

**American Institute of
Electrical Engineers**



FALL

GENERAL

MEETING

Program

*Please retain for use during
entire meeting*

CHICAGO, ILL.

OCTOBER 7-11

1957

Meeting Headquarters

MORRISON HOTEL

GENERAL INFORMATION

For the fourth year in succession, the Fall General Meeting of the AIEE is being held in Chicago. The meeting headquarters is again at the Morrison Hotel. The technical program, inspection trips and social activities occupy the entire facilities of the Morrison during the 5-day meeting.

At the General Session to be held on Monday afternoon, October 7, the **Institute's Medal** for outstanding service as a teacher in Electrical Engineering Education will be awarded to W. L. Everitt, Dean, College of Engineering, University of Illinois. Thomas G. Ayers, Vice-President, Commonwealth Edison Co. will give the welcoming address. President Walter J. Barrett will respond and Robert W. Galvin, President, Motorola, Inc. will give the principal address.

Registration Fees Required. In accordance with the policy as set up by the Board of Directors, a registration fee of \$5.00 has been established for members and a fee of \$8.00 for nonmembers. This is to help make the meeting self-supporting. Student members 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 "Technical Sessions Guide" 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 on TRANSACTIONS Papers in duplicate must be left with the chairman and/or sent to Edward C. Day, Assistant Secretary, Technical Operations Department, AIEE, 33 West 39th Street, New York 18, New York before October 25, 1957. Discussions received later may not be included, depending upon the printing schedule of the paper to which the discussion is directed. The original typewritten double-spaced copy, together with original illustrations as photographs or inked tracings must be submitted.

Advance Copies of Papers may be purchased by members at the registration desk at the uniform price of \$.40 each (\$.80 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 \$10.00 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, N. Y. The TRANSACTIONS Papers will also be published in the Bimonthly Publications. Note: Unnumbered Conference Papers (CP.*) may be available for sale at or after the meeting, if copies are provided by the author. They are not intended for publication in the TRANSACTIONS and are not presently scheduled for reproduction in any form by the Institute.

Fall General Meeting

SCHEDULE OF EVENTS

SUNDAY, OCTOBER 6

- 3:00 p.m. Registration
- 4:00 p.m. Reception Tea

MONDAY, OCTOBER 7

- 9:00 a.m. Industrial Power Systems
 - Power Reactor Instrumentation
 - Power System Communications
 - Ethics
 - Semiconductor Circuits
 - Ladies Coffee Hour (daily)
- 2:00 p.m. General Session
 - p.m. Ladies Dessert Card Party

TUESDAY, OCTOBER 8

- 9:00 a.m. Symposium on: "Electric Supply to Large Shopping Centers."
 - Switchgear
 - Rotating Machinery
 - Television and Aural Broadcasting
 - General Circuits and Circuit Theory
- a.m. Trip to Electro-Motive Division of General Motors
- 12:00 noon Ladies Luncheon—Pump Room
- 12:00 noon Joint AIEE Eta Kappa Nu Luncheon
- 2:00 p.m. Nuclear Reactors
 - Rotating Machinery
 - Television and Aural Broadcasting
 - Safety
 - Graduate Honors Cooperative Programs
- p.m. Trip to Commonwealth Edison
- Tour of Chicagoland Area's Shopping Centers

WEDNESDAY, OCTOBER 9

- 9:00 a.m. Metallic Rectifiers
 - Symposium on Substations and Electric Service
 - Computing Devices
 - Communication Theory
 - Power Generation
 - Feedback Control Systems
- a.m. Tour of Argonne National Laboratories
- Ladies Brunch—Cub Room

- 2:00 p.m.** Symposium on Substations and Electric Service
Transmission and Distribution
System Engineering
Land Transportation
Feedback Control Systems
Power Generation
- p.m.** Trip to Will County Generating Station
- Eve.** Fall Frolics

THURSDAY, OCTOBER 10

- 9:00 a.m.** Transmission and Distribution
Power Generation and System Engineering
Wire Communications
Mining and Metal Industry
Transformers
- a.m.** Trip to Automatic Electric Company
- 12:00 noon** Sperry Award Luncheon
Ladies Luncheon—Crystal Room
- 2:00 p.m.** Computing Devices
Transmission and Distribution
Power Generation and System Engineering
Communication Switching Systems
Mining & Metal Industry
Transformers
Wire Communications
- p.m.** Trip to Youngstown Sheet and Tube Company

FRIDAY, OCTOBER 11

- 9:00 a.m.** Transmission and Distribution
Electronics Transformers
New Concepts in the Application of Insulation and AIEE No. 1
- a.m.** Trip to Columbia Broadcasting System's New Headquarters
- 2:00 p.m.** Radio Communications
Industrial Control
Chemical Industry
Insulated Conductors

Monday, October 7

9:00 a.m.—Industrial Power Systems

*Industrial Power Systems Committee
Cotillion Room
F. D. HURD, Presiding*

- 57-1021. "Criteria for Industrial Application of Single Phase Transmission Lines, 400 to 20,000 Cycles," W. A. Munson and A. J. Germain, Westinghouse Electric Corp.
- CP57-1022. "Basic Considerations of DC Power System Design," W. A. Munson, Westinghouse Electric Corp.
- CP.* "400 Cycle Electrical Distribution Systems for Power or Lighting," D. L. Johnson, Oklahoma A & M College.
- CP.* "Testing the Adequacy of Industrial Power Distribution Systems," A. Durand and D. Dalasta, Allis-Chalmers Mfg. Co.

9:00 a.m.—Power Reactor Instrumentation

*Nucleonic and Radiation Instruments Committee
Venetian Room
J. M. HARRER, Presiding*

- CP.* "Argonne Low Power Reactor Instrumentation Design," H. H. Hooker, Argonne National Laboratory.
- CP.* "Problems in Reactor Instrumentation for the Experimental Breeder Reactor #2," A. Lovoff and J. R. Simanton, Argonne National Laboratory.
- CP.* "A Control System for a Boiling Water Reactor," R. N. Brey and R. H. Morse, Leeds and Northrup Co.
- CP.* "Reliability of Instruments Power Supply for Reactors," John Parnell and C. W. Sundin, Minneapolis-Honeywell Regulator Co.
- CP.* "Major Design Concept of the Instrumentation for the Country's First Privately Financed Atomic Power," E. P. Diehl, General Electric Company.

