

**American Institute of
Electrical Engineers**



**SUMMER
GENERAL
MEETING**

Program

*Please retain for use during
entire meeting*

MINNEAPOLIS, MINN.

JUNE 23-27

1952

Meeting Headquarters

HOTEL NICOLLET

GENERAL INFORMATION

This meeting in Minneapolis marks the 50th Anniversary of the Minnesota Section and the 67th Annual Summer General Meeting of the AIEE. A Technical program covering all fields in electrical engineering, with opportunity for inspection trips and social recreation, has been provided.

The Lamme Medal presentation to Arthur E. Silver will take place at the Annual Meeting, Monday morning, June 23. Our President, Professor F. O. McMillan, will close the meeting with an address entitled "Our Achievements".

On the Social side, there will be the President's Reception and entertainment, the dinner and dance and a luncheon each noon, as well as special entertainment for the ladies.

REGISTRATION FEES REQUIRED. In accordance with the policy as set up by the Board of Directors, a registration fee of \$3.00 has been established for members and a fee of \$5.00 for nonmembers. This is to help make the meeting self-supporting and obviate the need for raising the annual dues. Enrolled Students and the immediate families of members will not be required to pay any fee.

INFORMATION on all features may be obtained at the registration desk. Efforts will be made to deliver telegrams and messages promptly. Members who expect to receive mail are asked to inquire frequently at the mail and registration desk.

TECHNICAL SESSIONS AND DISCUSSIONS are covered by the "Conduct of Technical Sessions" at the discretion of the presiding officers. Usually 10 minutes will be allowed for the presentation of each paper and 5 minutes for each discussion. To receive consideration for publication, discussions in triplicate must be left with the chairman or sent to Edward C. Day, Secretary, Technical Program Committee, AIEE 33 West 39th Street, New York 18, New York, before July 11, 1952. Discussions received later will be returned. The original typewritten double-spaced copy, together with original illustrations with photostats or blueprints should be submitted.

Authors and discussers should make their presentations as effective as possible. Remember your audience. Stress the salient features of the paper which are new or novel. When using slides, please turn toward the audience before speaking and raise your voice. Extemporaneous delivery is preferable to reading unless done slowly and emphasis is put in the proper places.

ADVANCE COPIES OF PAPERS may be purchased by members at the registration desk at the uniform price of \$.30 each (\$.60 each to nonmembers). Only numbered papers are available. Mail orders, particularly from out-of-town members, are advisable, inasmuch as an adequate supply of each paper at the meeting cannot be assured. Coupon books in \$9.00 denominations are available for those who wish to avoid remittance by check or otherwise. Mail orders should be addressed to the AIEE Order Department, 33 West 39th Street, New York 18, New York. Most of the papers will ultimately be published in the Bimonthly Publications and in the TRANSACTIONS. Conference papers denoted by CP are intended for presentation only and are not available.

Summer General Meeting

SCHEDULE OF EVENTS

See Separate Folder for Entertainment, Inspection Trips and Ladies Program.

Sunday, June 22

2:00 p.m. Registration

Monday, June 23

8:30 a.m. Registration

10:00 a.m. Annual Meeting

12:00 noon Luncheon—Dr. James L. Morrill, Speaker

1:30 p.m. Ladies tour of the University of Minnesota

2:00 p.m. Transmission and Distribution
Computing Devices
Relays

Trip to General Mills, Inc.

Tuesday, June 24

8:30 a.m. Trip to Minnesota Mining & Mfg. Company

9:00 a.m. Trip to Riverside Steam Plant

9:30 a.m. Sections Forum on the Shortage of Engineers
Transmission and Distribution
Transformers
Instruments and Measurements
Communication Switching Systems

10:30 a.m. Ladies tour of Minneapolis and Luncheon

12:00 noon Luncheon—Great Lakes District Paper Prize Awards

2:00 p.m. Sections Delegates Conference
Transmission and Distribution
Transformers
Instruments and Measurements
Non-Linearities in Feedback Control Systems
Sightseeing Tour of the Twin Cities
Trip to Northwest Airlines Overhaul Base

6:00 p.m. President's Reception and Dinner

Wednesday, June 25

9:00 a.m. Trip to Institute of Technology
Trip to Lightning and Transients Research Institute
Ladies Breakfast at Donaldson's Department Store

9:30 a.m. Safety
Rotating Machinery
Insulated Conductors
Basic Sciences
Feedback Control Systems
District Branch Prize Papers

- 11:00 a.m. Ladies Trip to Red Wing, Minnesota
 12:00 noon Luncheon—Dr. Lawrence R. Hafstad, Speaker
 2:00 p.m. Management of Engineering Activity
 Rotating Machinery
 Basic Sciences
 Industrial Power Systems
 Carrier Current
 District Branch Prize Papers
 7:00 p.m. Sailboat Race on Lake Calhoun
 8:00 p.m. Fluid Mapper Demonstration Lecture

Thursday, June 26

- 8:00 a.m. Trip to St. Anthony Falls Hydraulic Laboratory
 9:00 a.m. Trip to Minneapolis-Honeywell Aero Division
 9:30 a.m. Insulation
 System Engineering
 Electrical Techniques in Medicine
 Electrothermal Processes
 Mining Industry
 9:45 a.m. Ladies Visit to Betty Crocker Test Kitchen
 12:00 noon Luncheon—Titus G. LeClair, Speaker
 1:30 p.m. Ladies Tour of the American-Swedish Institute
 Trip to Electric Machinery Mfg. Co.
 2:00 p.m. Trip to Northwestern Bell Telephone Co.
 Safety and Electrical Techniques in Medicine
 Dielectrics
 Storage Batteries
 Mining Industry
 6:30 p.m. Dinner and Dance

