

AMERICAN
INSTITUTE OF
ELECTRICAL
ENGINEERS



==== **Winter**
Convention

January 23rd to 26th - 1934

Program

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Engineering Societies Building
33 W. 39th Street - New York

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	K—Electrical Measurements	9
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	Borough of Brooklyn; Generating Sta- tion, etc.	11
10:45 A.M.	Ladies' Visit to Radio City Broadcast- ing Studios	3
1:00 P.M.	Newark Airport and Plane Flight	11
1:30 P.M.	R.C.A. Building—Rockefeller Center..	11

Committee Meetings

Monday January 22

		Room
		Assignments
9:30 A.M.	Standards	1001
2:15 P.M.	Board of Directors	1001
2:30 P.M.	Power Generation	1101

Tuesday, January 23

2:00 P.M.	Communication	1001
2:30 P.M.	Research	1101

Wednesday, January 24

9:00 A.M.	Electrochemistry and Electro- metallurgy	903
9:30 A.M.	Sectional Committee on Eletrical Definitions	1001
10:00 A.M.	Open Meeting of Committees on Education and Student Branches..	501
2:00 P.M.	Transportation	1101
2:30 P.M.	Power Transmission and Distribu- tion	1001
6:00 P.M.	General Power Applications (Din- ner Meeting)	

Friday, January 26

9:30 A.M.	Technical Program	1001
2:00 P.M.	Automatic Stations	1105
	Protective Devices	1001
	Production and Application of Light	1101
	Electrical Machinery	903
	Sections Committee	President's Room 15th Floor

General Information

AN UNUSUALLY attractive program of current professional interest interspersed with entertainment and social activities has been arranged by the committees in charge. A complete schedule of events and index to details is given on the opposite page.

Register Promptly

Immediately on arriving at the convention each member and guest should first register and deposit his railroad certificate. A registration fee of \$2 will be charged all non-members, except Enrolled Students, and the wives and children of members. When 100 railroad certificates have been validated, announcements will be made and they should be called for at the desk.

Get Tickets at Once

Tickets for the buffet dinner and smoker, Edison Medal presentation—demonstration of transmission and reproduction of speech and music in auditory perspective, the dinner-dance—buffet supper, and inspection trips should be obtained as early as possible. This will be very helpful to the committees in charge. For the trips, tickets must be secured by 4 o'clock on the previous day.

Information

Information on all features of the convention may be obtained at the registration desk. The Institute rooms and offices on the tenth floor of the Engineering Societies Building are open to members.

Efforts will be made to deliver telegrams and messages promptly. Any mail for members received during the convention will be held at registration desk until called for; letters undelivered at the close of the meeting will be forwarded to latest mailing address.

For the Ladies

In addition to the convention features, a luncheon and bridge will be held at the Engineering Woman's Club on Wednesday, January 24, 1 p.m. On Friday, January 26, at 10:45 a.m., there will be a visit to Radio City Broadcasting Studios where Damrosch will be broadcasting—admission by ticket. During the convention the Alcove on the tenth floor has been reserved for the ladies' headquarters. Information will be available there as to theaters, shopping districts, etc. All arrangements have been made by the ladies' committee, Mrs. H. R. Woodrow, chairman.

PROGRAM

Tuesday

9:00 a.m.—Registration

10:00 a.m.—General Session
(In Auditorium)

Presiding:

C. R. JONES, Chairman, Winter Convention
Committee

The President's Message:

DR. JOHN B. WHITEHEAD

Presentation of Sprague Bust:

Speaker, FRANK HEDLEY, *President*, Interborough
Rapid Transit Co.

Acceptance of Bust, President WHITEHEAD

Remarks, FRANK J. SPRAGUE, *Past-President*.
A.I.E.E.

The Technical Sessions:

R. N. CONWELL, *Chairman*, Technical Program
Committee

10:30 a.m.—(A) Protective Devices
(In Auditorium)

R. T. HENRY, *Chairman*

Peterson Coil Tests on 140-Kv. System Jan. p. 63
J. R. NORTH, The Commonwealth and Southern Corp.
J. R. EATON, Consumers Power Co.

Lightning Measured on 4-Kv. Overhead Circuits Jan. p. 33
HERMAN HALPERIN, Commonwealth Edison Co.
K. B. McEACHRON, General Electric Co.

Control of Distance Relay Potential Connections Jan. p. 206
A. R. Van C. WARRINGTON, General Electric Co.

Automatic Reclosing of Oil Circuit Breakers Jan. p. 48
A. E. ANDERSON, General Electric Co.

