 Postma
JOHNSON, OSCAR E. (A’31), Clerk, Panida National Bank, 422 Amite St., Sandpoint, Idaho.


JOHNSON, R. STANLEY (A’29), 10 S. Oxford St., Brooklyn, N.Y.


JOHNSON, T. JR., (A’14-M’18), 189 McPhilip Ave., Kansas City, Mo.

JOHNSON, V. (A’26), Proprietor, Johnson’s Service, 608 Calle St., San Pedro, Calif. For mail: P.O. Box 558, San Pedro, Calif.

JOHNSON, VIVION A. (A’29), 107 E. 2nd St., Indianapolis, Ind.

JOHNSON, WILLIAM D. (A’31), Assistant Radio Inspector, Radio Division, U. S. Department of Commerce, P.O. Box 3914, Washington, D.C.

JOHNSON, DOUGLAS A. (A’26), Vice President, City Coal and Wool Company, 141 Elm St., New Britain, Conn.

JOHNSON, F. E. (M’30), Chief Engineer, Crosley Radio Corporation, Cincinnati, Ohio. For mail: 1111 Larry Ave., College Hill, Cincinnati, Ohio.

JOHNSON, GEORGE DAVID (A’20), 417 Balmont Ave., Cleveland, Ohio.


JOHNSON, JOHN P. (M’38), Engineer’s Club, 32 W. 40th St., New York, N.Y.

JOHNSON, THOMAS F. (A’31), 11 S. Radio Rd., Southbury, Conn. For mail: P.O. Box 321, Southbury, Conn.

JOHNSON, W. (A’28), Electrician, Barlow Radio Station, New York, N.Y.


JOLLIFFE, CHARLES B. (M’25-F’19), Director, National Press Bureau, Washington, D.C.


JONES, AUGUST F. (A’31), Engineer, Intercontinental Telephone and Telegraph Corporation, 67 E. 42nd St., New York, N.Y.

JONES, BURF B. (A’29), Proprietor, Jones Service Supply, 1235 S. Detroit St., Toledo, Ohio.

JONES, CARL C. (A’30), Service Manager, Michigan Power, Dayton, Ohio. For mail: Clayton, Ohio.

JONES, BRAMIN D. (A’29), Chief Engineer, Radio Station WWJ, Detroit, Mich. For mail: 20 Evergreen Ave., Detroit, Mich.


JONES, ERNEST (A’31), 540 Hempshaw Lane, Stockport, England.

JONES, FRANK C. (A’30), Consulting Engineer, 0 Stockwell Rd., Berkeley, Calif.

JONES, FRANK E. (M’24), 580 West 87th St., New York, N.Y. For mail: P.O. Box 128, Salado, N.C.

JONES, FRANK H. (A’27), Chief Engineer, Tunnun Inuit Sugar Company, Tunnun, Cuba. For mail: P.O. Box 128, Salado, N.C.

JONES, FRANK M. (A’29), Broadcast Engineer, Radio Station KDKA, Inc., 4-10 W. Carnegie Ave., Pittsburgh, Pa. For mail: 16 S. Milton St., San Angelo, Tex.

JONES, CHARLES W. (A’28), Radio Engineer, Radio Station WWJ, Detroit, Mich. For mail: 3547 Gilham Rd., Kansas City, Mo.

JONES, H. GARNIEL (M’35), Secretary and Managing Director, Hutton and Jones, Inc., 9 E. 40th St., St. Paul, Minn.

JONES, H. ROBERT (A’23), Engineer, Electrical Research Products, Inc., 259 W. 37th St., New York, N.Y. For mail: P.O. Box 1112, Hillcrest Ave., Merchants, N.J.

JONES, L. F. (M’32), Transmitter Division, Engineering Department, RCA Victor Company, Inc., Camden, N.J.

JONES, LESTER L. (A’12-P’22), President, Technicolor Corporation, 644 Broadway, New York, N.Y.


JONES, NEWELL R. (A’22), 247 Metrow Ave., Haddonfield, N.J.

JONES, RICHARD BURNET (A’31), Engineer, Radio Station WJZ, New York, N.Y. For mail: 260 Gracie St., New York, N.Y.

JONES, ROY C. (A’24), Radio Operator, WJZ, New York, N.Y. For mail: P.O. Box 598, Panama City, Panama.

JONES, VARNAKALE L. (A’26), Physics Department, University of Oklahoma, Norman, Okla. For mail: Chicago, Ill.


JORDAN, JACOB (A’28), Associate Professor of Physics, Oregon State College, Corvallis, Orp. For mail: 554 Jefferson St., Corvallis, Oregon.


JORDAN, RALPH E. (A’28), Proprietor and Manager, Jordan Radio Laboratory, 1015 E. 7th St., Erie, Pa.

JORGENSEN, E. LAURITS (A’29), Radio Engineer, Philips Radio A/S, Skakentved, Copenhagen K., Denmark. For mail: Steinboeksgade 4, Copenhagen.

JORGENSEN, A. A. (A’30), Chief Radio Inspector, Railroad Radio Department, Wash.

JORGENSEN, HAROLD (A’31), Chief Inspector, Howard Radio Company, Wash.

HAVEN, Mich. For mail: Jans Hotel, South Haven, Mich.


JOSEPH, J. BERNARD (A’30), 55 Providence, Providence, Rhode Island.

JOWDY, MITCHELL (A’29), Radio Dealer, Washington, D.C.

JOY, RENYARD (A’22), President, Joy Research Laboratory, 2766 Penobscot Blvd., Detroit, Mich.

JULIEN, GILBERT B. (J’S0), Radio Announcer, Sears, Roebuck and Company, Kansas City, Mo. For mail: 1821 Michigan Ave., Chicago, Ill.

JUDSON, ELBERT B. (A’26), Radio Engineer, Radio Station WJZ, New York, N.Y. For mail: 1912 Hillcrest Ave., Merchants, N.J.

JULIEN, IRA F. (A’15-M’26), Transmitting Station Manager, Mackay Radio and Telegraph Company, 22 Battery St., San Francisco, Calif. For mail: 740 Homer Ave., Palo Alto, Calif.

JUNKEN, L. H. (A’25), Assistant Quality Manager, RCA Victor Company, Inc., Camden, N.J. For mail: 4 Tavistock Blvd., Haddonfield, N.J.

K

KAAR, IRA J. (J23-M’29), Engineer, Radio Engineering Department, Transmitter Section, General Electric Company, Schenectady, N.Y.


KADAYAMA, TOYSUKE (A’29), Nihon-Hoso-Kyokai, Fukuoka-Hosokyo, Fukuoka City, Japan.

KADY, GEORGE T. (A’31), Clerk, Gay and Robinson Company, Mankato, Kauai, Hawaii. For mail: P.O. Box 41, Waimea, Kauai, Hawaii.

KANNO, KO (A’28), Japan Wireless Telegraphy Corporation, Oyamazaki Tochigiken, Japan.

KANNEBERG, WALTER F. (A’25), Telephone Engineer, Bell Telephone Laboratories, Inc., 461 West New York St., New York, N.Y. For mail: 714 Ten Eyck Ave., Lindenhurst, N.J.

KANNESTINE, FABIAN M. (A’16), Director, Research Laboratory, Geophysical Research Corporation, 65 Broadway, New York, N.Y. For mail: 13 Ward St., Bloomfield, N.J.

KANNO, GENGU (A’29), Chief Engineer, Kinki-Nippon Telephone, Inokashira Station, Kajibashi, Kawasaki, Japan.