Friday, June 27

- 9:00 a.m. Trip to Brown and Bigelow
 Trip to St. Croix Falls Hydroelectric Plant
 Excitation Systems
 9:30 a.m. Excitation Systems
 New Electronic Devices and Applications
 Land Transportation
 Magnetic Amplifier Circuits
 12:00 noon Luncheon—Award of Sports Trophies and Prizes
 2:00 p.m. Hydroelectric Systems
 Switchgear
 Electrostatic Processes
 Magnetic Amplifier Test Methods

Saturday, June 28

- Trip to Mesabi Iron Range and Duluth

Monday, June 23

10:00 a.m.—Annual Meeting

Main Ballroom
 PRESIDENT F. O. McMILLAN, Presiding

1. Report of Board of Directors. H. H. Henline, Secretary.
2. Report of Treasurer. W. I. Slichter.
3. Report of Committee of Tellers on:
 - (a) Votes for nominees for AIEE offices.
 - (b) Proposed Constitutional amendments.
4. (a) Introduction of, and presentation of President's badge to D. A. Quarles.
 (b) Response by Mr. Quarles.
5. Presentation of Lamme Medal to Arthur E. Silver, Retired, Ebasco Services, Inc., New York.
 - (a) The Establishment of the Medal. A. H. Kehoe, Chairman, Lamme Medal Committee.
 - (b) The Career of the Medalist. Clay C. Boswell, Vice-President and Assistant General Manager, Minnesota Power and Light Co.
 - (c) Presentation of the Medal and Certificate by President F. O. McMillan.
 - (d) Response by Mr. Silver.
6. Any other business that may be presented.
7. "Our Achievements". President F. O. McMillan.

2:00 p.m.—Transmission and Distribution

Main Ballroom
 T. J. BROSANAN, Presiding

- 52-176. Transient Fault Current and Voltage Recovery Characteristics of Distribution Systems. Joint Subcommittee on Distribution Circuit Recovery Voltages.
 52-177. A Passive Compensator for Switching Surges. P. A. Cartwright, University of Minnesota.
 52-178. Some Observations on the Economic Benefits in Going from One System Voltage Level to a Higher System Voltage Level. D. K. Blake, General Electric Co.
 52-175. Lightning to the Empire State Building III. J. H. Hagenguth and J. G. Anderson, General Electric Co.

2:00 p.m.—Computing Devices

Junior Ballroom
 J. M. COOMBS, Presiding

- 52-179. A Contribution to the Design of Binary Counters. G. R. ACO.* Lang, L. L. Luke and D. K. Ritchie, Ferranti Electric, Ltd.
 CP.** ERA Shaft-Position Analog-to-Digital Converter. G. W. Lund, Engineering Research Associates.
 CP.** Digital-to-Analog Shaft-Position Transducers. S. J. O'Neil, Air Force Cambridge Research Center.
 52-181. DINA, A Proposed Digital Network Analyzer. C. Leondes and M. Rubinoff, University of Pennsylvania.
 52-162. Typical Block Diagrams for a Transistor Digital Computer. J. H. Felker, Bell Telephone Labs., Inc. Presentation by title only for discussion.

2:00 p.m.—Relays

Minnesota Terrace
A. J. McCONNELL, Presiding

- 52-182. Ground Fault Relay Protection of Transmission Lines. J. L. Blackburn, Westinghouse Electric Corp.
- CP.** Back-up Protection of Transmission Lines. Report of Project Committee on Transmission-Line Protection.
- 52-183. Power Line Carrier for Relaying and Joint Usage—II. A Survey of Modern Power Line Carrier Systems. G. W. Hampe and B. W. Storer, Commonwealth Edison Co.
- CP.** Performance of Overcurrent Relays on Cold Load Restoration. O. Ramsaur, Pennsylvania Power & Light Co.
- 52-184. Selecting AC Overcurrent Protective Device Settings for Industrial Plants. F. P. Brightman, General Electric Co. Presentation by title only for discussion.

Tuesday, June 24

9:30 a.m.—Forum—THE SHORTAGE OF ENGINEERS

Junior Ballroom
H. A. DAMBLY, Presiding

- A—"The Situation Today, and the Outlook for the Future." Col. Carey H. Brown, Chairman, Engineering Manpower Commission Engineers Joint Council.
- B—"Encouragement of Technical Training for Young People." Dr. Ovid W. Eshbach—Dean, Technological Institute Northwestern University.
- C—"A Program of Action for Local Sections." J. H. Foote, President, Commonwealth Services, Inc.
- D—Specific Discussion.
- 1—Publicity Can Help and How to Use It. Mr. G. T. Minasian, Chairman, Public Relations Committee, AIEE.
- 2—Case Histories of Successful Student Guidance Work. Mr. S. P. Shackleton—Member, Committee on Student Guidance, Engineers Council for Professional Development.
- E—General Discussion by Delegates.

9:30 a.m.—Transmission and Distribution

Main Ballroom
E. L. KANOUSE, Presiding

- 52-188. Sleet Melting Practices—Niagara Mohawk System. H. B. Smith and W. D. Wilder, Niagara Mohawk Power Corp.
- 52-189. Sleet Thawing Practices of the New England Electric System. C. P. Corey, H. R. Selfridge; New England Power Co. and H. R. Tomlinson; New England Power Service Co.
- 52-187. 42 Years' Experience Combating Sleet Accumulations. A. N. Shealey, K. L. Althouse and R. N. Youtz, Pennsylvania Water & Power Co.
- 52-186. Ice Melting and Prevention Practices on Transmission Lines. V. L. Davies and L. C. St. Pierre, Public Service Co. of Northern Illinois.
- 52-185. Sleet Melting on the American Gas and Electric System. S. C. Bartlett, C. A. Imburgia and G. H. McDaniel, American Gas & Electric Service Corp.