9:00 a.m.—Power System Communications

*Power System Communications Committee
Madison Room
G. E. FARMER, Presiding*

- 57-1091. "Protection Equipment for Power Company Communication Lines," Delmar L. Brown and Leon N. Sherban, Portland General Electric Co.
- CP57-1092. "Fully Automatic Dialing System for Two Canadian Power Utilities," Otto Kreis, Brown Boveri (Canada) Ltd.
- 57-1093. "Coupling Methods for Power Line Carrier Systems," D. E. Jones, Hydro-Electric Power Commission of Ontario and P. W. Waddington, Spilsbury and Tindall, Ltd.

9:00 a.m.—Ethics

*Professional Conduct Committee
Room 427
H. A. AFFEL, Presiding*

- CP.* "The Growing Importance of Ethics to Engineers," P. L. Alger, General Electric Co.
- CP.* "A Proposed Code of Ethics for Recruiting," E. L. Obert, American Society of Engineering Education.

9:00 a.m.—Semiconductor Circuits

*Electronics Committee
Hollywood Room
A. P. STERN, Presiding*

- CP.* "Thermal Stability of Junction Transistors and Its Effect on Maximum Power Dissipation," H. C. Lin.

- 57-1023. "A Generalized Theory of Transistor Bias Circuits," Herbert I. Hellerman, University of Delaware.
- CP57-1024. "Shunt Feedback in Transistor Amplifiers," R. J. Patch, General Electric Co.
- CP57-1025. "Graphical Analysis of Transistor Switching Circuits," M. Rubinoff, A. Messey, and H. Yamada, University of Pennsylvania.
- CP57-1026. "Transistorized Television Vertical Deflection System," W. Palmer and G. Schiess, Sylvania Electric Products, Inc.

2:00 p.m.—General Session

Ballroom
G. L. WELCH, *Presiding*

"Welcoming Address," Thomas G. Ayers, Vice-President, Commonwealth Edison Co.

"Response," President Walter J. Barrett.

PRESENTATION OF THE AIEE EDUCATION MEDAL

History of the Education Medal. W. R. Brownlee, Chairman, Recognition Awards Committee.

Career of the Medalist. Professor E. C. Jordan, Head, Electrical Engineering Dept., University of Illinois.

Presentation of the Medal and Certificate, President Walter J. Barrett.

Response of the Medalist, W. L. Everitt, Dean, College of Engineering, University of Illinois.

"Address," Robert W. Galvin, President, Motorola, Inc.

Tuesday, October 8

9:00 a.m.—Symposium on: "Electric Supply to Large Shopping Centers"

Transmission and Distribution Committee
Cotillion Room
F. A. COX, *Presiding*

- CP57-1072. "Electric Supply to Detroit Area Shopping Centers," W. E. Groves, The Detroit Edison Co.
- CP57-1073. "Electric Service to Shopping Centers on Virginia Electric and Power Company's System," R. C. Daffron, Virginia Electric and Power Co.
- CP57-1071. "Electric Service Supply to Roosevelt Field Shopping Center," R. M. Grogan, Long Island Lighting Co.
- CP.* "Supply to Large Shopping Areas in the Chicago Metropolitan Area," W. R. Zimmerman, Commonwealth Edison Co.

9:00 a.m.—Switchgear

Switchgear Committee
Venetian Room
C. A. WOODROW, *Presiding*

- 57-727. "Severe Rates of Rise of Recovery Voltage Associated With III Transmission Line Short Circuits," W. F. Skeats, C. H. Titus and W. R. Wilson, General Electric Company. Re-presented for Discussion.
- 57-1032. "4160 Volt, 350 MVA. Metal-Clad Switchgear With Symmetrical Ratings," E. B. Rietz, G. O. Perkins, and W. A. Carter, I-T-E Circuit Breaker Company.
- 57-1031. "An Outdoor Metal-Clad Switchgear Unit With a Weather-III Protected Operating Aisle," H. B. Wortman, Westinghouse Electric Corp.
- CP57-1049. "Airblast Circuit Breaker Characteristics," W. O. Rowan, The Hydro-Electric Power Commission of Ontario.
- CP57-1100. "Vacuum Switch Properties For Power Switching Applications," H. C. Ross, Jennings Radio Mfg. Corp.

TUESDAY (continued)

9:00 a.m.—Rotating Machinery

Rotating Machinery Committee
Hollywood Room
L. O. DORFMAN, *Presiding*

- CP57-1005. "A Modified Adjustable Speed Brushless Induction Motor," A. M. El Gammal, Ain Shams University.
- 57-1003. "Simulation of the Operational Impedances of Synchronous III Machines on Network Analysers," Colin Adamson and A. M. S. El-Serafi, Manchester College of Science and Technology.
- 57-1006. "Gas Flow and Heat Transfer in Conductor Cooled Machines," L. T. Rosenberg, Allis-Chalmers Mfg. Co.
- 57-1004. "A Variable Speed D-C Motor Drive Employing The Xatron, III A Grid Controlled Mercury Arc Rectifier," A. J. Humphrey and K. L. Shrider, Reliance Electric and Engineering Co.

9:00 a.m.—Television & Aural Broadcasting

Television and Aural Broadcasting Systems Committee
Madison Room
J. B. EPPERSON, *Presiding*

- CP57-1007. "Color and Monochrome Cathode Ray Tube Performance Tests," Charles F. Otis, Philco Corporation.
- CP.* "Prediction and Measurement of the Coverage of a Television Station," D. W. Peterson, RCA Laboratories.
- CP.* "Status Report on Video Tape Applications in Broadcasting," Howard A. Chinn, CBS Television.
- CP.* "A Radiating System for Television Broadcasting," Andrew Alford and Harold Leach, Alford Mfg. Company.