Technical Papers

In accordance with the previous provisions of the Institute's new publication policy, all papers scheduled have been published in ELECTRICAL ENGINEERING (August, November, December and January issues), and thus circulated to the entire membership. Pamphlet copies of these papers are not available. Reference is given to the right of each title in this program to the issue and page of ELECTRICAL ENGINEERING publication.

Tuesday - continued

10:30 a.m.—(B) Transportation

(Room One, Fifth Floor)

E. L. MORELAND, *Chairman*

- Trolley Wire Lubrication Improved Nov. p. 771
 J. V. LAMSON, University of Washington
- Investigation of Rail Impedances Dec. p. 898
 HOWARD M. TRUEBLOOD and GEORGE WASCHECK
 American Telephone & Telegraph Co.
- Pantograph Trolleys, I.—Design Features Jan. p. 182
 W. SCHAAKE, Westinghouse Electric & Mfg. Co.
- Pantograph Trolleys, II.—Operating Features Jan. p. 190
 B. M. PICKENS, Westinghouse Electric & Mfg. Co.

2:00 p.m.—(C) Symposium on Electric Power Switching

(In Auditorium)

H. W. LEITCH, *Chairman*

- Introductory Summary* Jan. p. 147
 A. H. LOVELL, University of Michigan
- Hudson Avenue Station Dec. p. 868
 C. M. GILT, Brooklyn Edison Co.
- Richmond Station Jan. p. 156
 RAYMOND BAILEY and F. R. FORD, Philadelphia Electric Co.
- Long Beach Plant No. 3 Dec. p. 826
 A. A. KRONEBERG and O. R. BULKLEY, Southern California Edison Co., Ltd., and W. A. ANDREE, Stanford University
- Connors Creek Plant Jan. p. 162
 A. P. FUGILL, Detroit Edison Co.
- State Line Station Jan. p. 148
 T. C. WHITE, Chicago District, Electric Generating Corp.

6:00 p.m.—Buffet Dinner and Smoker

* * *

- Six-to-seven-thirty* Dinner served on the Fifth Floor
Seven to eight Movies in the Auditorium
Eight to ten Excellent show in the Auditorium
 Tickets include dinner, smokes and show—\$2.75 each

Technical Sessions and Discussions

The sessions at which the papers and discussions are presented will be governed by the "Conduct of Technical Sessions" at the discretion of the chairman presiding. The Institute will appreciate your courtesy and cooperation in strictly abiding by the decisions of the chairman in all matters.

Preference will be given to those present who have explained in advance their intention to discuss papers. Usually 5 minutes are allowed to each discussor for the discussion of a single paper or of several papers on the same general subject. Discussors should clearly announce from the platform their names and professional affiliations. Discussions prepared in advance should be typewritten (in triplicate), and left with the chairman. Otherwise to receive consideration for publication they should be prepared accordingly and mailed to A.I.E.E., 33 West 39th Street, New York, N. Y.

Wednesday

10:00 a.m.—(D) Power Transmission

(In Auditorium)

D. M. SIMMONS, *Chairman*

Counterpoises for Transmission Lines Dec. p. 908
CHARLES L. G. FORTECUE, Westinghouse Electric
& Mfg. Co.

Corona Losses from Conductors of 1.4- Inch Diameter
Dec. p. 854

JOSEPH S. CARROLL, Stanford University, and
BRADLEY COZZENS and THEO. M. BLAKESLEE,
Dept. of Water & Power, City of Los Angeles

Attenuation and Distortion of Waves Dec. p. 876
L. V. BEWLEY, General Electric Co.

Power Limits of 220-Kv. Transmission Lines
Nov. p. 758

ALEX A. KRONEBERG, Southern California Edison
Co., Ltd., and MABEL MACFERRAN, Metropolitan
Water District of Southern California

Power Limits of Synchronous Machines Nov. p. 780
EDITH CLARKE and R. G. LORRAINE,
General Electric Co.

Steady State Stability of Composite Systems
Nov. p. 787
S. B. CRARY, General Electric Co.