9:30 a.m.—Transformers

Minnesota Terrace
F. J. VOGEL, Presiding

- 52-156. Relation of Transformer Design to Fire Protection. E. D. Treanor and L. C. Whitman, General Electric Co. Presentation by title only for discussion.
- 52-159. Dielectric Measurements on New Power Transformer Insulation. W. L. Teague and J. H. McWhirter, Westinghouse Electric Corp.
- 52-190. 1,100,000 KVA Short-Circuit Transformer in the New High-ACO.* Capacity Switchgear Testing Laboratory. B. A. Cogbill, General Electric Co.
- CP.** Proposed Changes in Standards for Current Limiting Reactors. Project Group on Revision of Standards on Current Limiting Reactors.
- CP.** Common Insulation Problem. G. I. Cohn, Illinois Inst. of Technology; and F. J. Vogel, Allis-Chalmers Manufacturing Co.

9:30 a.m.—Instruments and Measurements

Hennepin Room
J. H. MILLER, Presiding

- 52-191. Computing Circuits and Devices for Industrial Process Functions. A. J. Hornfeck, Bailey Meter Company. Presentation by title only for discussion.
- 52-163. The Fundamental Accuracy of Single Phase Three-Wire Metering. E. C. Wentz and A. J. Petzinger, Westinghouse Electric Corp.
- CP.** Basic Theory and Experimental Verification of the Percent Limit Capacitance Bridge. T. J. Higgins and J. Joerger, University of Wisconsin.
- CP.** Complementary Galvanometer Deflection Constants and Steady State Solutions of the Unbalanced Bridge. P. M. Address, Rubicon Company.
- CP.** The Key to Quality—A Comprehensive Test Department. W. H. Clausen, Minneapolis-Honeywell Regulator Co.

9:30 a.m.—Communication Switching Systems

East Room
JOHN MESZAR, Presiding

- 52-201. Automatic Switching for Nationwide Telephone Service. A. B. Clark, Bell Telephone Labs., Inc.; and H. S. Osborne, American Tel. & Tel. Co.
- 52-202. Fundamental Plans for Toll Telephone Plant. J. J. Pilliod, American Tel. & Tel. Co.
- 52-203. Nationwide Numbering Plan. W. H. Nunn, American Tel. & Tel. Co.
- 52-204. Automatic Toll Switching Systems. F. F. Shipley, Bell Telephone Labs., Inc.

2:00 p.m.—Sections Delegates Conference

Junior Ballroom
C. S. PURNELL, Presiding

- I. Changes in Section Organization.
- II. Institute Affairs.
- III. Section Operation and Management.
- A. Section Growth Award Presentations.
- B. Revisions of By-Laws Section 85.

- C. General Discussion by Delegates.
 Membership.
 Student Member Card Records.
 Publicity.
 Cooperation with other Professional Societies.
 Subsections.
 Technical Groups.
 Women's Auxiliaries.
 Increasing Meeting Attendance and Fellowship.
 Use of Model By-Laws in Section Organization.
 Participation in Local Engineering Councils.

2:00 p.m.—Transmission and Distribution

Main Ballroom
 R. L. WITZKE, Presiding

- 52-171. Power Limits of Transmission Lines. L. E. Saline, General Electric Co.
 52-160. Accurate Computation of Two-Machine Stability. R. D. Goodrich, Jr., Bureau of Reclamation.
 52-192. Tensorial Analysis of Integrated Transmission Systems, Part III—The "Primitive" Division. G. Kron, General Electric Co.
 52-193. Analysis of Losses in Interconnected Systems. A. F. Glimm, L. K. Kirchmayer; General Electric Co.; and G. W. Stagg, American Gas & Electric Service Corp.

2:00 p.m.—Transformers

Minnesota Terrace
 M. K. BROWN, Presiding

- 52-232. Standard Basic Impulse Insulation Levels, 450 Kv to 1050 ACO.* Kv Inclusive. Joint AIEE-EEI-NEMA Committee on Coordination of Insulation.
 52-194. Impulse Testing of Power Transformers. J. H. Hagenguth and J. R. Meador, General Electric Co. Presentation by title only for discussion.
 52-195. New Apparatus Bushing with Improved Characteristics. R. N. Anderson and D. L. Johnston, General Electric Co.
 CP.** A New Method of Obtaining Insulation Coordination of Transformers. W. C. Sealey and F. J. Vogel, Allis-Chalmers Mfg. Co.
 52-196. The Production Impulse Testing of Distribution Transformers. E. D. Treanor, H. C. Stewart and J. E. Holcomb, General Electric Co.
 CP.** Selection of Temperature Limits for Transformer Windings Under Short Circuit Conditions. J. E. Clem, General Electric Company.

2:00 p.m.—Instruments and Measurements

Hennepin Room
 H. W. BERRY, Presiding

- 52-157. Electronic Recorder with Range and Precision Adequate for the Platinum Resistance Thermometer. A. J. Williams, Jr., Leeds & Northrup Co. Presentation by title only for discussion.
 CP.** Resistance Temperature Sensing Elements for Aircraft Gas Turbines. Finn Larson and Ralph Squiers, Minneapolis-Honeywell Regulator Co.
 52-197. A Long Distance Multi Point Telemetry System Using Teletype Transmission. A. J. Hornfeck and G. R. Markow, Bailey Meter Co.
 CP.** An Electric Hydrometer of Small Dimensions. W. A. Brastad and L. F. Borchardt, General Mills, Inc.
 CP.** Home Heating Control. John Wilson, Minneapolis-Honeywell Regulator Co.