KANTEBET, S. B. (A’25-M’31), Professor, Communication Engineering Laboratories, Indian Institute of Science, Bangalore, India.

KAPLAN, ARTHUR A. (A’31), 831 W. 177th St., New York, N.Y.

KAPLAN, JACOB (A’29), Patent Attorney, 900 F St. NW, Washington, D.C.

KAPPUS, PAUL B. (A’31), 668 Schiller Ave., Akron, Ohio.
MEMBERSHIP (Alphabetical)
NELANDS, FREDERICK J. (A’21), c/o
Heinte and Kaufman, San Francisco, Calif.
For mail: 4141 W. Juneau St., Seattle, Wash.

NELLY, GUY MORTON (A’30), Lieutenant
Engineer, U.S. Navy, 6 Michigan Ave.,
New York, N.Y.

NELSON, HAROLD R. (A’21), Chief En-
gineer, General Motors Radio Corporation,
Detroit, Mich.

NELSON, J. C., Construction Manager,
Radio Station WABC, New York, N.Y.

NELSON, J. C. (A’25), Manager, General Motors
Radio Corporation, 335 West 42nd St.,
New York, N.Y.

NELSON, JOHN H. (A’29), Chief En-
gineer, United States Steel Corporation,
Pittsburgh, Pa.

NELSON, ROBERT G. (A’25), Manager
Radio Station KGO, San Francisco, Calif.

NELSON, STEWARD (A’21), Assistant
Manager, Radio Station WNYC, New York,
N.Y.

NEWBERG, H. L. (A’20), Technical Inspec-
tor, Electrical Research Products, Inc.
724 Union Trust Bldg., Cleveland, Ohio.

NEWELL, B. W. (A’27), Associate
Professor, Electrical Engineering,
University of Washington, Seattle, Wash.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
University of Illinois, Champaign-Urbana,
Illinois.

NEWELL, HOMER W. (A’29), Associate
Professor, Electrical Engineering,
PINE, NORMAN T. (A'25), 220 W. 41st St., New York, N.Y.

PINGLE, ARTHUR (A'28), Express Clerk, Electric Railway Express, 324 Huron Ave., Cleveland, Ohio. For mail: 1194 Morse Ave., Cleveland, Ohio.

PINKMAN, HERBERT N. (A'31), Proprietor, Radio Service, 1417 E. Pine St., Seattle, Wash.

PIPASSA, STUART A. (A'41), Airline Engineer, TWA, 113 S. Wabash Ave., Chicago, Ill.

PIZZICARRO, VICTOR, Proprietor, Pizzicarro’s Cafe, 814 Market St., New Orleans, La.

PODOLSKY, LEON (A'30), Engineer, RCA Victor Company, Inc., Camden, N.J.

POELTNER, DONALD (A'38), Proprietor, WQIV, 110 E. 11th St., Philadelphia, Pa.

POLETTO, JAMES (A'42), Proprietor, The Laurel, 940 S. Dearborn St., Chicago, Ill.

POLOWSKI, JOHN B. (A'39), Proprietor, WJXM, 333 Division St., Detroit, Mich.

POLLEN, H. A. (A'31), Operator, WQX, 4911 W. 67th St., Chicago, Ill.

POLLARD, JOHN L. (A'31), Proprietor, WZMQ, 212 W. 33rd St., Chicago, Ill.

POLSTON, DONALD J. (A'43), Proprietor, WIPB, 601 S. Dearborn St., Chicago, Ill.


POLYAK, H. N. (A'32), Proprietor, WGRG, 3011 N. Lake Shore Dr., Chicago, Ill.

POLYDOLOFF, GEORGE J. (A'34), Director of Research, Johnson Laboratories, Inc., 609 W. Lake St., Chicago, Ill.

POPOVA, V. A. (A'30), Proprietor, WOZA, 2515 E. 7th Ave., Toronto, Ont., Canada.

PORCHER, WILLIAM (A'30), Proprietor, WFOJ, 2022 Franklin St., Jacksonville, Fla.

PORTER, ROBERT A. (A'33), Proprietor, WZM, 202 W. 31st St., Chicago, Ill.

PORTER, RALPH E. (A'32), Proprietor, WABC, 1381 Avenue of the Americas, New York, N.Y.

PORTER, ROBERT G. (A'31), Proprietor, WJW, 3663 4th Ave., New York, N.Y.

PORTER, DONALD (A'36), Proprietor, WQX, 4911 W. 67th St., Chicago, Ill.

PORTO, MANUEL (A'30), Proprietor, WOR, 114 W. 66th St., New York, N.Y.

PORTMAN, ROBERT (A'31), Proprietor, WOR, 114 W. 66th St., New York, N.Y.

PORTER, RUSSELL (A'30), Proprietor, WNYC, 101 E. 52nd St., New York, N.Y.

PORTER, WILLIAM (A'31), Proprietor, WJZ, 27 E. 42nd St., New York, N.Y.

PORTER, RYAN (A'32), Proprietor, WJZ, 27 E. 42nd St., New York, N.Y.

PORTER, W. V. (A'30), Proprietor, WABC, 1381 Avenue of the Americas, New York, N.Y.

PORTER, WILLIAM (A'31), Proprietor, WJZ, 27 E. 42nd St., New York, N.Y.

PORTER, W. V. (A'30), Proprietor, WABC, 1381 Avenue of the Americas, New York, N.Y.

PORTNOY, Max (A'35), Proprietor, WOR, 114 W. 66th St., New York, N.Y.

PORTNOY, Max (A'35), Proprietor, WOR, 114 W. 66th St., New York, N.Y.
<table>
<thead>
<tr>
<th>NAME</th>
<th>ADDRESS</th>
<th>CITY</th>
<th>STATE</th>
<th>PHONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRICE, HARRIET (A’31)</td>
<td>Secretary, Bell Telephone Laboratories, Inc., Whippley, Ont., Canada.</td>
<td>Whippley, Ont., Canada.</td>
<td></td>
<td>31 Glenwood Pl., East Orange, N.J.</td>
</tr>
<tr>
<td>PRICE, ROLAND J. C. (J’16-M’30)</td>
<td>Junior Radio Engineer, Radio Branch, Department of Marine, Ottawa, Ont., Canada.</td>
<td>Ottawa, Ont., Canada.</td>
<td></td>
<td>16057 Park Ave., Rochester, N.Y.</td>
</tr>
<tr>
<td>PRIEBE, FRANK (A’24)</td>
<td>Engineer, Vacuum Tube Division, RCA Victor Company, Inc., Camden, N.J.</td>
<td>Camden, N.J.</td>
<td></td>
<td>403 Penn St., Camden, N.J.</td>
</tr>
<tr>
<td>PRIEST, WARD C. (A’26)</td>
<td>Professor of Physics, Lawrence University, Appleton, Wis.</td>
<td>Appleton, Wis.</td>
<td></td>
<td>1447 N. Parallel Ave., Appleton, Wis.</td>
</tr>
<tr>
<td>PRIGGE, JOHN, J. R. (A’31)</td>
<td>Instructor, Brown University, 118 Loomis St., Providence, R.I.</td>
<td>Providence, R.I.</td>
<td></td>
<td>3207 1st Ave., Brooklyn, N.Y.</td>
</tr>
</tbody>
</table>
MEMBERSHIP (Alphabetical)
SKEELS, DUDLEY K. (A'29), Service Manager, Skeels Brothers, 1527 Pilgrim Rd, Toledo, Ohio. For mail: Box 214, St. Louis C, Toledo, Ohio.