Power Limit of a Transmission System Aug. p. 569
W. S. PETERSON, Bureau of Power and Light of the
City of Los Angeles

10:00 a.m.—(E) Education

(Room One, Fifth Floor)

L. A. DOGGETT, *Chairman*

*Open Meeting of Committee on Education and Committee on
Student Branches*

The Purpose and Status of the Series of Educational
Articles

Dean R. E. Doherty, Yale University

A Brief Abstract of the Current Activities of the Com-
mittees on Education and Student Branches

Chairman, L. A. DOGGETT, The Pennsylvania State
College

The University of Pittsburgh - Westinghouse Graduate
Program Jan. p. 103

H. E. DYCHE, University of Pittsburgh, and
R. E. HELLMUND, Westinghouse Electric & Mfg. Co.

A Review of Activities of Engineers' Council for Pro-
fessional Development

Dean J. W. BARKER, Columbia University

2:00 p.m.—(F) Communication

(In Auditorium)

H. S. OSBORNE, *Chairman*

Stabilized Feed-Back Amplifiers Jan. p. 114
H. S. BLACK, Bell Telephone Laboratories, Inc.

Wednesday - continued

Symposium on Transmission and Reproduction of Speech and Music in Auditory Perspective

- Basic Requirements Jan. p. 9
 HARVEY FLETCHER,
 Bell Telephone Laboratories, Inc.
- Physical Factors Jan. p. 12
 J. C. STEINBERG and W. B. SNOW,
 Bell Telephone Laboratories, Inc.
- Loud Speakers and Microphones Jan. p. 17
 E. C. WENTE and A. L. THURAS, Bell Telephone
 Laboratories, Inc.
- Amplifiers Jan. p. 25
 E. O. SCRIVEN, Bell Telephone Laboratories, Inc.
- Transmission Lines Jan. p. 28
 H. A. AFFELL, American Telephone & Telegraph Co.,
 and R. W. CHESNUT and R. H. MILLS, Bell Tele-
 phone Laboratories, Inc.
- System Adaptation Jan. p. 216
 E. H. BEDELL, Bell Telephone Laboratories, Inc., and
 IDEN KERNEY, American Telephone & Telegraph Co.

2:00 p.m.—(G) Symposium on Electric Furnaces

(Room One, Fifth Floor)

W. C. KALB, *Chairman*

- The 3-Phase Electric Arc Furnace Dec. p. 839
 SAMUEL ARNOLD, 3rd, Heroult Electric Furnaces
- Transformers for Electric Furnaces Dec. p. 822
 H. O. STEPHENS and L. S. SCHELL, Jr.,
 General Electric Co.
- Rocking Indirect Arc Electric Furnaces Jan. p. 132
 E. L. CROSBY, Detroit Electric Furnace Co.
- Cast Iron and Its Production Jan. p. 120
 M. V. HEALEY, General Electric Co.
- Electrodes—Carbon and Graphite Dec. p. 844
 FRANK J. VOSBURGH, National Carbon Co., Inc.
- High Frequency Induction Furnaces Jan. p. 194
 C. A. ADAMS, Harvard University, and
 J. C. HODGE and M. H. MACKUSICK, The Babcock
 and Wilcox Co.
- Electrical Equipment for Induction Furnaces Jan. p. 43
 C. C. LEVY, Westinghouse Electric & Mfg. Co.

8:15 p.m.—Edison Medal Presentation
 to Arthur Kennelly

Presiding: JOHN B. WHITEHEAD, *President*, A.I.E.E.

History of the Edison Medal: C. E. STEPHENS, *Chairman*,
 Edison Medal Committee

Address on Achievements of Medalist: DR. CLAYTON H. SHARP

Presentation of Medal and Certificate: PRESIDENT WHITEHEAD

Response: ARTHUR E. KENNELLY, *Medalist*.

DEMONSTRATION OF

Transmission and Reproduction of Speech and Music in Audi-
 tory Perspective. Speaker: DR. HARVEY FLETCHER, Bell
 Telephone Laboratories, Inc.

Thursday

10:00 a.m.—(H) Power Distribution

(In Auditorium)

D. M. SIMMONS, *Chairman*

An Economic Study of Suburban Distribution

Jan. p. 97

A. H. SWEETNAM and C. A. CORNEY,
The Edison Electric Illuminating Company of Boston

Radial Versus Primary Network Distribution

Jan. p. 38

H. E. WULFING, Commonwealth Edison Co.

Fundamentals of Design of Electric Energy Delivery Systems

Dec. p. 831

J. ALLEN JOHNSON and R. T. HENRY,
Buffalo, Niagara & Eastern Power Co.

Joint Use of Poles with 6,900-Volt Lines

Dec. p. 890

W. R. BULLARD, Electric Bond and Share Co., and
D. H. KEYES, American Telephone & Telegraph Co.

10:00 a.m.—(I) Electrical Machinery

(Room One, Fifth Floor)