- 52-241. Aircraft Radio Interference Measurements. M. M. Newman, R. C. Schwantes, J. R. Stahmann; Lightning and Transients Research Institute.

2:00 p.m.—Non-Linearities in Feedback Control Systems

East Room
 F. E. CREVER, Presiding

- 52-198. A Study of Amplifier Saturation and Magnetic Saturation in ACO.* a Servomechanism. Cornelius Leondes, University of Pennsylvania.
 52-154. Sinusoidal Analysis of Feedback-Control Systems Containing Nonlinear Elements. E. C. Johnson, Bendix Aviation Corp.
 52-199. The Use of Non-Linear Feedback to Improve the Transient ACO.* Response of a Servomechanism. J. B. Lewis, University of Tennessee.
 52-200. Feedback Control Systems with Dead-Time Lag or Distributed ACO.* Lag by Root-Locus Method. Yaohan Chu, Massachusetts Inst. of Technology.

Wednesday, June 25

9:30 a.m.—Safety

Junior Ballroom
 C. E. GANTHER, Presiding

- CP.** The Electrical Engineers' Stake in Safety. H. F. Webb, West Penn Power Co.
 CP.** Safety Aspects of Grounding Portable Equipment. H. B. Whitaker, Underwriters Labs., Inc.
 CP.** Electrical Aspects of Mine Safety. V. M. Sovick, U. S. Steel Corp.
 CP.** Extinguishing Fires in Electrical Equipment. J. E. Appel, Commonwealth Edison Co.; and J. A. Bono, Underwriters' Laboratories, Inc.

9:30 a.m.—Rotating Machinery

East Room
 M. R. LORY, Presiding

- 52-167. Torque of Reluctance Type Magnetic Couplings. F. W. Suhr, General Electric Co. Presentation by title only for discussion.
 52-168. Simplified Measurement of Subtransient and Negative Sequence Reactances in Salient Pole Synchronous Machines. F. K. Dalton and A. W. W. Cameron, Hydro-Electric Power Comm. of Ontario. Presentation by title only for discussion.
 52-221. New Large Short Circuit Testing Generators. C. E. Kilbourne, General Electric Co.
 52-222. Forces in Machine End Winding. Dean Harrington, General Electric Co.
 52-223. A New Theory of Hunting. Gabriel Kron, General Electric Co.
 52-224. Synchronous Machines with Rotating Permanent Magnet Fields—I. Characteristics and Mechanical Construction. M. W. Brainard, O'Keefe & Merritt Co.
 52-225. Synchronous Machines with Rotating Permanent Magnet Fields—II. Magnetic and Electrical Design Considerations. Fritz Strauss, O'Keefe & Merritt Co.

9:30 a.m.—Insulated Conductors

Main Ballroom
 C. T. HATCHER, Presiding

- 52-152. Artificial Cooling of Power Cable. F. H. Buller, General Electric Co.
 52-205. Weathering and Crack Resistance of Black Polyethylene ACO.* Wire and Cable Insulation. W. A. Haine, E. F. Smith and N. R. Smith, Union Carbide & Carbon Corp.

- 52-226. Guide for Temperature Correlation in the Connection of ACO.* Insulated Wires and Cables to Electrical Equipment. Project Committee on Temperature Correlation.
- 52-158. Rapid Measurement of the Thermal Resistivity of Soil. V. V. Mason and M. Kurtz, Hydro-Electric Power Comm. of Ontario. Presentation by title only for discussion.
- 52-206. Surface Discharges from Cable Sheaths and Their Relation to Electric Shock. E. W. Greenfield, Kaiser Aluminum & Chemical Corp. Presentation by title only for discussion.

9:30 a.m.—Basic Sciences

Parlor JK
M. G. MALTI, Presiding

- CP.** Influence of Atmosphere Upon Contact Transients in a Simple Electric Circuit. O. E. Berg and H. E. Stauss, Naval Research Lab.
- 52-207. Subharmonics in a Series Nonlinear Circuit as Influenced by Initial Condenser Charge. W. J. McKune and M. F. Brust, University of Texas.
- 52-240. A New Property of Two-Dimensional Fields. A. D. Moore, University of Michigan.
- 52-208. Ultra-Thin Tapes of Magnetic Alloys with Rectangular Hysteresis Loops. M. F. Littmann, Armco Steel Corp. Presentation by title only for discussion.
- 52-227. Electrical and Physical Properties of IN-420 — A New Chlorinated Liquid Dielectric. A. J. Warner, Federal Telecommunication Labs., Inc. Presentation by title only for discussion.

9:30 a.m.—Feedback Control Systems

Minnesota Terrace
S. W. HERWALD, Presiding

- 52-161. The Analysis of Sampled Data-Systems. J. R. Ragazzini and L. A. Zadeh, Columbia University.
- 52-211. Signal Component Control. D. J. Gimpel and J. F. Calvert, ACO.* Northwestern University.
- CP.** Stability Limits for Third-Order Servomechanisms. T. J. Higgins and J. G. Levinthal, University of Wisconsin.
- CP.** Progress Report on Terminology and Nomenclature for Feedback Control Systems. Terminology and Nomenclature Subcommittee.
- 52-239. Stabilization Templates for Servomechanisms. O. J. M. Smith, University of California. Presentation by title only for discussion.