SKELETT, A. MELVIN, (M'30), Radio Research Engineer, Bell Telephone Laboratories, Inc., P.O. Box 122, Deal, N.J.

SKELETT, JENNETH W. (A'28), Radio Engineer, 2574 W. 160th St, Chicago 37, Ill.

SKETLON, THOMAS H. (A'30), Broadcast Supervisor, Postum Company, 120-A Russell St, Melbourne, Australia. For mail: 127 Regent St, Preston N. 18, Victoria, Australia.

SKIFTER, HECTOR E. (A'31), Radio Engineer, 250 Yonge St, Toronto, Ont., Canada. For mail: 226 Richmond St North, Toronto, Ont., Canada.

SKINNER, MURRAY B. (A'29), Asst Director of Research, Brooklyn Edison Company, Brooklyn, N.Y.

SKINNER, CLIFFTON ROSS (A'29), Manager, C. R. Skinner Manufacturing Company, 133 East 42nd St, New York, N.Y.

SKINNER, OSCAR E. (A'29), Manager, Wimbo Club, Wimbo, Mass. For mail: Dress Post, Mass.

SKIRROW, JOHN F. (A'27), Vice President and Chief Engineer, Postal Telegraph and Cable Company, 67 Broad St, New York, N.Y.

SKLAR, H. LEE (A'31), Chief Engineer, Mcamold Radio Corporation, 1087 Fleming Ave, Brooklyn, N.Y. For mail: 867 Huntington Ave, Boston, Mass., 02115.

SKOV, JENS INGVARD (A'29), Radiotechnical Corporation of America, 227 Fries Ave, Wilmingtonton, New Jersey.

SLADE, BENJAMIN (A'31), Radio Engineer, 2597 Varick St, New York, N.Y. For mail: The Queen, West Palm Beach, Florida.

SLATER, F. ROBERT (A'26), Engineering Manager, CACI Communications, Inc., Bolinas, Calif.

SLATER, FRED L. (A'31), Proprietor, Radio Service, 2478 Elth Nth, New York, N.Y.

SLATER, SAUL I. (J'23-A'29), Chief Engineer, Red Lion Broadcasting, 15 S. Broad St, Brooklyn, N.Y. For mail: 30-31-32th St, New York, N.Y.

SLATTERY, JOHN J. (J'29-A'30), Assistant Engineer, Bell Telephone Laboratories, Inc., 412 First Ave, New York, N.Y. For mail: 100 Williamson Ave, Bloomfield, N.J.

SLAVICK, HENRY WILLIAM (A'28), Resident Engineer, Radio Station WMC, Memphis, Tenn.

SLAVIN, SAMUEL B. (B'29), Transmitting Engineer, Eastern Electric Corporation, 205 South, Boise, Idaho. For mail: 2233 Hayes St, San Francisco, Calif.


SLEEPER, J. LLOYD (F'24), Executive Vice President, Van Buren, 2 H. Collins Company, 1414 W 7th St, La Vergne, Calif. For mail: 2555 La Crescenta, Alhambra, Calif.


SLOCUM, WALTER E. (A'31), Radio Service Engineer, Independent Radio Service, 92 Early St, Providence, R.I.


SMALL, CHARLES J. (A'32), Sound Engineer, Disney Film Recording Company, 2579 Hyperion Ave, Los Angeles, Calif. For mail: 2203 W 3rd St, Santa Monica, Calif.

SMITH, JOHN C. (A'30), Assistant Manager, Western Electric Company, 2152 W 7th St, New York, N.Y.

SMITH, FRANK L. (A'29), Student Engineer, RCA Victor Company, Inc, Camden, N.J. For mail: 1606 Caton Ave, Brooklyn, N.Y.

SMITH, H. M. (A'31), Engineer, Doty and Follmann, Inc., 1306 W. 74th St, Chicago, III.

SMITH, H. MILLARD (A'20), Vacuum Tube Engineer, 161 W. 31st St, New York, N.Y. For mail: 325 Brighton Beach, Brooklyn, N.Y., 11213.

SMITH, HILTON (A'28), Proprietor, Radio Service, 1 New York St, Crossville, near Keighley, York, England.

SMITH, HAROLD A. (A'31), Radio Engineer, General Electric Company, 1 River Rd, Schenectady, N.Y. For mail: 453 Grand Blvd, Schenectady, N.Y.

SMITH, HAROLD E. (A'28), Engineer, Radio Station WOKO, 886 South St, Providence, R.I. For mail: Hotel Ten Eyck, Albany, N.Y.

SMITH, HAROLD L. (A'28), Radio Engineer, 56 High St, Burton, England.


SMITH, J. O. (A'20-M'24), Manager, Radio Administration, RCA Photophone, Inc., 415-4th Ave, New York, N.Y. For mail: White Rd, Shore Aeries, Mamaroneck, N.Y.

SMITH, J. P. (A'29), Engineer, RCA Victor Company, Inc, Camden, N.J. For mail: 145 Grant Ave, Elmhurst, N.J.

SMITH, JAMES E. (A'20-M'25), President, National Radio Institute, Washington, D.C. For mail: 1121 Fairmont St, N.W., Washington, D.C.

SMITH, JAMES H. (A'26), Radio Engineer and Analytical Engineer, Radio Stores, Duke St, Dartmouth, Devon, England.

SMITH, JEROME C. (A'31), Engineer, RCA Victor Company, Inc, 6th Floor, Radio Station WOKO, 886 South St, Providence, R.I. For mail: 235-A 5th Ave, San Francisco, Calif.

SOCIETY OF PHOTO-OPTICAL ENGINEERS (SPE)
STANLEY, CHARLES A. (A'15), 31 Beech St., East Orange, N.J.

STANBROOK, W. L. (M'60), Research Engineer, Electro-Mechanical Division, Grumman Aircraft Engineering Corp., Bethpage, L.I., N.Y.

STARK, R. T. (A'31), Research Engineer, Bell Telephone Laboratories, Inc., Murray Hill, N.J.

STARK, R. H. (M'60), Engineer, General Electric Co., Schenectady, N.Y.

STARK, R. H. (M'60), Engineer, General Electric Co., Schenectady, N.Y.

STARK, R. H. (M'60), Research and Development Engineer, General Electric Co., Schenectady, N.Y.

STARK, R. H. (M'60), Research and Development Engineer, General Electric Co., Schenectady, N.Y.

STARK, R. H. (M'60), Research and Development Engineer, General Electric Co., Schenectady, N.Y.

STARK, R. H. (M'60), Research and Development Engineer, General Electric Co., Schenectady, N.Y.

STARK, R. H. (M'60), Research and Development Engineer, General Electric Co., Schenectady, N.Y.

STARK, R. H. (M'60), Research and Development Engineer, General Electric Co., Schenectady, N.Y.

STARK, R. H. (M'60), Research and Development Engineer, General Electric Co., Schenectady, N.Y.

STARK, R. H. (M'60), Research and Development Engineer, General Electric Co., Schenectady, N.Y.
VASEUDEVA, D. N. (A'38), Lecturer in Physics, Government College, Dharamkot, Punjab, India.

VAUGHAN, CARROLL R. (B'28), Box 110, Greenville, S. C., S. C.

VAUGHAN, FRANK P. (A'18), Engineer and Manager, Veitch & Dennis, 340 West 17th St., New York, N. Y.

VAUGHAN, KENNETH A. (A'25), Broadcast Engineer, WJZ, Newark, N. J.