9:00 a.m.—General Circuits and Circuit Theory

Electronics Committee
Room 427
R. C. WEYRICK, *Presiding*

- 57-1027. "Small Signal Heterodyne Mixers With Excessive Injection I Potentials," Jack F. Cline, Stanford Research Institute.
- CP57-609. "Amplitude and Frequency Stabilization of an Oscillator I Using Nonlinear Elements," C. J. Triska, Iowa State College of Agriculture and Mechanical Arts. Re-presented for Discussion.
- CP57-1028. "The Diode Reactance Modulator," G. Franklin Montgomery, National Bureau of Standards.
- 57-1029. "A Nonlinear Low Frequency Instability Phenomenon in I Audio Amplifiers," Theron Usher, Jr., Yale University.
- CP57-1030. "Equivalent Circuits of Noisy Networks," Leo Young, Westinghouse Electric Corp.

2:00 p.m.—Nuclear Reactors

Power Generation Committee
Cotillion Room
E. G. NORELL, *Presiding*

- 57-1068. "Load Control for the Shippingport Nuclear Power Station," III H. A. Van Wassen, Duquesne Light Co.
- 57-1069. "Engineering Design of the EBWR Facility," D. C. McClintock, Sargent and Lundy.
- CP.* "EBWR Nuclear Design and Power Station Operating Experience," J. M. Harrer, Argonne National Lab.
- CP57-1094. "Special Features of 5000-KW EBWR Turbine Condenser and Pump," C. H. Morris, K. H. Gruenwald and C. E. Kenny, Allis-Chalmers Mfg. Co.

TUESDAY (continued)

2:00 p.m.—Rotating Machinery

Rotating Machinery Committee
Hollywood Room
M. L. SCHMIDT, *Presiding*

- 57-1008. "Analog Computer Study of Wind Tunnel Drive," K. G. Black and R. J. Noorda, General Electric Company.
- CP.* "A Theory for Shaded-Pole Motors," F. W. Suhr, General Electric Co.
- CP.* "Switching Voltages of Induction Motors," E. C. Schrom, General Electric Co.
- CP.* "Switching Transients in Small Motors," R. K. Drake and S. A. Zimmermann, General Electric Co.

2:00 p.m.—Television & Aural Broadcasting

Television and Aural Broadcasting Systems Committee
Madison Room
C. E. SMITH, *Presiding*

- CP.* "The Television Allocations Study Organization Its Origin, Objectives and Progress," George R. Town, Executive Director, TASO.
- CP.* "The Systems Approach to the Determination of Television Coverage," Robert M. Bowie, Sylvania Electric Products, Inc.
- CP.* "Summary of Performance of UHF and VHF Television Transmitting and Receiving Equipment," W. J. Morlock, General Electric Co. and Wm. O. Swinyard, Hazeltine Research, Inc.
- CP.* "The Measurement of Television Field Intensities and the Relationship Between Field Intensity and Picture Quality," Howard T. Head, A. D. Ring and Associates.

2:00 p.m.—Safety

Safety Committee
Venetian Room
B. L. VOSBURGH, *Presiding*

- CP57-1009. "The Scope and Limitations of Cardiac Resuscitation," Archer S. Gordon, M.D., University of Illinois, College of Medicine.
- CP57-1010. "The Adjunctive Use of Mechanical Resuscitation in Electrical Contact Accidents," T. M. C. Martin, University of California.
- CP57-1011. "The Principles and Practice of Emergency Mechanical Resuscitation," Charles W. Frye, M.D. and Archer S. Gordon, M.D., University of Illinois, College of Medicine.
- CP57-1012. "A Comparison of Mouth-to-Mouth and Manual Artificial Respiration Techniques," Archer S. Gordon, M.D. and Charles W. Frye, M.D., University of Illinois, College of Medicine.
- CP.* "A Demonstration of Artificial Respiration," Archer S. Gordon, M.D., et al, University of Illinois, College of Medicine.

2:00 p.m.—Graduate Honors Cooperative Programs

Education Committee
Room 427
J. A. M. LYON, *Presiding*

- John M. Cage, Hewlett-Packard Co.
- John F. Calvert, University of Pittsburgh.
- Everett Strong, Cornell University.
- Robert Whitehorne, International Business Machines.

Wednesday, October 9

9:00 a.m.—Metallic Rectifiers

Semiconductor Metallic Rectifiers Committee
Cotillion Room
E. A. HARTY, *Presiding*

- CP57-1046. "III-V Compound Rectifiers," G. B. Kich, Fansteel Metallurgical Corporation.
- CP.* "Gallium Arsenide Phosphide PHN Junctions," G. A. Jenny, RCA.
- CP57-1047. "Structure and Characteristics of SiC Light-Emitting Junctions," Lyle Patrick, Westinghouse Electric Corp.
- CP.* "Preparation of Silicon Carbide, Single Crystal and Use in Rectifiers," L. Kroko and H. Chang, Westinghouse Electric Corporation.
- CP57-1048. "Anodized Titanium-Solid Lead Peroxide Rectifier," Samuel Ruben, Ruben Laboratories.

9:00 a.m.—Symposium on Substations and Electric Service

Substations Committee
Madison Room
HAROLD FOSSUM, *Presiding*

- "How Substation Design and Operation Reflect Customer Service Continuity Requirements," L. M. Olmstead, Electrical World.
- "Corrosion in Substation Grounding," P. M. Black, Radio Receptor Co.