9:30 a.m.—District Branch Prize Papers

Hennepin Room
H. E. HARTIG, Presiding

- Dist. 1. An Analogue Computer for Solving Algebraic Equations. M. M. Dickinson, Jr., Worcester Polytechnic Institute.
- Dist. 2. Magnetic Fluids. J. V. Reihing, University of Pittsburgh.
- Dist. 3. A Device for Reproducing Information Recorded as a moving Dot on 35mm. Film. M. C. Baum, New York University.
- Dist. 4. Magnetic Tape Sound for 16mm. Motion Pictures. M. J. Wiggins, University of Florida.

2:00 p.m.—Management of Engineering Activity Panel Discussion—W. R. Hough, Moderator

Main Ballroom
C. J. BELLER, Presiding

- Techniques for Managing Engineering Work. T. M. Linville, General Electric Co.
- Work Simplification as Applied to Engineering Work. C. L. Brisley, Wolverine Tube Co.

Training for Engineering Supervisors. E. W. Seager, Cutler Hammer Corp.

2:00 p.m.—Rotating Machinery

East Room
C. G. VEINOTT, Presiding

- CP.** Repeated Surge Testing of Motor Windings. N. Rohats, General Electric Co.
- CP.** Studies of Impulse Strength and Impulse Testing Problems on High Voltage Generators. G. L. Moses and R. J. Alke, Westinghouse Electric Corp.
- CP.** A New Magnetic Amplifier Control for Magnetic Drives. D. W. Schlicker.
- CP.** Eddy Current Coupling Drives on the Longest Cement Kiln in the Western Hemisphere. E. H. Frederick.

2:00 p.m.—Basic Sciences

Parlor JK
M. G. MALTI, Presiding

- 52-212. Design of Unequal-Q Double-Tuned Transformers. Sid Deutsch, Polytechnic Research & Development Co., Inc.
- CP.** Analysis of a Comb Filter Using Synchronously Commutated Capacitors. W. R. LePage, C. R. Cahn and J. S. Brown; Syracuse University.
- 52-213. Solution of Electrical Engineering Problems by Southwell's Relaxation Method. E. M. Grad, Associated Electrical Industries, Ltd. Presented by L. A. Pipes.
- CP.** A Mathematical Analysis of Nonlinear Capacitors. L. A. Pipes, University of California.
- 52-214. The Current Status of Dynamic Stability Theory. F. E. Bothwell, U. S. Naval Ordnance Test Station, Inyokern. Presentation by title only for discussion.
- 52-215. Notes on the Design of Eccles-Jordan Flip-Flops. Morris Rubinoff, University of Pennsylvania. Presentation by title only for discussion.

2:00 p.m.—Industrial Power Systems

Junior Ballroom
R. H. WHALEY, Presiding

- CP.** Electric Power Relaying is Important in Industrial Plants. S. S. Paist, Rohm-Haas.
- CP.** Philosophy of Electrical Designs for the Office Building of Tomorrow. C. C. Saunders, E. I. DuPont de Nemours & Co.
- CP.** Industry Response to Systems Neutral Grounding and Higher Voltage Lighting. S. C. Cooke, General Electric Co.

2:00 p.m.—District Branch Prize Papers

Hennepin Room
H. E. HARTIG, Presiding

- Dist. 5. Report on Design of an Electronic Pulse Generator for Physiological Research. R. F. Grantges, University of Minnesota.
- Dist. 6. 100 KC Radio Propagation. C. S. Lorens, University of Colorado.
- Dist. 7. Characteristics of the Radion Tube, Preliminary Report. A. R. Engquist, R. S. Christy, University of New Mexico.
- Dist. 8. Transmission Line Vibration. C. J. Boyd, University of Santa Clara.
- Dist. 9. A Voltage Controlled Magnetic Amplifier. J. V. Stover, H. D. McNair, Oregon State College.

2:00 p.m.—Carrier Current

Minnesota Terrace
C. W. BOADWAY, Presiding

- 52-153. A Broad-Band Coupling Unit for Power Line Carrier with Associated Potential Device. J. A. Doremus, R. P. Crow and W. H. Freeman; Motorola, Inc.

- 52-217. New Method of Calculating Carrier Current Attenuation. J. A. Becker, Westinghouse Electric Corp.
- 52-218. Frequency-Shift, Carrier-Current Equipment for Telemetering and Other Control Type Functions. R. W. Beckwith, General Electric Co.
- 52-219. Application of Power Line Carrier by Analog Computer ACO.* Studies. J. D. Moynihan, Westinghouse Electric Corp.
- 52-220. The Application of Power Line Carrier Coupling Equipment to Typical Field Installations—Part I. F. B. Gunter, Westinghouse Electric Corp.

Thursday, June 26

9:30 a.m.—Insulation

East Room
L. J. BERBERICH, Presiding

- 52-209. Field Studies of Generator Windings. H. C. Marcroft, Pennsylvania Water & Power Co.
- 52-151. D-C Overpotential Testing Experience on High Voltage Generators. R. J. Alke, Westinghouse Electric Corp.
- CP.** Testing Electrical Insulation of Rotating Machinery with High Voltage D.C. G. L. Hill, Pacific Gas & Electric Co.
- 52-174. Interlaminar Insulation Test for Synchronous Machine Stators. H. R. Tomlinson, New England Power Service Co.
- 52-166. The Re-Examination of Temperature Standards for Electrical Insulation. G. L. Moses, Westinghouse Electric Corp. Presentation by title only for discussion.