VAEZR, EDWIN P. (A'31), Bell Telephone Laboratories, 530 Hudson St., New York, N. Y.

VEYRUP-JENSEN, J. G. (A'24), Superintendent, Colby Broadcasting Company, 201 South Tenth St., Minneapolis, Minn.

VIELLE, JOE M. (B'12), General Manager, American Telephone & Telegraph Co., 555 Madison Ave., New York, N. Y.

VLOOK, GEORGE (A'31), Vice President, Vought Aircraft Co., 31 East 53rd St., New York, N. Y.

VOLKET, RICHARD J. (A'24), 225 East 42nd St., New York, N. Y.

VOLKMAN, JOHN E. (A'32), 311-19-168th St., Long Island City, L. I., N. Y.


VOOGT, JACOB VAN (A'31), 322-19-168th St., Long Island City, L. I., N. Y.

VOORHEE, FREDERICK R. (A'25), Engineer, Broadcasting Corporation of Canada, 220 King St., Toronto, Ont., Canada.

VORIS, DON LEA (A'30), Instructor, Madrona School, 1112-54th Ave., Seattle, Wash. For mail: R. R. No. 2, Bellevue, Wash.

VOROJEIKEN, I. M. (A'33), Development Engineer, Colonial Radio Corporation, 244 Washington St., New York, N. Y.

VANCE, JOHN E. (A'30), 2361 West 59th Pl. S.W., Minneapoli, Minn.

VAN DEVENTER, J. M. (A'24), Chief Engineer, Vought Aircraft Co., 31 East 53rd St., New York, N. Y.

VAN DEVENTER, GEORGE W. (A'27), Engineer, 251 East 72nd St., New York, N. Y.

VAN DER LEU, R. E. (A'29), 1560 Kellway Rd., Long Branch, N. J.

VAN DOBBEREER, JOHN E. (A'33), Engineer, 2604 Vincennes St., Washington, D. C.

VAN DOORN, A. J. (A'26), President, New York Broadcasting Company, New York, N. Y.

VAN DOORN, H. V. (A'32), Second Engineer, New York Broadcasting Corporation, Washington, D. C.

VAN EYNDEN, CHARLES B. (A'35), President, Chilton Publishing Co., 1721 Saw Mill River Rd., Tarrytown, N. Y.

VANET, LAWRENCE J. (A'28), 400 New Jersey Ave., Washington, D. C.

VAN GERWAN, WALTER (A'30), 3015 Singha Ave., San Diego, Calif.

VAN HELDEN, JAN (A'27), Telecommunications, National Radio, Inc., 440 Newfield Ave., St. Louis, Mo.

VAN HUYTEN, HERBERT G. (A'31), Showroom Manager, National Cash Register Co., 440 Newfield Ave., St. Louis, Mo.

VAN VLIET, CLARENCE J. (A'27), Service Engineer, 2728 Walnut Ave., Kansas City, Mo.

VAN WILDER, WILLARD A. (A'37), Operating Manager, WJZ, Newark, N. J.


VAN LOAN, CULLEN G. (A'25), Radio Dept., A. L. Rossiter Company, La Crescenta, Calif. For mail: P. O. Box 461, La Crescenta, Calif.

VAN MEEL, G. M. (A'31), Head of Repeater Department, Bell Telephone Manufacturing Company, Bloomfield, Antwerp, Belgium. For mail: Heide F. 80, Calhounth, Belgium.


VAN ROY, F. J. (A'28), 570 W. 54th St., New York, N. Y.

VANSANT, P. T. (A'20), Engineer, Bell Telephone Laboratories, 53rd St., New York, N. Y.

VANSANT, GEORGE W. (A'27), Engineer, 2087 West 44th St., New York, N. Y.

VAUGHAN, BOYCE T. (A'32), Associate Engineer, 400 Newfield Ave., St. Louis, Mo.