9:00 a.m.—Computing Devices

Computing Devices Committee
Ballroom
H. HAMER, *Presiding*

- 57-1053. "The Transformer Analogue Computer," P. Venkata Rao I and G. Krishna, Indian Institute of Science.
- CP.* "Some Aspects of the Reliability of Analog-to-Digital Conversion," A. Yeiser, Applied Electronics Laboratories.
- CP.* "Digital Camera Coder for Spatial Angles," J. S. Ward, Massachusetts Institute of Technology.
- 57-684. "Analog Computer Study of the Transient Performance of a Dual Cycle Boiling Water Reactor Nuclear Power Plant," David W. Leiby, General Electric Co. Re-presented for Discussion.
- 57-685. "A Rolling Mill Analogue for the Study of Non-Linear Problems Associated With Gauge Control," L. R. Hulls and K. R. Canfor, Canadian Westinghouse Co. Re-presented for Discussion.

9:00 a.m.—Communication Theory

Communication Theory Committee
Room 427
L. G. ABRAHAM, *Presiding*

- CP.* "The 'Megacoder'—A High-Speed Large-Capacity Micro-miniature Decoder for Selective Communication," Harry Kihn and W. E. Barnette, RCA Laboratories.
- CP57-1041. "Binary Symmetric Decision Feedback Systems," Bernard Harris and K. C. Morgan, New York University.
- 57-1042. "Kineplex, A Bandwidth Efficient Binary Transmission System," R. R. Mosier and R. G. Clabaugh, Collins Radio Company.
- CP.* "An Experimental Study of a Binary Code," W. Wesley Peterson, University of Florida.

WEDNESDAY (continued)

9:00 a.m.—Power Generation

Power Generation Committee
Venetian Room
D. M. SAUTER, Presiding

Panel Discussion—"The Relation of Automatic Transfer of Steam Station Auxiliaries to Station Protection."

Panel Members:

- J. F. ALLEN on "Survey of Station Service Bus Transfer Practices on Large Units in New England."
J. G. NOEST "Load Transfer Applications for Central Station Auxiliary Power Systems."
R. L. BOYD "Objectives and Experience in Automatic Transferring of Auxiliary Motors."
W. E. MARTER and H. A. THOMPSON "Voltage Transfer Applications on Duquesne Light Co. System."
A. S. GRIMES, S. H. HOROWITZ and W. S. MORGAN "Some Considerations for Auxiliary Power Transfer for Supercritical Units of the A. G. & E. Company System."
J. P. FITZGERALD, C. F. PAULUS and H. A. VARGAS "Plant Auxiliary Transferring at the Cleveland Electric Illuminating Co."

9:00 a.m.—Feedback Control Systems

Feedback Control Systems Committee
Hollywood Room
T. J. HIGGINS, Presiding

- 57-1033. "The Selection and Use of Servo Performance Criteria," II W. C. Schultz and V. C. Rideout, University of Wisconsin.
57-1036. "Extended Switching Criterion for Second Order Saturated Servomechanisms," J. W. Diesel, Washington University.
CP57-1035. "Analyses of Servomechanisms by Describing Function Method on a Plane With Parameters as Coordinates," Toshio Numakura, Takeo Miura, and Akira Kamoi, Hitachi Central Research Laboratory.

2:00 p.m.—Symposium on Substations and Electric Service

Substations Committee
Madison Room
J. H. RIXSE, Presiding

- "Highside Protection of Substation Transformers Without Breakers and Fuses," O. J. Rotty, Union Electric Co.
"Voltage Regulation for Substations," H. F. Barsun, Westinghouse Electric Co.

2:00 p.m.—Transmission & Distribution

Transmission and Distribution Committee
Cotillion Room
A. B. WEAVER, Presiding

- 57-1074. "Economics of System Conversion From 27.6-KV to 33-KV III Operation," H. K. Amchin, T. May and T. J. Nagel, American Gas & Electric Service Corp.
57-1075. "Unbalanced Loading of Three-Phase Transformer Banks—II III —Economics," S. W. Anderson, Middle West Service Co.
57-1076. "Combined Single-Phase and Three-Phase Loading of Open-III Delta Transformer Banks," H. M. Bankus and J. E. Gerngross, General Electric Company.

2:00 p.m.—System Engineering

System Engineering Committee
Ballroom
G. S. WHITLOW, Presiding

- 57-1054. "Kilovar Supply in Bulk-Power Transmission Systems," III J. M. Henderson, H. O. Simmons, Jr. and J. B. Tice, General Electric Co.

57-1101. "A New Approach to Loss Minimization in Electric Power III Systems," John F. Calvert and T. W. Sze, The University of Pittsburgh.

57-1055. "Rapidly Converging Digital Load Flow," R. H. Jordan, III Indianapolis Power and Light Company.

CP57-1056. "Extensions in Digital Load Flow Techniques Using High Speed Computer," M. S. Dyrkacz, A. F. Glimm and D. G. Lewis, General Electric Co.

2:00 p.m.—Land Transportation

Land Transportation Committee
Room 427
H. F. BROWN, Presiding

CP57-1096. "Technical Aspects of Providing Service to Single-Phase, 60 Cycle Railroad Loads," T. J. Nagel and A. F. Gabrielle, American Gas and Electric Corp.

CP.* "Electric Equipment for the MTA High Performance Cars," M. F. Bretz, General Electric Co.

CP.* "Electric Locomotives for the Butte, Anaconda and Pacific Railway," William Wishart, General Electric Co.

CP.* "Electric Snowmelter Systems for Railroad Track Switches," D. R. Brewer, General Electric Co.

2:00 p.m.—Feedback Control Systems

Feedback Control Systems Committee
Hollywood Room
H. W. CORY, Presiding

CP57-578. "Servo Control System for a Large Optical Tracking Instrument," Morton H. Mehr, The Perkin-Elmer Corp.

CP57-1037. "Analysis of Multiple Sampler Systems With Finite Pulse Width (Open Loop)," G. Farmanfarma, University of California.

CP57-1034. "Stability Study of a Third-Order Servomechanism With Multiplicative Feedback Control," Y. H. Ku, Moore School of Electrical Engineering and C. F. Chen, Christian Brothers College.