9:30 a.m.—System Engineering

Main Ballroom
C. B. KELLEY, Presiding

- CP.** Synchronous Condenser Operation. C. R. Canady and J. H. Drake; Southern California Edison Co.
- CP.** Colfax Stability Tests. Motion picture film by Duquesne Light Co.
- CP.** Pool Accounting From An Operating Standpoint. M. J. Lacopo, American Gas and Electric Service Corp.
- CP.** Emergency Dispatching Rules. E. E. George, Ebasco Services, Inc.
- CP.** System Operation Without Communication. C. P. Corey, New England Power Co.
- CP.** Centralized Control of Electric Hot Water Heaters on a R.E.A. Distribution System. Lincoln Rietow, Control Corp.; and H. A. Schimelpfenig, Minnesota Valley Electric Co-operative.

9:30 a.m.—Electrical Techniques in Medicine

Junior Ballroom
E. D. TROUT, Presiding

- CP.** Factors Concerned with the Medical Application of Ultra Sound. R. E. De Forest, M.D., American Medical Association.
- CP.** Electrical Stimulation of Human Muscle. H. D. Bouman, M.D. and Kathryn J. Shaffer, University of Wisconsin.
- CP.** A Practical Quantitative Electrocardiograph. D. A. Kohl, University of Minnesota.
- CP.** Past and Present Forms of Apparatus for Physical Medicine. F. T. Jung, M.D., American Medical Association.

9:30 a.m.—Electrothermal Processes

Hennepin Room
L. W. ROUSH, Presiding

- CP.** Electrical Supply for Arc Furnaces. R. L. Tremaine and R. F. Lawrence, Westinghouse Electric Corp.

- CP.** Determination of Optimum Current in an Arc Furnace. D. R. Cochran, General Electric Co.
- CP.** Comparison Between European and American Electric Furnace Equipment. J. R. Lee, Pittsburgh Lectromelt Furnace Corp.
- CP.** Melting and Refining of Modern Steels. A Sound Film. Allegheny-Ludlum Steel Corporation.

9:30 a.m.—Mining Industry

Minnesota Terrace
J. G. IVY, Presiding

- CP.** Modern Electric Equipment for Hulett Unloaders. W. C. Raube, General Electric Co.
- CP.** Electric Equipment Applications in Taconite Plants. W. H. Schwedes and A. F. Gettelman, General Electric Co.
- CP.** The Elliott Oxygen Process. Irving Roberts, H. K. Ferguson Co.
- CP.** Application of Electrical Controls and Machinery to Power Shovels. W. J. Cheronos, Harnischfeger Corporation.

2:00 p.m.—Safety and Electrical Techniques in Medicine

Junior Ballroom
S. R. WARREN, JR., Presiding

- CP.** Electric Defibrillation of the Heart. W. B. Kouwenhoven, The John Hopkins University.
- CP.** Physiologic Effects of Microwaves. J. F. Herrick and F. H. Krusen, M.D., Mayo Clinic.
- CP.** Possible Industrial Hazards in the Use of Microwave Radiation. H. M. Hines and J. F. Randall, University of Iowa.

2:00 p.m.—Dielectrics

East Room
L. J. BERBERICH, Presiding

- CP.** Fluorine Containing Gaseous Dielectrics. G. Camilli and R. E. Plump, General Electric Co.
- CP.** Properties of Some Fluorinated Liquids for Dielectric Uses. N. M. Bashara, Minnesota Mining & Mfg. Co.
- CP.** Fluorine Containing Solids. R. D. Rowley and C. B. Leape, Westinghouse Electric Corp.
- 52-228. Impulse Dielectric Strength Characteristics of Liquid Impregnated Pressboard. T. W. Dakin and C. N. Works, Westinghouse Electric Corp. Presentation by title only for discussion.
- 52-210. The Variation at Constant Density of the Dielectric Breakdown of Paper with Air Resistance. Paul Cloke, University of Maine; and K. K. Khandelwal, Syracuse University. Presentation by title only for discussion.

2:00 p.m.—Storage Batteries.

Hennepin Room
L. W. ROUSH, Presiding

- CP.** Motive Power Batteries. H. C. Riggs, The Electric Storage Battery Co.
- CP.** Lead Calcium Cells. J. H. Rittenhouse and H. E. Jensen. C. and D. Storage Battery Company.
- CP.** Control of Dry Disc Rectifiers for Battery Charging. C. E. Hamann, General Electric Company
- CP.** Engine Starting. E. A. Hoxie, The Electric Storage Battery Company.

2:00 p.m.—Mining Industry

Minnesota Terrace
J. G. IVY, Presiding

- CP.** Taconite—Processing the Magnetic Type. E. W. Davis, Representing AIME.
- CP.** Operating Experience with Heated Screens. S. E. Erickson and M. Tanamachi, M. A. Hanna Company

CP.** A Power Plant Suitable for a Taconite Project. H. H. McQueen, N. A. Miller, Sargent & Lundy.

Friday, June 27

9:30 a.m.—Excitation Systems

Minnesota Terrace
A. J. KRUPY, Presiding

52-229. Development of a Modern Amplidyne Voltage Regulator for Large Turbine Generators. W. A. Hunter and M. Temoshok, General Electric Co.

52-164. Effect of a Modern Amplidyne Voltage Regulator on Under-excited Operation of Large Turbine Generators. W. G. Heffron, R. A. Phillips, General Electric Company.

52-165. Operating Experience with Shaft-Driven Exciters in Air and Hydrogen. F. M. Porter and H. B. Margolis, American Gas & Electric Service Corp.

CP.** New Excitation Principles and Techniques. J. E. Barkle, C. E. Valentine and J. T. Carleton, Westinghouse Electric Corp.