VAUGHAN, GEORGE T. (A'24), 3000 Hough Ave., Cleveland, Ohio.
WALKER, FRANK A. (AZ7), Cooperative Radio Engineer, Laketille and Walker, 65 S. Main St., Winchester, Ky.
WALKER, GUY P. (A29), Junior Physicist, U. of Iowa Research Laboratory, Ankeny, Iowa.
WALKER, JAMES H. (A30), Electrical Engineer, 2640 Third Ave., St. Louis, Mo.
WALKER, M. (A33), Engineer, 5101 S. 44th St., Kansas City, Mo.
WALKER, NOLAN S. (A29), Chief Engineer, Ohio Broadcasting Company, 318 Towne Tavern Rd., Canton, Ohio.
WALKER, RAYMOND E. (A29), 20 W. P. Fuller Company, South San Francisco, Calif.
WALKER, ROBERT M. (A29), 6749 Sycamore Ave., Seattle, Wash.
WALKER, WERNER H. (A31), Service Manager, Palmer Music House, 296 E. Main St., Medford, Ore. For mail: 721 Alder St., Medford, Ore.
WALL, LEAVELL D. (A27), Transmission Engineer, Southwestern Bell Telephone Company, San Antonio, Tex. For mail: 1202 McKinley Ave., San Antonio, Tex.
WALLACE, DAVID R. (A26), President, 851 E. 45th St., New York, N.Y.
WALLACE, DONALD G. (A25), District Manager, Eastern States, Kerr Radio, Inc., 1040 Thomas St., Newark, N.J. For mail: 4714 Country Club Dr., Long Beach, Calif.
WALLACE, G. A. (A29), Assistant Professor of Electrical Engineering, McGill University, Montreal, P.Q., Canada.
WALLACE, H. EDWARD (A28), 151 Sip Ave., Greensboro, N.C.
WALLACE, J. M. (A16), Radiotechnician, 144 Springhill Ave., Toronto, Ont., Canada.
WALLACE, JAMES D. (A29), Assistant Physicist, Electro Radio Division, U. S. Naval Research Laboratory, Beverly, Mass., U. S. A.
WALLACE, MARCEL (A30), Consulting Engineer, 10, Rue Forgery, Paris, France.
WALLACE, MARTIN J. (A28), RCA Victor Specialty, 200 Cornell Rd., Audubon, N.J.
WALLACE, MILTON W. (A29), Laboratory Assistant, Western Electric Company, 106-7th Ave., New York, N.Y. For mail: 3 S. Maple Ave., East Orange, N.J.
WALLACE, T. (A30), Engineer, Michigan Electrical Service, P.O. Box 451, Kimball, Mich.
WALLACE, RICHARD H. (A31), Wireless Operator, Spaers Lightship, Humber Bay, Ontario, Canada. For mail: 31 Grafton St., Beverley Rd., Hull, Canada.
WALLACH, MOSES U. (A26), Secretary, J. and J. Wallach, 280-234 E. 59th St., New York, N.Y.
WALLER, PAUL (A30), Manager, Radio Service Department, Western Electric Company, 351 W. Capitol Ave., Little Rock, Ark. For mail: 370, S. Nevada St., Success Land, Ark.
WALLIN, HARRY E. (A20), Technical Engineer, Stewart-Warner Corporation, 1852 Divisery Pkwy., Chicago, Ill. For mail: 713 Helene Ave., Chicago, Ill.
WALLS, HOY J. (A29), Radio Engineer, Bureau of Lighthouses, S. Department of Commerce, Washington, D.C. For mail: 6619 Summit Ave., Chevy Chase, Md.
WALSH, ARTHUR L. (A28), Vice President, Thomas A. Edison Inc., Orange, N.J.
WALSH, HAROLD E. (A26), Assistant Radio Engineer, Radio Branch, Department of Marine & Fisheries, Ottawa, Ont., Canada.
WALSCH, LINCOLN (A27), Consulting Engineer, 1424 Sherwood Pl., Elizabeth, N.J.
WALSH, PHILIP S. (A29), Proprietor, The R. & W. Hospital, 135 Franklin St., Fall River, Mass.
WALSCH, SAM CHARLES (A30), Sales Engineer, Southern Telephone & Telegraph Company, 4300 Euclid Ave., Cleveland, Ohio. For mail: 3720 S. State St., Chicago, Ill.
WALTER, JOHN C. (A30), Assistant Engineer, Western Electric Company, Inc., Hawthorne Station, Chicago, Ill. For mail: 611 Spring Rd., Hawthorne, N.Y.
WALTON, LAURANCE A. (A11), Radio and Electrical Instructor, Eastern High School, Honolulu, Hawaii.
WANG, SHERMAN R. (A29), Graduate Student, Harvard University, Cambridge, Mass. For mail: 58 Boylston St., Cambridge, Mass.
WANG, Y. M. (A30), Assistant Engineer, Asia Electric Company, 259 Broadway, Shanghai, China. For mail: 81 Rue de Constance, Shanghai, China.
WARD, CHARLES L. (A29), Radio Engineer, Canadian Government, 297 Wycliffe St., Providence, R.I., For mail: 24 Berkeley St., Providence, R.I.
WARD, DOUGLAS H. (A23), Superintendent, Radio Division, Sparkes-Watford Company, E. Customs St., Toronto, Ont., Canada. For mail: 1019-14th St., Jackson, Mich.
WARD, DONALD G. (A28), Service Manager, Toronto, Ontario, Canada. For mail: 129 Harvard Ave., Cleveland, Ohio.
WARD, G. PEARSON (A28), Manager, Radio Service Department, Western Electric Company.
WARD, LLOYD S. (A26), Manager, L. S. Warol Service Radio, 1132-14th St., Rockford, Ill.
WARD, ZANGWILL (A28), Engineer, Central Broadcasting Station of Kunitzkom, Nanking, China.
WARSREAL, JOHN (A29), Operating Manager, Post Office Radio Station, Port of London, Somerset, England. For mail: 97, Alder House, 193 W. 13th St., Oklahoma City, Okla.
WATENBERG, HERBERT A. (A22-M31), Radio Engineer, City of Milwaukee Police Radio Station, Milwaukee, Wis. For mail: 4125 N. 30th St., Milwaukee, Wis.
WATERFIELD, J. TUCKER, (A11), Clerk, Wilkinsboro Company, Wilkinsboro, N.C. For mail: 1157 S. 5th St., Wilkinsboro, N.C.
WARING, JOHN T. (A21), Radio Engineer, Hotel Wrigley, 4th St. and Lexington Ave., New York, N.Y.
WARING, VERN J. (A31), Radio Technician, Eastern Manufacturing Supply Company, 1600 S. Broadway, Los Angeles, Calif. For mail: 1578 W. 50th St., Los Angeles, Calif.
WARMER, FREDERICK P. (A29), Radio Engineer, Radio Engineers, N. Grant St., Wilkes-Barre, Pa.
WATSON, GEORGE H. (A29), 64 South St., Cambridge, Mass., U. S. A.
WATSON, GORDON B. (A31), Operator, Radio Section, Signal Corps, Fort Monroe, Va. For mail: 64 Grand Ave., Long Branch, N.J.
WATT, WILLIAM H. (A27), Engineer, RCA Victor Company, Inc., Camden, N.J.
MEMBERSHIP (Alphabetical)

For mail: 361 Crest Ave, Haddon Heights, N.J.

WATERS, HAROLD E. (F'39), Wireless Telegraph Engineer, Egyptian State Telegraphs, 39th Evergreen Street, Embassy, Cairo, Egypt. For mail: 4 Rue Chevalier, Alexandria, Egypt.


WATTS, E. A. (A'37), 8 Old Bear Street, Lake Placid, N.Y.

WATTS, GEORGE A., (F'30), President, St. Joseph, Mo. For mail: 1611 Elwood St., St. Joseph, Mo.

WEAVER, HOWARD J. (F'35), Sales Engineer, American Transformer Company, 132 E. 57th St., Chicago, Ill. For mail: 9 W. Walton St., Chicago, Ill.

WEATHERFORD, RICHARD V. (A'31), Experimental Engineer, N. V. N. X. Radio Development Laboratory, 1352 York Blvd., Los Angeles, Calif.

WEBER, ARTHUR W. (A'29), Research Engineer, General Laboratories of California, Los Angeles, Calif. For mail: 145 N. Renwick St., Glendale, Calif.

WEBER, BILL (A'31), Technician and Secretary, F. J. Reynolds, 907 Florida Ave., Falls Church, Va.

WEBER, CHARLES L. (A'29), Radio Engineer, Development Laboratory, RCA Victor Company, Inc., Camden, N.J. For mail: 18 Austin Pl., Bloomfield, N.J.

WEBER, RALPH E. (A'31), Mechanic, City of Akron Fire Department, No. 3 SHOP, Bucoli Ave., Akron, Ohio. For mail: 1319 E. 40th St., Akron, Ohio.


WEBB, J. S. (A'17), Associate Professor, Department of Electrical Engineering, University of Minnesota, Minneapolis, Minn.

WEBER, ARNOLD R. (A'31), Section Leader, Drafting, RCA Victor Company, Inc., Camden, N.J. For mail: 25 East 42nd St., New York, N.Y.


WEBER, CARLTON F. (A'30), Service Department, National Radio Institute, 1354 U. St., Washington, D.C. For mail: 1908 N. 20th St., Washington, D.C.

WEBER, H. D. (A'27), Assistant Professor, Massachusetts Institute of Technology, Cambridge, Mass. For mail: 16 Harvard Rd., Mattapan, Mass.

WEBER, H. E. (A'29), Secretary and Treasurer, The Kalamazoo Post, 314 Factory St., Dover, Ohio.

WEBER, PAUL (A'31), Service Engineer, E. C. M. Co., Buffalo, N.Y.

WEBER, RENNIE L. (A'28), Standard Radio Sales, Rolling Rock Club, 970 St. Lawrence St., Toronto, Ont., Canada. For mail: 1352 Bathurst St., Toronto, Ont., Canada.

WEBER, WALTER (A'29), Assistant Chief Engineer, 970 Bergamot Ave., Union City, N.J. For mail: 320 Zink St., Jersey City, N.J.

WEBRE, ANDREW S. (A'30), Student, Louisiana State University, Baton Rouge, La. For mail: 830 North St., Baton Rouge, La.

WEBSTER, ALLAN (A'30), Technical Department, 970 Bergamot Ave., Union City, N.J. For mail: 970 Bergamot Ave., Union City, N.J.

WEBSTER, BETHUEL M. JR. (A'29), Attorney and Commissioner at Law, St. Louis and Nashville, 41 Broad St., New York, N.Y.


WEBSTER, GLEN E. (A'30), Radio Engineer, 970 W. South St, South Bend, Ind.

WEBSTER, ROBERT (A'31), Instructor, Wireless Department, James Madison College, Greenock, Scotland. For mail: c/o Mrs. M. B. Webster, 42 Forsyth St., Greenock, Scotland.

WECHEL, WILSON E. (A'32), 218 Tus- star St., Waco, Ohio.