2:00 p.m.—Power Generation

Power Generation Committee
Venetian Room
A. G. MELLOR, Presiding

57-1098. "Recommended Specifications for Speed-Governing of Steam III Turbines Intended to Drive Electric Generators Rated 500 KW and Larger," Report of Joint AIEE-ASME Committee on Recommended Specifications for Prime Mover Speed Governing.

57-1099. "Grounding of Power Station 4160 Volt Auxiliary Systems," III T. H. McGreer, Sargent and Lundy.

Thursday, October 10

9:00 a.m.—Transmission and Distribution

Transmission and Distribution Committee
Hollywood Room
J. T. LUSIGNAN, Presiding

57-1087. "1956 Lightning Field Investigation on the OVEC 345 KV III System," R. H. Schlomann and W. S. Price, American Gas and Electric Service Corp.; J. G. Anderson, I. B. Johnson, General Electric Co.

57-1084. "Lightning Performance of 138 KV Twin Circuit Transmission III Lines of Commonwealth Edison Company Operating Experience and Field Studies," R. W. Caswell and E. F. Konecl, Jr., Commonwealth Edison Co.; I. B. Johnson and N. R. Schultz, General Electric Co.

THURSDAY (continued)

- 57-1085. "Field Studies of the Surge Response of a 345 KV Transmission Tower and Ground Wire," G. D. Breuer, A. J. Schultz, R. H. Schломann and W. S. Price, General Electric Co.
- 57-548. "An Approximate Transient Solution of the Tapered Transmission Line," L. O. Barthold, General Electric Co.
- 57-1086. "Analytical Studies on Lightning Phenomena Involving Towers, Insulator Strings, and Transmission Lines," I. B. Johnson and A. J. Schultz, General Electric Co.

9:00 a.m.—Power Generation & System Engineering

Power Generation and System Engineering Committees
Cottillon Room
C. NICHOLS, Presiding

- 57-1064. "Minimization of Fuel Costs By The Technique of Linear Programming," A. P. Hayward and C. E. Taylor, Duquesne Light Co.; R. H. Kerr and L. K. Kirchmayer, General Electric Co.
- 57-1065. "Economic Considerations in Generation Scheduling Southwestern Public Service Company System," R. W. Thomas, Southwestern Public Service Co.; L. K. Kirchmayer, J. R. Wilson, General Electric Co.
- CP57-1066. "Basic Data For Load Schedule Development," F. H. Light, Sr., Philadelphia Electric Co.
- CP57-1067. "Determination of the Incremental Heat Rate Characteristic By Performance Testing," Roy W. Thomas, Southwestern Public Service Co.

9:00 a.m.—Wire Communications

Wire Communications Systems Committee
Room 427
J. N. PETRIE, Presiding

- CP57-1016. "Transistorized Negative Impedance Telephone Repeaters," Robert P. Dimmer, Automatic Electric Company.
- 57-391. "The Application of Negative Impedance Repeaters on Long Rural Telephone Lines," H. T. Uthlaut, Jr., Southern Bell Telephone & Telegraph Company. Re-presented for Discussion.
- CP57-1097. "A Miniaturized Negative Voice Repeater Employing Transistors," A. S. Howell, Stromberg-Carlson Company.
- CP.* "A Study of Negative Impedance Loading," D. F. Hoth, Bell Telephone Laboratories.

9:00 a.m.—Mining and Metal Industry

Mining and Metal Industry Committee
Madison Room
A. C. LORDI, Presiding

- CP.* "Standardization of Cables and Hose Conduits of Mine Motors and Controllers," J. Tindall, Reliance Electric and Engineering Co.
- CP.* "Sequence Control of Mining Belt Conveyors," Ben Harbage, Jeffrey Mfg. Co.
- CP.* "Pioneering Carrier Communications and Controls in Mines and Mills," W. Porter Place, FEMCO Inc.
- CP.* "Current Carrying Capacity of Portable Cables on Reels," John McNiff and A. H. Shepherd, Simplex Wire and Cable Co.

9:00 a.m.—Transformers

Transformers Committee
Venetian Room
D. L. LEVINE, Presiding

- CP57-1038. "The Significance of Transformer Functional Testing To The Operating Company," A. M. Lockie, Westinghouse Electric Corp.

THURSDAY (continued)

- 57-1039. "The Effect of Transformer Oil Preservation Methods on the Dielectric Strength of Oil," R. B. Kaufman, J. L. Pierce and E. R. Uhlig, General Electric Company.
- CP.* "Rapid Spot Test Methods for the Evaluation of Used Transformer Oil," R. E. Reinhard and W. E. Elliott, Allis-Chalmers Manufacturing Co.

2:00 p.m.—Computing Devices

Computing Devices Committee
Ballroom
J. F. KALBACH, Presiding

- 57-1061. "Statistical Design Theory for Strictly Digital Sampled Data Systems," S. S. L. Chang, New York University.
- 57-1062. "Russian To English Machine Translation With Simple Logical Processing," Robert E. Wall, Jr., University of Washington and Udo K. Niehaus, Boeing Airplane Co.
- CP57-1063. "Random Access and the Manufacturing Control Problem," Claude A. R. Kagan, Western Electric Company, Inc.
- 57-673. "Matrix Analysis of Logical Networks," E. J. Schubert, Westinghouse Electric Corp. Re-presented for Discussion.
- 57-677. "Cycle and Delay Time Considerations in a Real-Time Digital Computer," Herbert Freeman, Sperry Gyroscope Co. Re-presented for Discussion.

2:00 p.m.—Transmission & Distribution

Transmission and Distribution Committee
Hollywood Room
H. L. DAVIS, Presiding

- 57-1077. "Suspension Insulator Flashover Under High Impulse Voltages," B. E. Kingsbury, General Electric Company.
- 57-1078. "Impulse Flashover Characteristics of Long Strings of Suspension Insulators," A. F. Rohlfis and H. E. Fiegel, General Electric Co.
- 57-1079. "Factors Affecting the Lightning Performance of Transmission Lines," J. H. Hagenguth and J. G. Anderson, General Electric Co.
- 57-1080. "A Hypothesis Concerning Lightning Phenomena and Transmission Line Flashover," I. B. Johnson and A. J. Schultz, General Electric Co.
- CP57-537. "Calculation of Transmission Line Lightning Voltages By Field Concepts," R. Lundholm, Chalmers Tekniska; R. B. Finn, Jr. and W. S. Price, American Gas and Electric Service Corp.