CP.** Exciter Response. H. W. Cory, Allis-Chalmers Mfg. Co.

9:30 a.m.—New Electronic Devices and Applications

East Room
W. C. WHITE, Presiding

CP.** An Engineering Progress Report on Reliable Tubes. R. E. Moe, General Electric Co.

CP.** A Ten-Stage Cold-Cathode Stepping Tube. D. S. Peck, Bell Telephone Labs., Inc.

CP.** Recent Advances in Industrial Electronics. E. D. Cook, General Electric Co.

9:30 a.m.—Land Transportation

Main Ballroom
L. W. BIRCH, Presiding

52-169. Fifteen Years Progress in the Design of Industrial Diesel-Electric Switchers. R. W. Barrell, General Electric Co.

52-172. Electrification of Holland's Railway System. A. H. Candee, Westinghouse Electric Corp.

CP.** Get Off the Beaten Path. C. M. Hines, Westinghouse Electric Corp.

9:30 a.m.—Magnetic Amplifier Circuits

Junior Ballroom
E. L. HARDER, Presiding

52-233. The Effect of Commutation on the Stability of Magnetic ACO.* Amplifiers. Masao Sakamoto, Minneapolis-Honeywell Regulator Co.

52-234. The Figure of Merit of Magnetic Amplifiers. J. T. Carleton, W. F. Horton; Westinghouse Electric Corp.

52-235. An Improved Magnetic Servo Amplifier. C. W. Lufcy, A. E. Schmid, P. W. Barnhart; U. S. Naval Ordnance Lab.

52-236. Saturable Reactors with Inductive D-C Load — Part I, Steady-State Operation. H. F. Storm, General Electric Co.

52-237. A new Type of Magnetic Servo Amplifier. W. A. Geyger, U. S. Naval Ordnance Lab.

52-238. Dynamic Hysteresis Loop Measuring Equipment. H. W. Lord, General Electric Research Lab. Presentation by title only for discussion.

52-216. Types of Magnetic Amplifiers—A Survey. J. G. Miles, Engineering Research Associates, Inc. Presentation by title only for discussion.

2:00 p.m.—Hydro-Electric Systems

Minnesota Terrace
F. L. LAWTON, Presiding

Round Table Discussion on Power Generation — Any discussion pertaining to Power Generation will be welcomed at this session, particularly discussion pertaining to hydro-electric systems. Prepared answers will be given to questions sent in prior to the meeting, and there will be time for questions and answers from the floor. The following is a partial list of subjects to be discussed:

1. Financing Small Hydro-Electric Generating Stations for Heads Less Than 100 Feet.
2. Experience with Automatic and Supervisory Control for Hydro-Electric Plants and the Range of Plant Sizes to Which They Should Be Applied.
3. Extended Use of Vertical Impulse Water Turbines.
4. Use of Spherical Type Shutoff Valves and Their Advantages over Other Types.
5. Pipe and Tubing Used for Inhibited Oil in Hydro-Electric Stations.
6. Ball Bearings for Auxiliary Motors.
7. Operating Large Generators at Leading Power Factor Loads and Stability Problems Associated Therewith.
8. Operating Experience As to Life of Hydro-Electric Generator Stator Windings with Class B Insulation.
9. Experience As to Cost and Value of Protective Coatings on Internal Surfaces of Penstocks.
10. Auxiliary Power Requirements in Hydro-Electric Generating Stations.

CP.** Holcombe Hydro Plant. H. E. Rhoades, Northern States Power Co.

52-155. Tables of Binomial Probability Distribution to Six Decimal Places.

Joint Subcommittee on Application of Probability Methods to Power System Problems. Presentation by title only for discussion.

2:00 p.m.—Switchgear

Main Ballroom
H. V. NYE, Presiding

52-173. A New 14.4 Kv Indoor Compressed Air Circuit Breaker. J. E. Schrameck, Westinghouse Electric Corp.

52-170. Developing A Superspeed Trip Free Reclosing Circuit Breaker Mechanism. L. J. Linde and H. L. Peek, Allis-Chalmers Mfg. Co.

52-231. Pneumatic Operating Mechanisms for Power Circuit Breakers. R. C. Van Sickle, W. T. Parker and F. E. Florschutz, Westinghouse Electric Corp.

52-226. Temperature Correlation in the Connection of Insulated Wires ACO.* and Cable to Electrical Equipment. Project Committee on Temperature Correlation.

2:00 p.m.—Electrostatic Processes

East Room
G. W. HEWITT, Presiding

52-230. A Pulse Method for Supplying High-Voltage Power for Electrostatic Precipitation. H. J. White, Research Corp.

CP.** Monocyclic Constant Current Control for Industrial Precipitators. H. V. Nelson, General Electric Co.

CP.** Electrostatic Atomization and Precipitation of Coating Materials. E. P. Miller, Ransburg Electro-Coating Corp.

2:00 p.m.—Magnetic Amplifier Test Methods.

Junior Ballroom
H. M. OGLE, Presiding

CP.** Core Matching at High Frequency. D. H. Toth and L. W. Mader, Engg. Research Associates.

CP.** Production Test Experience on Air Craft Magamps. K. H. Sueker, Westinghouse Electric Corp.

CP.** Test Methods for Magnetic Amplifier Cores. J. R. Conrath Vickers Electric Div.

CP.** Evaluation of Core Materials for Magnetic Amplifiers. D. C. Dieterly, Armco Steel Corp. Demonstration of test methods.