WEED, C. BRONSON (A'27), 224 St. Roman St., New Haven, Conn.

WEDEEN, EDWARD L. (A'31), Associate Professor of Electrical Engineering, MacKenzie College, 3245 Mound St., Toledo, Ohio.

WEDDON, WILLIAM N. (A'26), Electro-Acoustic Consultant, 1 Allen Pl., Brooklyn, N.Y.


WEINBERG, SIDNEY (J'38), General Production Engineer, 6960 York Blvd., Los Angeles, Calif. For mail: 246 E. 57th St., New York, N.Y.

WEINBERG, JULIUS (A'31), Engineer-in-Charge, Research Department, 151 L. 24th St., New York, N.Y.

WEINER, MAX J. (A'31), Operator in Charge, Station WODA, O'Dea Temple of Music, 115 Elm St., Paterson, N.J.

WEINSTEIN, JULIUS (A'30), Engineer, Arturo Radio Television Company, Newark, N.J. For mail: 278 Orange Ave, Irvington, N.J.

WEINHOPPEL, CHARLES H. (A'31), 533 F. Ave., New York, N.Y.

WEINTRAUB, DANIEL H. (A'30), Proprietor, Radio Service, 655 E. 167th St., New York, N.Y.

WEINTRAUB, LEON (A'31), 1441 36th St., New York, N.Y.

WEISBERG, DANIEL (A'31), 734 E. 167th St., New York, N.Y.


WEIR, EDWARD G. (A'30), 152 S. Michigan Ave., Chicago, Ill. For mail: 1121 Central Ave, Anderson, Ind.

WEINBERG, ROBERT (A'31), 1401 W. Chicago Ave., Chicago, Ill. For mail: 1121 Central Ave, Anderson, Ind.

WEISBROTH, SAM (A'30), Pulaski Manufacturing Corporation, 829 E. 14th St., New York, N.Y. For mail: 260 Brook Ave, New York, N.Y.


WEISBERG, EARL (J'33), In Charge of Technical Department, Swishen Brothers, 1914 S. Englewood Ave., Chicago, Ill. For mail: 9751 S. Englewood Ave., Chicago, Ill.


WEISS, TOBIAS (A'28), District Sales Manager, 4071 N. Prospect Ave., Milwaukee, Wis.

WEINMUNT, C. H. (A'27), Assistant Radio Engineer, Electron Radio Laboratory, 5647 N. Lake Shore Dr., Chicago, Ill. For mail: 6911 69th St., Denver, Col.

WEST, ROY E. (A'31), S. S. Treat Steamship Company, Sandusky, Ohio.

WESTON, JAMES O. (A'26), Chief Engineer, Radio Station WABY, 300, Inc., 2040 Broadway, New York, N.Y. For mail: 205 Sixth Ave., New York, N.Y.

WEBER, EARLE SELWIN, (J'32), Radio Engineer, 254 Van Buren St., Litchfield, Ill.

WELLS, DANIEL W. (A'27), General Foreman, Quality Division, RCA Victor Company, Inc., Camden, N.J. For mail: 215 W. 48th St., Haddon Heights, N.J.

WELLS, HARRY W. (A'30), 105 E. Thomp- son Ave., Chicago, Ill.

WELLS, JAMES E. (A'31), Proprietor, Radio Service Company, Box 992, Raymond, Ohio.


WELLS, MARTIN (A'29), R.F.D. No. 2, Bellefontaine, Ohio.

WELLS, W. BRUCE (A'28), Radio Inspector, United States Navy Yard, Pearl Harbor, Honolulu, Hawaii.

WELMAN, VICTOR A. (A'31), Service Manager, Motion Picture Operators, 750 Prospect Ave, Cleveland, Ohio.

WELSH, FRED D. (A'31), Advertising Engineer, 170 Spring St., Rochester, N.Y.


WELSH, ROBERT (A'30), Technical Super-visor, Electrical Research Products, Inc., 210 W. 57th St., New York, N.Y. For mail: 301 E. 57th St., New York, N.Y.

WEND, CLYDE G. (A'31), Proprietor, Radio Station WHF, Anderson, Ind. For mail: 1121 Central Ave, Anderson, Ind.

WENDELL, EDWARD H. (A'30), Engineer, International Telephone and Telegraph Corpora- tion, 67 Broad St., New York, N.Y.

WENDLER, EDWARD A. (A'31), 826 Field Ave., Detroit, Mich.
CATALOG OF MEMBERSHIP

December 31, 1931
Arranged Geographically

UNITED STATES

ALABAMA
Anadarko
Gray, John M. (A)

Auburn
Wade, George V. (A)

Birmingham
Bell, John C. (A)
Duran, Albert E. (A)

Fairhope
Nest, Delmer N. (A)

Mobile
Griffith, M. H. (A)
Helt, Scott (A)
Manuel, John G. (A)
Montgomery
Hallman, L. B., Jr. (A)

Pratt City
Hansler, W. Dan (A)

Tuscaloosa
Hamilton, Sam (A)

ARIZONA
Flagstaff
Bannister, M. W. (A)
Phoenix
Gregg, James W. (A)
Kingman
Waller, P. H. (A)
Prescott
De Witt, Harold (A)

Tucson
Percy, F. W. (A)
Sams, E. E. (A)

ARKANSAS
Blytheville
Littles, C. L. (A)

Conway
Cordrey, E. E. (M)

Fayetteville
Albrecht, Harold D. (A)
Port Smith
Barry, James A. (A)

Hot Springs
Tuggle, Granville D. (A)

Little Rock
Beem, Raymond M. (A)
Boone, Virgil (A)
Harlington, Conrad F. (A)
Logan, E. Warren, Jr. (A)
Minor, Robert How. (A)
Simmons, Guy A., Jr. (A)
Stover, Arthur R., Jr. (A)

Tracy, Kermit F., Jr. (A)
Walter, Paul (A)
Wenel, Raymond W. (A)

McGehee
Wallace, L. E. (A)

CALIFORNIA
Alameda
Daniels, Harold H. (A)
Jackson, Chester M. (A)
Maysay, Alan N. (A)

White, Ray II. (A)

Alhambra
Greger, J. G. (A)
Grimes, William P. (A)
Lang, Cassie (A)
Lee, George Richard (A)
Sleeper, J. Lloyd (A)

Altadena
Johnson, Paul F. (A)

Arcadia
Strachan, George H. (A)

Wilson, Clarence L. (A)

Artesia
Covarrubias, E. M. (A)

Corcoran, George L. (A)

Bakersfield
Lemert, Ralph D. (A)

Baldwin Park
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Bell
Anderson, Edward R. (A)

Berkeley
Armey, Austin A. (A)

Davis, Darly D. (A)

Greves, George G. (A)

Hallman, A. H. (A)

Hartig, J. Ernest (A)

Heinrich, Esteline (A)

Jones, Frank C. (A)

Kellogg, Walter D. (A)

McMahan, William K. (A)

Meinert, Karl R. (A)

Powell, Lawrence T. (A)

Rekimoto, Lester E. (A)

Beverly Hills
Bayley, James R. (A)

Bishop
Wheeler, Walter R. (A)

Canoga Park
Bolinas
Falk, Charles W. (A)

Slater, F. Robert (A)

Tancek, Henry (A)

Burbank
Beatty, W. E. (A)

Choi, Carl J. (A)

Shaw, Theodore S. (A)

Waltz, Stuart F. (A)

Burleunder
Michaels, C. T. (A)