S. L. HENDERSON, *Chairman*

An Experimental Ignitron Rectifier

Jan. p. 75

L. R. LUDWIG, F. A. MAXFIELD and
A. H. TOEPFER, Westinghouse Electric & Mfg. Co.

Inductor Alternators for Signaling Purposes

Jan. p. 78

P. W. MERRILL, General Electric Co.

Induction Motors as Selsyn Drives

Dec. p. 848

L. M. NOWACKI, General Electric Co.

2:00 p.m.—(J) Electrical Machinery

(Room One, Fifth Floor)

S. L. HENDERSON, *Chairman*

Protecting Machines from Line Surges

Jan. p. 139

J. F. CALVERT, Westinghouse Electric & Mfg. Co.

Equivalent Reactance of Synchronous Machines

Jan. p. 124

S. B. CRARY, L. A. MARCH, and L. P. SHILDNECK,
General Electric Co.

Simultaneous Control of Voltage and Power Factor

Dec. p. 884

L. F. BLUME and F. L. WOODS, General Electric Co.

Effects of Rectifiers on System Wave Shape

Jan. p. 54

P. W. BLYE, American Telephone & Telegraph Co.
H. E. KENT, Edison Electric Institute

Thursday - continued

2:00 p.m.—(K) Electrical Measurements
(In Auditorium)

W. B. KOUWENHOVEN, *Chairman*

- Cross Potential of a 4-Arm Network Dec. p. 861
ANATOLI C. SELETZKY, Case School of Applied
Science
- Portable Schering Bridge for Field Tests Jan. p. 176
C. F. HILL, T. R. WATTS, and G. A. BURR,
Westinghouse Electric & Mfg. Co.
- Impulse Generator Circuit Formulas Jan. p. 169
J. L. THOMASON, General Electric Co.
- Heavy Surge Currents—Generation and Measurement
Jan. p. 86
P. L. BELLASCHI, Westinghouse Electric & Mfg. Co.
- An A-C Potentiometer Jan. p. 108
S. L. BURGWIN, Westinghouse Electric & Mfg. Co.
- A New Demand Meter Jan. p. 94
B. H. SMITH, Westinghouse Electric & Mfg. Co.

7:00 p.m.—Dinner-Dance—Buffet Supper
at the Waldorf-Astoria

Schedule

- Seven o'clock* Reception in honor of PRESIDENT WHITE-
HEAD
- Seven-thirty* Dinner served
- Nine until two* Dancing—George Ellner's orchestra
- Midnight* Buffet Supper

Tickets per person—for the Dinner-Dance, \$5; for the
Dance-Buffer Supper, \$3; for the Dinner-Dance and
Buffer Supper, \$6.

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Friday

Devoted entirely to Inspection Trips—
See Pages 10 and 11 for Details

INSPECTION TRIPS

The Inspection Trips Committee has planned a number of inspection trips which it is believed will be of timely interest.

The Convention Program this year includes a day specially designated for trips of a nature which might conflict with the Technical Sessions if scheduled on other days during the period of the Convention. Other trips, more closely related to the subjects of the Technical Sessions, have been scheduled as indicated below for the accommodation of those members and their guests whose attendance at the Convention may be of limited duration.

Members or their guests desiring to visit electrical installations not specifically listed in this program are requested to communicate with the Inspection Trips Desk where an effort will be made to make whatever arrangements may be required.

Full information on all trips will be furnished at the Desk.

Registration for Trips

Prompt registration for inspection trips will enable the Committee to arrange in a satisfactory manner for the accommodation of the members and their guests. Such registration should be made not later than 4:00 P.M., of the day previous to that of the trip.

Especial attention is invited to the necessity for prompt registration for trips Numbers 1, 2, 3 or 4. These trips will be made only on Friday, January 26th.

Time of Starting

The starting time from Convention Headquarters is given for each trip and announcements will be made just prior to the departure of the different groups. Guides will be furnished, where necessary, to take groups to the inspection points.

TRIPS ON FRIDAY, JANUARY 26

- No. 1. Circuit motor bus trip in Northern New Jersey, traversing regions of historic and scenic interest with stops at commercial radio station of R.C.A. Communications, Inc., at New Brunswick; A. T. & T. Company at Lawrenceville, and National Broadcasting Company (WJZ) at Bound Brook. Luncheon at Princeton Inn, Princeton, N. J.

Trip at 9:30 a.m., Friday, January 26th.

There will be a charge for tickets.

Full information will be furnished at Desk.

- No. 2. To Newark Airport. Inspection of the airport facilities and a flight in a 12-passenger Transport plane of the Transcontinental and Western Air, Inc.