2:00 p.m.—Power Generation & System Engineering

Power Generation and System Engineering Committees
Cottillon Room
G. H. McDANIEL, Presiding

- CP.* "Determination of Incremental Heat Rate Characteristics From Operating Records," V. R. Peterson and A. H. Willenar, American Gas and Electric Service Corp.
- CP57-1058. "Practical Limitations in the Determination of the Incremental Cost of Fuel," E. K. Corporon, Interchange Power Services, Inc.
- CP57-1059. "The Effect of Fuel Heating Value on the Economic Loading of Power Systems," W. H. Guppy, Commonwealth Edison Co.

THURSDAY (continued)

57-1060. "Incremental Maintenance Costs of Steam-Electric Generating Stations," M. J. Steinberg, Consolidated Edison Company of New York, Inc.

Round Table Discussion—"Application of Incremental Heat Rates to Automatic Load Dispatching."

2:00 p.m.—Communication Switching Systems
Communication Switching Systems Committee
Parlor F
W. KEISTER, *Presiding*

57-1019. "A Numerical-Graphical Method for Synthesizing Switching Circuits," A. H. Scheinman, Bell Telephone Laboratories, Inc.

CP57-1020. "Automatic Mobile Telephone System," R. P. Dimmer, Automatic Electric Co.

CP.* "Mechanization of Toll Switching in Providence, R. I.," C. W. Anderson, New England Telephone and Telegraph Company.

57-1095. "The Examination of Electrical Contacts by the Plastic Replica Method," H. W. Hermance and T. F. Egan, Bell Telephone Laboratories.

2:00 p.m.—Mining and Metal Industry
Mining and Metal Industry Committee
Madison Room
R. D. GREER, *Presiding*

CP.* "Factors Affecting Rating of Mine Motors," L. L. Lipanye, Reliance Electric and Engineering Co.

CP.* "Wired Vision and Pushbutton Control," E. A. Berry, Mine Safety Appliances Co.

CP.* "Electrical Problems Involved in Designing Fluorescent Mine Lighting Systems," R. S. James, U.S. Bureau of Mines.

2:00 p.m.—Transformers
Transformers Committee
Venetian Room
D. L. LEVINE, *Presiding*

57-530. "Orthomagnetic Current Transformers for Laboratory and Factory Testing," L. W. Marks and G. Camilli, General Electric Co. Re-presented for Discussion.

57-1040. "A Way to Get Low Sound Levels in Large Power Transformers—Preassembled Enclosures," M. W. Schulz, Jr. and W. J. McNutt, General Electric Company.

CP.* "Standard Basic Impulse Insulation Levels," Report by AIEE Standards Coordinating Committee No. 8.

2:00 p.m.—Wire Communications
Wire Communications Systems Committee
Room 427
A. M. SEYMOUR, *Presiding*

CP57-1070. "Filter Design for Transistorized Carrier," T. Winkler, Stromberg-Carlson Co.

57-1017. "Mechanical Features of 561 Subscriber Carrier," J. E. Ross and O. H. Goldman, Stromberg-Carlson Co.

57-1018. "Engineering Features and Field Trial Performance of a New Subscriber Carrier System," R. L. Layburn, Stromberg-Carlson Company.

57-786. "A Review of Telephone Development in Western Europe and in Underdeveloped Areas," G. D. Wallenstein, Lenkurt Electric Company. Re-presented for Discussion.

CP.* "New Design Approaches for Military Carrier Equipment," Neale Zellmer and William Luchier, Lenkurt Electric Co.

Friday, October 11

9:00 a.m.—Transmission & Distribution
Transmission and Distribution Committee
Cotillion Room
R. W. CASWELL, *Presiding*

57-1081. "Ground Fault Location Indicator," A. C. Lee, Northern States Power Co.

57-1082. "Transmission Line Tower Footing Design," L. B. LeVesconte, W. C. Freeman and R. L. Reese, Sargent and Lundy.

CP57-1083. "Correct Aluminum Connector Designs Eliminate Need For 'Pressure Maintaining Devices,'" Meril B. Monashkin, Burndy Corporation.

9:00 a.m.—Electronics Transformers
Electronics Committee
Hollywood Room
H. W. LORD, *Presiding*

57-1013. "Size Reduction of Airborne Transformers," Ray E. Lee, Westinghouse Electric Corp.

57-1014. "Standards for High Voltage, High Power Rectifier Transformers," James J. Halloran, Electro Engineering Works.

CP.* "Bridge Method for Pulse Measurements on Miniature Transformer Core Materials," A. D. Furbee, General Electric Company.

CP57-1015. "Design of Random Noise Transformers," M. P. Vore, Westinghouse Electric Corp.

CP.* "Design Considerations for Dry-Type High-Voltage Power Supplies for Electrostatic Processes," E. C. Hill, General Electric Company.

9:00 a.m.—New Concepts in the Application of Insulation and AIEE No. 1
Standards Committee
Venetian Room
F. J. VOGEL, *Presiding*

57-1088. "Revision of Standard No. 1," Report of Coordinating Committee #4 of the Standards Committee, AIEE.

CP57-1089. "The Guides for Thermal Evaluation of Insulating Materials and Systems, AIEE No. 1D and 1E," Graham Lee Moses, Westinghouse Electric Corp. and J. F. Dexter, Dow Corning Corp.

CP57-1090. "International Activities in the Temperature Classification of Electrical Insulating Materials," L. J. Berberich, Westinghouse Electric Corp. and K. N. Mathes, General Electric Co.