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COMMITTEE MEETINGS

Monday, June 23

9:30 a.m.—ASA Sectional Committee C50 on Rotating
Machines Room 352
10:00 a.m.—Lightning & Insulator Subcommittee..... Parlor G
2:00 p.m.—Student Branches Parlor H
2:00 p.m.—Publication Parlor G
2:00 p.m.—ASA Sectional Committee C50 on Rotating
Machines Room 352
2:00 p.m.—Conference of Vice-Presidents & District
Secretaries Parlor JK
5:30 p.m.—Section Delegates Dutch Treat
Get-Together East Room

Tuesday, June 24

9:30 a.m.—Transmission Substations Subcommittee..... Parlor G
9:30 a.m.—ASA Sectional Committee C50 on Rotating
Machines Room 352
9:30 a.m.—Section Forum Junior Ballroom
12:00 Noon—Luncheon—Communication Division..... Parlor I
2:00 p.m.—Section Delegates Conference Junior Ballroom
2:00 p.m.—Distribution and Conversion Substations
Subcommittee Parlor G
2:00 p.m.—Working Group Standards Coordinating #4... Parlor H
2:00 p.m.—Communications Switching Systems Room 352
2:00 p.m.—Carrier Current Measurements
Subcommittee North Shore Room
4:00 p.m.—Technical Program Committee Parlor JK

Wednesday, June 25

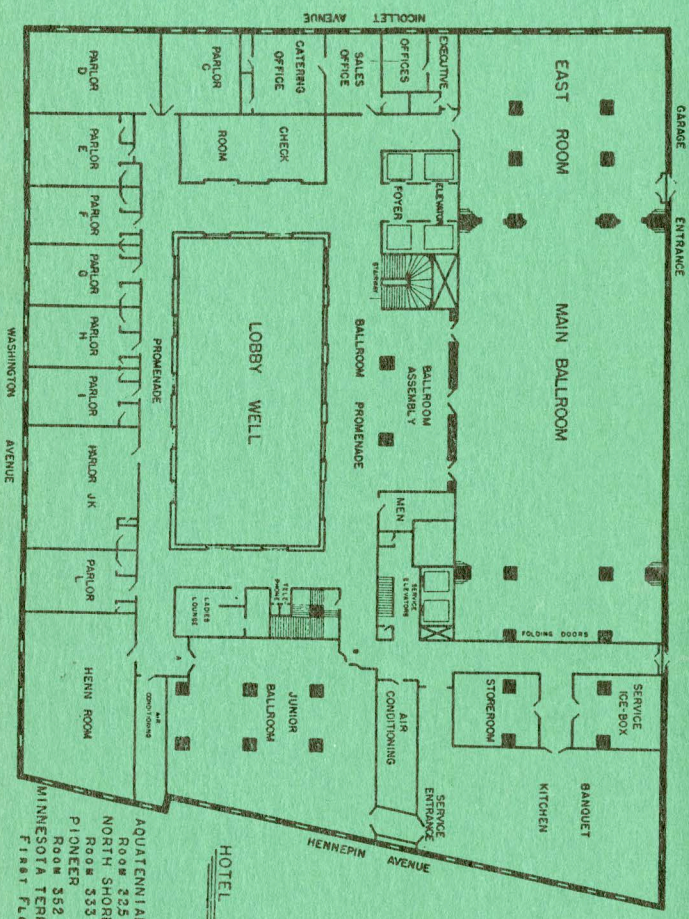
7:30 a.m.—Breakfast—Working Group on Rotating
Machinery Insulation Room 352
7:30 a.m.—Industry Division Parlor G
8:00 a.m.—Breakfast—Science and Electronics Division... Parlor I
9:30 a.m.—Power Division Parlor H
9:30 a.m.—Industrial Power Systems Parlor G
12:00 Noon—Luncheon—Instruments and Measurements... Room 352
12:00 Noon—Luncheon—Technical Advisory Parlor G
12:00 Noon—Luncheon—Insulated Conductors Administra-
tive Subcommittee Parlor I
12:00 Noon—Luncheon—Public Relations..... North Shore Rm.
2:00 p.m.—Feedback Control Systems Parlor H
2:00 p.m.—Committee on Electrical Techniques in Medicine
and Biology Parlor E
3:00 p.m.—R. M. Insulation Subcommittee..... North Shore Rm.
4:00 p.m.—Dinner—Electronics Aquatennial Rm.
4:00 p.m.—AIEE-ASME Steam Turbine Generator Joint
Committee Parlor I
8:00 p.m.—F.C.S. Terminology and Nomenclature Subcom.. Parlor G

Thursday, June 26

9:30 a.m.—Dielectric Amplifier..... North Shore Room
9:30 a.m.—Magnetic Amplifier Definitions Subcommittee.. Room 352
9:30 a.m.—Hydro-Electric System Subcommittee Parlor H
8:00 a.m.—Breakfast—Edison Medal Parlor G
9:30 a.m.—Basic Sciences Parlor I
9:30 a.m.—Board of Directors..... Aquatennial Room
9:30 a.m.—Carrier Current Parlor JK
2:00 p.m.—Power Generation Committee Parlor JK
2:00 p.m.—Board of Directors..... Aquatennial Room
2:00 p.m.—RM Administrative Subcommittee Parlor G
2:00 p.m.—Electrostatic Processes Committee Parlor H
4:00 p.m.—Magnetic Amplifiers..... North Shore Room

Friday, June 27

12:00 Noon—Luncheon—Land Transportation Committee.. Parlor JK



HOTEL NICOLLET

- AQUATENNIAL Room 225
- NORTH SHORE Room 333
- PIONEER Room 352
- MINNESOTA TERRACE First Floor