Carpinteria
Eber, F. Johnson (A)

Claremont
Packard, Alden C. (A)

Compton
Cook, Francis H. (A)

Smith, F. E. (A)

Concord
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Corona
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Fierce, Francis E. (M)

Corning
Ross, M. F. (A)

Culver City
Adams, Myron S. (A)
Burns, G. Austin (A)
Fiquet, Frank M. (A)
Wexler, David T. (A)

Eagle Rock
Ford, Walter B. (A)

Sagare, G. M. (A)

El Centro
Cook, John W. (A)
Friend, Earl R. (A)
Lewis, Virgil E. (A)

El Segundo
Hart, William J. (A)

Fallon City
Brown, Elmer L. (A)

Fontana
Morecroft, J. H. (F)

Fresno
Finis, Owen F., Jr. (A)

Gifford, Delbert K. (A)

Fullerton
Atheron, Malcolm J. V. (A)

Lewis, Evan J. (J)

Glendale
Bowes, Theodore C. (A)

Clement, Jack D. (A)

Elfers, John (A)

Elsin, George D. (A)

Engen, Ralph E. (A)

Kennedy, Frank M. (A)

Keller, O. L. (A)

Maxwell, Robert W. (A)
Shumaker, H. B. (A)

Wheeler, Chester F. (A)

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Hemet
Sorrenson, Hands (A)

Hermosa Beach
Cooper, Harold G. (A)

Perkins, George S. (A)

Hollywood
Rockburn, John F. (A)

Cookway, Don C. (A)

Campbell, Carleton W. (A)

Cooper, George R. (A)

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de Forest, E. F. (A)

Hering, Fred J. (A)

Fox, Bert M. (A)

Goldsmith, Lloyd T. (A)
MEMBERSHIP (Geographical)

CAIRO (Continued)
Rathaus, Henry (A)
Termin, Frederick A (A)
Stockton, Charles A (A)
Hurt, Elmer A (A)
Roberts, Walker L (A)
Scheids, Fred M (A)
Sunnyvale
Van Deusen, Ernest E (A)
Tudman
Elliott, William H (A)
Valle
Bee, Arthur A (A)
Robinson, R J (A)
Van Nuys
Miller, Robert A (A)
Fischer, Alveda P (A)
Venice
Avis, Fred J (I)
Davall, Charles A (A)
Gleason, Sterling (A)
Ventura
Snow, Louis A (A)
West Hollywood
Fredericks, Bernard A (A)
Kruer, Bernad A (A)
Krueger, Leon E (A)
Smith, Walter H (A)
West Angeles
Larson, L A (A)
MacKenzie, Finley B (A)
Powers, Edwin H (J)
Spiller, Cecile Chas (A)
Whittier
Evans, Roy D (J)
Smith, L E (A)
Wiggin, Wallace S (A)
West Covina
Blank, S A (A)
Skor, Jens Ingvar (A)

COLORADO

Arapahoe
Arvill, Paul A (A)
Keenan, Rupert E (A)
Boulder
Carrabba, Randle V (A)
Diederich, William J (A)
Denver
Gallagher, Robert G (A)
Hansley, Robert S (A)
Roberts, Frederick A (A)
Deltic
Fulghum, Chas K (A)
Denver
Barnes, Glen W (M)
Geyer, Raymond C (M)
Graham, Richard W (A)
Johnson, Harry A (A)
Rogers, Robert H (A)
Pyle, William D (A)
Nedelichi, Herbert J (A)
Williams, Howard M (A)
Fort Collins
Capron, Floyd A (A)
Golden
Hale, Myron G (A)
Green River
Aberg, Reuben (J)
Nichols, Frederick A (A)

Hollyoke
Haynes, Henry Wesley (A)
Cushing Anderson, William A (A)
Pueblo
Coday, Wm J (J)
Frank, Joseph E (A)
Seibert
Flogado, Francis A (A)
Yuma
Bereiter, Elmer G (A)

CONNECTICUT

Bridgeport
Austin, Kirby H (A)
Henderson, Nathaniel (A)
Chapman, Peter A (A)
Crossley, Henry (A)
Gimney, Norman H (A)
Gravel, Lee P (A)
Ham, Frank M (A)
Harlinton, Carlton E (A)
Horton, Leland D (A)
Natchez, Gen E (A)
Simonds, Leon (A)
Tomlinson, Harry E (A)
Bristol
Drever, Harry W (M)
East Hartford
Gray, Ernie A (A)
Randall, John C (A)
Elmwood
Batty, Elsie L (A)
Glenbrook
Nieder, George (A)
Greenwich
Thomas, Wm A (A)
Hamden
McNamara, Francis T (A)
Hartford
Bourne, Roland B (M)
Coe, Robert S (A)
Henderson, Frank (A)
Madden, Hawaii F (A)
Pemberton, Harold H (A)
Roach, John C (A)
Runnals, Wallace E (A)
Scully, Russell G (A)
Somerville, Henry V (A)
Tanner, Joseph M (A)
Weston, Francis B (A)
Ivyton
Kelley, Philip C (A)
Kensington
Ediger, Albert H (A)
Litchfield
Vanderpool, Floyd L (A)
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Van Noy, Roy T (A)
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Widow, Ernest C (A)
Young, Frank A (A)
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Cady, Walter G (F)
Van Dyke, Karl S (M)
Zotte, Paul B (A)
Milford
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Mount Carmel
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Wexford
Wood, Wm Forrest (A)

New Britain
Johnston, Douglas A (A)
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Sturtevant, Leonard B (A)
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Weed, G C (A)
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Kotcher, Louis F (A)
Noroton Heights
Meese, George W (A)
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Dana, Alan S (A)
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Gallagher, Daniel F. (A)
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Johnson, Leslie E. (A)

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Rowe, Thomas L. (A)
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Burkitt, Lloyd (A)

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Evenson

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Fisk, Lawrence E. (A)
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Shalhoub, Clarke L. (A)

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Marshall, Clayton H. (A)

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Glencoe

Left, Howard (A)

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Booth, Edgar M. (A)

Hinsdale

Armstrong, C. E. (A)

Hobart

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Mckenzie, Paul E. (A)

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Duff, Donald P. (A)

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Huntington

Gregory, S. (A)

Ives

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Jackson Heights

Hines, Louis, D. (A)

Jacksonville

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Lakewood

Lam, Harold A. (A)

La Grange

Lange, Albert F. (A)

Lake Forest

Lamb, Christian (A)

Lake Park

Lazar, Joseph H. (A)

Lake View

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Lansing

Lilly, W. J. (A)

Kenwood

Linden, William E. (A)

Kendall

Lincoln, Willard C. (A)

Kellogg

Lillus, Paul (A)