2:00 p.m.—Radio Communications
Radio Communications Systems Committee
Madison Room
R. D. CAMPBELL, *Presiding*

57-1044. "6000 Megacycle/Sec. Radio Relay System for Broad Band Long Haul Service in the Bell System," M. B. McDavitt, Bell Telephone Laboratories, Inc.

CP.* "Radio Multiplex With Circulators," L. B. Johnson, Lenkurt Electric Company.

FRIDAY (continued)

CP.* "Single Sideband for Mobile Applications," H. Magnuski, W. Firestone, and R. Richardson, Motorola.

CP57-1045. "Unattended Recording of VHF Receiver Site Noise," Robert E. Bloor, Ohio Telephone Company.

CP.* "Evaluation of 900 Megacycles as a Potential Vehicular Communication Band," C. J. Schultz, Motorola, Inc.

2:00 p.m.—Industrial Control

Industrial Control Committee
Hollywood Room
J. W. PICKING, Presiding

CP.* "Automation Applied to a Structural Mill," Samuel A. DeCaro, United States Steel Corp.

CP.* "Factors Influencing Control Desk Design," Donald E. Strom, United States Steel Corp.

CP.* "Improved Safety in the Control of Stamping Presses," Thomas N. Anderson, Clark Controller Co.

CP57-1043. "A Photoelectric Device Using a Radioactive Source," Paul Weisman and Stanley L. Ruby, Westinghouse Electric Corp.

2:00 p.m.—Chemical Industry

Chemical Industry Committee
Venetian Room
J. P. OLIVER, Presiding

CP57-1052. "New Developments in Cathodic Protection," B. Husock, Harco Corp.

CP.* "Rectifiers as Used in Cathodic Protection," R. M. Wainwright, Good-All Electric Mfg. Co.

2:00 p.m.—Insulated Conductors

Insulated Conductors Committee
Cotillion Room
L. E. FOGG, Presiding

57-1050. "A Study of the Superposition of Heat Fields and the Kennelly Formula As Applied to Underground Cable Systems," Conrad A. Bauer and Robert J. Nease, Commonwealth Edison Co.

57-1051. "Cable Tunnel Crossings," E. J. Dawson, Commonwealth Edison Co.; R. W. Gillette, Consolidated Edison Co.; and A. F. Corry, Boston Edison Co.

NOTE: Unnumbered Conference Papers (CP.*) may be available at or after the meeting, if copies are provided by the author. They are not intended for publication in the TRANSACTIONS and are not presently scheduled for reproduction in any form by the Institute.

NOTE: The TRANSACTIONS papers will be printed in the bimonthly publications as follows:

- I COMMUNICATIONS AND ELECTRONICS.
- II APPLICATIONS AND INDUSTRY.
- III POWER APPARATUS AND SYSTEMS.

LADIES PROGRAM

In addition to the daily 9 a.m. coffee hour during the AIEE Fall General Meeting, the women attending the meeting will be entertained at a variety of events. Following is a list and description of each event:

Sunday: Reception in the Cotillion Room in the Morrison Hotel—4:00 to 6:00 p.m.

Monday: Afternoon, Dessert Card Party in the Ladies Headquarters in the Walnut Room. This is sponsored by the Delta Star Company.

Tuesday: Luncheon in the Pump Room of the Ambassador East Hotel. Dorothy Bond, a syndicated cartoonist, will speak and will also do some caricatures of a few in the audience attending the Luncheon. This Luncheon is being sponsored by the Allis-Chalmers Company.

Wednesday: Brunch in the Cub Room of the Morrison Hotel. Betsy Ross, a well known decorator from the John A. Colby Company, will speak to us on Interior Decorating. There will be a \$3.00 charge for the Brunch.

Thursday: Luncheon in the Crystal Room of the Chicago Athletic Club. Sulie Harand, a well known entertainer, will give a musical play. This luncheon is being sponsored by Westinghouse Electric Corporation.

Friday: Our program ends with the morning coffee hour.

RADIO, TELEVISION, AND THEATER TICKETS

Free radio and television tickets for all days of the convention are available. Tickets should be secured a day in advance and information concerning programs, show times and seating is available at Headquarters.

Theater tickets and tickets for sporting events are available only from the hotel ticket broker in the lobby.

SOCIAL ACTIVITIES

Reception Tea and Hospitality Hour—Social activities will begin on Sunday afternoon, October 6, from 4:00 to 6:00 p.m., with an informal reception tea, and with a hospitality hour sponsored by the Chicago Section, AIEE, for members of the AIEE and their families.

On Tuesday, October 8th, all members and guests are cordially invited to attend a luncheon in Parlors B, C and D at 12.15 p.m., jointly sponsored by the AIEE and ETA KAPPA NU. Dr. Kaj A. Strand, Director of The Dearborn Observatory of Northwestern University, will speak on the "Geophysical Year." Contact the registration desk for tickets at \$4.00 each.

On Thursday, October 10, in the beautiful Terrace Casino of the Morrison Hotel the **Sperry Award** for developing the Diesel-Electric Locomotive will be awarded to Harold L. Hamilton, Richard M. Dilworth and Eugene W. Kettering at a luncheon scheduled for 12 noon. The award will also go to the Controls, Electrical Engineering, Locomotive and Mechanical Engineering Sections of the Engineering Department of the Electro-Motive Division of the General Motors Corp. The Elmer A. Sperry Award is jointly sponsored by ASME, SAE, SNAME and AIEE.

FALL FROLICS

The Fall Frolics will be held on October 9th in the Terrace Casino of the Morrison Hotel. Last Fall the party was a gay and colorful

affair. The women added spice to the occasion and they are welcomed back this year. An excellent floor show after dinner is in store and dancing will follow. Dress will be informal. The tickets are \$11.00 each or \$22.00 per couple.

INSPECTION TRIPS

Trips during AIEE Fall Meeting to be interesting and informative. Eight separate trips have been arranged for AIEE members attending the Fall General Meeting in Chicago.