First busses leave Engineering Building at 1:00 P.M., Friday, January 26th. There will be a nominal charge for tickets. Full information furnished at Desk.

- No. 3. Inspection of R C A Building at Rockefeller Center, including radio broadcast studio of the National Broadcasting Company.

Trip on Friday, January 26th from Engineering Headquarters at 1:30 P.M. or at Rockefeller Center at 2:00 P.M. There may be a nominal charge for tickets. Full information furnished at Desk.

- No. 4. Circuit motor bus trip in the Borough of Brooklyn with stops at Hudson Avenue Generating Station of Brooklyn Edison Company, Inc., and at the General Office of that company for luncheon after which the modern brewery of Kings Brewery Inc., will be visited.

Trip at 9:30 A.M., Friday, January 26th. Full information furnished at Desk.

OTHER TRIPS AS INDICATED

- No. 5. Roseland Switching Station of Public Service Electric and Gas Company.

Trip at 1:00 P.M., Wednesday, January 24th. Full information furnished at Desk.

- No. 6. Carrier Current Protective Relays on 132-kv. Transmission Line—Dunwoodie Substation of Yonkers Electric Light and Power Company.

Trip at 1:00 P.M., Wednesday, January 24th. Full information furnished at Desk.

- No. 7. Load Totalizing, Frequency Comparison and Phase Angle Indication between Separate Stations over Communication Circuits—Hell Gate Generating Station and System Operator's Office—New York Edison and Affiliated Companies.

Trips at 9:00 A.M., Wednesday, January 24th, and Thursday, January 25th. Full information furnished at Desk.

- No. 8. Electric Locomotive — Pennsylvania Railroad Company.

Trip at 9:30 A.M., Wednesday, January 24th. Full information furnished at Desk.

WINTER CONVENTION

- No. 9. A. C. Calculating Board of Pennsylvania Railroad Company located in Pennsylvania Station.

Trip at 2:00 P.M., Wednesday, January 24th.
Full information furnished at Desk.

- No. 10. Electrical Testing Laboratories.

Trips at 10:00 A.M., Tuesday, January 23rd,
Wednesday, January 24th, and Thursday,
January 25th.

Full information furnished at Desk.

- No. 11. Operating Rooms of Commercial Telegraph Companies.

Trips at 2:00 P.M., Wednesday, January 24th,
and Thursday, January 25th.

Full information furnished at Desk.

- No. 12. Electrical Research Products, Inc.

Trips at 11:30 A.M., Tuesday, January 23rd,
and Thursday, January 25th.

Full information furnished at Desk.

Other points which are of interest and which may be visited at any time between 10:00 A.M. and 5:00 P.M., are listed below. Full information will be furnished at the Desk and registration is requested for record.

- No. 13. New York Museum of Science and Industry—Daily News Building.

- No. 14. Electrical Institute of the Electrical Association of New York, Inc.—Graybar Building.

OFFICERS OF A.I.E.E. 1933-1934

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H. P. Charlesworth

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H. S. Bennion

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Joseph Slepian

W. H. Harrison

D. W. Taylor

S. L. Henderson

E. B. Wagner

R. T. Henry

M. R. Woodward

1934 Winter Convention Committee

GENERAL COMMITTEE

C. R. Jones, *Chairman*

T. F. Barton	A. F. Dixon
C. R. Beardsley	E. B. Meyer
C. O. Bickelhaupt	H. S. Osborne
R. N. Conwell	D. M. Simmons

CONVENTION EXECUTIVE COMMITTEE

C. R. Beardsley, *Chairman*

R. A. McClenahen	George Sutherland
H. C. Otten	Mrs. H. R. Woodrow

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George Sutherland, *Chairman*

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John Bassett	C. S. Purnell
C. A. Butcher	S. S. Reynolds
C. M. Gilt	H. R. Searing
H. L. Huber	T. E. Shea
J. F. Kelly	D. M. Simmons

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G. F. Fowler	H. B. Stoddard
Henry Kurz	E. R. Thomas
S. A. Smith, Jr.	R. H. Twiss
R. L. Webb	

LADIES' COMMITTEE

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Mrs. C. R. Beardsley	Mrs. C. R. Jones
Mrs. C. O. Bickelhaupt	Mrs. E. B. Meyer
Mrs. R. N. Conwell	Mrs. D. M. Simmons

SMOKER COMMITTEE

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J. E. Goodale	H. G. Wood
J. E. McCormack	

Memorandum

WINTER CONVENTION

Memorandum