Kendrick

Lincoln, Willard C. (A)
<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>Address</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL</td>
<td>Arnold, Thomas E. (A)</td>
<td>123 Main St, Chicago, IL 60601</td>
<td>555-1234</td>
<td><a href="mailto:aarnold@il.org">aarnold@il.org</a></td>
</tr>
<tr>
<td></td>
<td>Massey, Alfred W. (A)</td>
<td>456 West Ave, St. Louis, MO 63101</td>
<td>555-2345</td>
<td><a href="mailto:amassey@il.org">amassey@il.org</a></td>
</tr>
<tr>
<td></td>
<td>Reeves, David (A)</td>
<td>789 North St, Bloomington, IL 61701</td>
<td>555-3456</td>
<td><a href="mailto:dreeves@il.org">dreeves@il.org</a></td>
</tr>
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<td>Howard, Austin A. (M)</td>
<td>101 South Ave, Springfield, IL 62701</td>
<td>555-4567</td>
<td><a href="mailto:ahoward@il.org">ahoward@il.org</a></td>
</tr>
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<td>Mandly, Harold P. (A)</td>
<td>222 East St, Champaign, IL 61820</td>
<td>555-7890</td>
<td><a href="mailto:hmandly@il.org">hmandly@il.org</a></td>
</tr>
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<td>Orner, Ralph H. (A)</td>
<td>333 West Ave, Peoria, IL 61601</td>
<td>555-8901</td>
<td><a href="mailto:norner@il.org">norner@il.org</a></td>
</tr>
<tr>
<td></td>
<td>Wolfson, C. F. (A)</td>
<td>444 North St, Rockford, IL 61101</td>
<td>555-9012</td>
<td><a href="mailto:cwolfson@il.org">cwolfson@il.org</a></td>
</tr>
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<td></td>
<td>Wills, David C. (A)</td>
<td>555 South Ave, Joliet, IL 60435</td>
<td>555-1234</td>
<td><a href="mailto:dwills@il.org">dwills@il.org</a></td>
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<tr>
<td></td>
<td>Rockford, Harry P. (A)</td>
<td>666 West Ave, Rockford, IL 61101</td>
<td>555-2345</td>
<td><a href="mailto:hrockford@il.org">hrockford@il.org</a></td>
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<tr>
<td></td>
<td>Devine, William F. (A)</td>
<td>777 East Ave, Rockford, IL 61101</td>
<td>555-3456</td>
<td><a href="mailto:wdevine@il.org">wdevine@il.org</a></td>
</tr>
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<td></td>
<td>Findlay, Carl A. (A)</td>
<td>888 North St, Rockford, IL 61101</td>
<td>555-4567</td>
<td><a href="mailto:cfindlay@il.org">cfindlay@il.org</a></td>
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<td></td>
<td>Kamin, Albert (A)</td>
<td>999 South Ave, Rockford, IL 61101</td>
<td>555-7890</td>
<td><a href="mailto:akamin@il.org">akamin@il.org</a></td>
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<td>Ward, Lloyd S. (A)</td>
<td>101 West Ave, Rockford, IL 61101</td>
<td>555-8901</td>
<td><a href="mailto:lward@il.org">lward@il.org</a></td>
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<td></td>
<td>Westland, J. V. (A)</td>
<td>222 South Ave, Rockford, IL 61101</td>
<td>555-9012</td>
<td><a href="mailto:jwestland@il.org">jwestland@il.org</a></td>
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<td>Savanna, Graham, George W. (A)</td>
<td>333 East Ave, Rockford, IL 61101</td>
<td>555-1234</td>
<td><a href="mailto:g.savanna@il.org">g.savanna@il.org</a></td>
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<td>South Chicago, Kahn, Lamos (A)</td>
<td>444 West Ave, Rockford, IL 61101</td>
<td>555-2345</td>
<td><a href="mailto:lkahn@il.org">lkahn@il.org</a></td>
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<td>Turner, Russell S. (A)</td>
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<td><a href="mailto:rturner@il.org">rturner@il.org</a></td>
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<td>Springfield, Holts, Frederick C. (A)</td>
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<td>Kunz, H. L. (A)</td>
<td>777 North St, Rockford, IL 61101</td>
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<td><a href="mailto:hkunz@il.org">hkunz@il.org</a></td>
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<td>888 West Ave, Rockford, IL 61101</td>
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<td><a href="mailto:fnumrich@il.org">fnumrich@il.org</a></td>
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<td>Parish, Eugene V. (A)</td>
<td>999 South St, Rockford, IL 61101</td>
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<td><a href="mailto:egparish@il.org">egparish@il.org</a></td>
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<td>Ring, Edward F. (A)</td>
<td>101 West Ave, Rockford, IL 61101</td>
<td>555-1234</td>
<td><a href="mailto:ering@il.org">ering@il.org</a></td>
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<td>222 South Ave, Rockford, IL 61101</td>
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<td><a href="mailto:rwhedon@il.org">rwhedon@il.org</a></td>
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<td>Stockton, Hanson, Ralph L. (A)</td>
<td>333 East Ave, Rockford, IL 61101</td>
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<td><a href="mailto:rhanson@il.org">rhanson@il.org</a></td>
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<td>Streeter, Litch, Henry M. (A)</td>
<td>444 West Ave, Rockford, IL 61101</td>
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<td>555 North St, Rockford, IL 61101</td>
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<td><a href="mailto:fsysamore@il.org">fsysamore@il.org</a></td>
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<td>666 East Ave, Rockford, IL 61101</td>
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<td><a href="mailto:rmounden@il.org">rmounden@il.org</a></td>
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<td>777 South St, Rockford, IL 61101</td>
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<td><a href="mailto:herieich@il.org">herieich@il.org</a></td>
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<td>888 West Ave, Rockford, IL 61101</td>
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<td><a href="mailto:aherrmann@il.org">aherrmann@il.org</a></td>
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<td>101 South Ave, Rockford, IL 61101</td>
<td>555-1234</td>
<td><a href="mailto:hdetrick@il.org">hdetrick@il.org</a></td>
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<td>Pomer, Herman (A)</td>
<td>222 East Ave, Rockford, IL 61101</td>
<td>555-2345</td>
<td><a href="mailto:hpomer@il.org">hpomer@il.org</a></td>
</tr>
<tr>
<td></td>
<td>Scott, Kenneth L. (A)</td>
<td>333 West Ave, Rockford, IL 61101</td>
<td>555-3456</td>
<td><a href="mailto:kscott@il.org">kscott@il.org</a></td>
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<td></td>
<td>West Liberty, Waddell, George G. (A)</td>
<td>444 North St, Rockford, IL 61101</td>
<td>555-4567</td>
<td><a href="mailto:gwaddell@il.org">gwaddell@il.org</a></td>
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<td></td>
<td>Wheaton, Matthews, Geo. D. (A)</td>
<td>555 South St, Rockford, IL 61101</td>
<td>555-7890</td>
<td><a href="mailto:gmatthews@il.org">gmatthews@il.org</a></td>
</tr>
<tr>
<td></td>
<td>Taylor, Hawley O. (M)</td>
<td>666 East Ave, Rockford, IL 61101</td>
<td>555-8901</td>
<td><a href="mailto:htaylor@il.org">htaylor@il.org</a></td>
</tr>
<tr>
<td></td>
<td>Wilmette, Burrows, Fred A. (A)</td>
<td>777 West Ave, Rockford, IL 61101</td>
<td>555-9012</td>
<td><a href="mailto:fburrows@il.org">fburrows@il.org</a></td>
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MEMBERSHIP (Geographical)
PALESTINE
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Jones, Roy (C. (A)
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Wallr, Bertil (A)

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Tank, Franz (A)

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Tuck, H. P. (A)

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Yakovlev, A. (A)

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(Signature of references not required here)

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City and State .................................. City and State ..............................

Mr. ..............................................

Address ........................................

City and State ..................................
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Name ........................................
(Give full name, last name first)
Present Occupation ........................................
(Title and name of concern)
Business Address ........................................
Permanent Home Address ........................................
Place of Birth ........................................ Date of Birth ........................................ Age ........................................
Education ........................................
Degree ........................................ (college) ........................................ (Date received)

TRAINING AND PROFESSIONAL EXPERIENCE

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