Tuesday Morning: Electro-Motive Division of General Motors will be host for a tour through their facilities at La Grange, Illinois. In addition to the tour of the manufacturing facilities for diesel locomotives, guests will be given a demonstration of the Electro-Motive mobile Diesel-electric generating units called Electro-Mobile Power. The units are designed to boost power in fringe areas of utility systems and to meet peak load demands.

Tuesday Afternoon: A tour to three of the Chicagoland area's most modern shopping centers will provide a look at the latest electrical service facilities for this type of application. The shopping centers are the Hillsdale Shopping Center, Old Orchard Shopping Center and Cermak-Plaza Shopping Center.

Tuesday Afternoon: At this time Commonwealth Edison will display how they use an electronic computer in preparing nearly 12,000,000 bills annually—approximately 50,000 each day.

Wednesday Morning: A tour of the Argonne National Laboratories features a look at the Atomic Experimental Boiling Reactor officially dedicated and put "on stream" a few months ago.

Wednesday Afternoon: Will County Generating Station is the newest generating plant of Commonwealth Edison Company and is the subject for the Wednesday afternoon tour. Located on the Chicago Sanitary and Ship Canal, the station's first two—each of 160,000 kw net capability—were placed in operation in 1955. The third, a 260,000 kw net capability, was placed in commercial operation in June of this year. The station can now generate enough electricity to adequately supply a city of 800,000 people.

Thursday Morning: Automatic Electric Company has just moved into its new 1,520,000 square foot manufacturing plant in suburban Northlake and the Thursday morning trip will be made through this plant.

Thursday Afternoon: Thursday afternoon's tour will be to the Chicago plant of the Youngstown Sheet and Tube Company to view the processes of making steel.

Friday Morning: The final tour of the Fall Meeting will be to the new headquarters and broadcasting facilities for the Columbia Broadcasting System in Chicago. The new facilities are in a building which formerly housed an ice skating arena but which was completely transformed for its broadcasting duties.

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COMMITTEE MEETINGS

Monday, October 7

- 9:00 a.m.—Public RelationsRoom 526
- 9:00 a.m.—Excitation Systems SubcommitteeRoom 628
- 9:00 a.m.—Special PublicationsRoom 528
- 9:00 a.m.—Stray Load Loss Working GroupRoom 530
- 9:00 a.m.—System Planning SubcommitteeRoom 630
- 12:00 noon—Luncheon—AIEE Medal in Electrical
Engineering EducationSuite 440
- 12:00 noon—Luncheon—Nucleonic & Radiation
InstrumentsRoom 532
- 2:00 p.m.—General SessionBallroom
- 4:00 p.m.—Student Branches AdvisoryRoom 526

Tuesday, October 8

- 9:00 a.m.—Publications DepartmentRoom 526
- 9:00 a.m.—Power GenerationClark Room
- 9:00 a.m.—EducationRoom 634
- 9:00 a.m.—ResearchRoom 528
- 9:00 a.m.—SafetyRoom 530
- 9:00 a.m.—Metallic RectifiersRoom 630
- 9:00 a.m.—Electrical Systems for Commercial Bldgs.Room 532
- 9:00 a.m.—District #5 ExecutiveSuite 440
- 10:00 a.m.—Electronic & High Frequency Instruments....Room 628
- 12:00 noon—Luncheon—Induction Machinery
SubcommitteeRoom 534
- 2:00 p.m.—Computer Application SubcommitteeClark Room
- 2:00 p.m.—Power Division
- 2:00 p.m.—System Operation SubcommitteeRoom 626
- 2:00 p.m.—System Economics SubcommitteeRoom 528
- 2:00 p.m.—Metallic RectifiersRoom 630
- 2:00 p.m.—Telegraph SystemsRoom 530
- 2:00 p.m.—MembershipRoom 632
- 2:00 p.m.—System Controls SubcommitteeRoom 526
- 2:00 p.m.—Industrial Power SystemsRoom 532
- 2:00 p.m.—District #5 ExecutiveSuite 440
- 2:00 p.m.—ManagementRoom 628
- 3:00 p.m.—Communication TheoryRoom 634
- 4:00 p.m.—System EngineeringClark Room

Wednesday, October 9

- 9:00 a.m.—Land TransportationRoom 526
- 9:00 a.m.—Administration DepartmentRoom 530
- 9:00 a.m.—General Applications DivisionRoom 532
- 9:00 a.m.—AIEE Grounding Guides #954 Working
GroupRoom 534
- 9:00 a.m.—Television & Aural Broadcasting Systems....Room 536
- 9:00 a.m.—Industry DivisionRoom 626
- 9:00 a.m.—Single Phase & FHP Machinery
SubcommitteeRoom 628
- 12:00 noon—Luncheon—Computing DevicesRoom 526
- 12:00 noon—Luncheon—Single Phase & FHP Machinery
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- 12:00 noon—Luncheon—Communication DivisionRoom 532
- 2:00 p.m.—Administration DepartmentRoom 530
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- 2:00 p.m.—Dielectric Devices SubcommitteeRoom 534
- 2:00 p.m.—Science and Electronics DivisionRoom 630
- 2:30 p.m.—TOD Representatives & Technical Activities..Room 632
- 4:00 p.m.—Rotating Machines Insulation Working
GroupRoom 628
- 5:00 p.m.—Distribution Substation SubcommitteeRoom 528
- 6:30 p.m.—Dinner—Pulse Transformer Working Group..Suite 440

Thursday, October 10

- 9:00 a.m.—Vice-President's ConferenceSuite 440
- 9:00 a.m.—Technical Operations DepartmentParlor C
- 9:00 a.m.—R. M. Insulation SubcommitteeRoom 530
- 9:00 a.m.—Professional Development & Recognition Dept..Room 528
- 12:00 noon—R. M. Administrative SubcommitteeRoom 632
- 2:00 p.m.—Vice-President's ConferenceSuite 440
- 2:00 p.m.—Joint Division Committee on Automation
TechniquesRoom 630
- 2:00 p.m.—General Industry ApplicationsRoom 628
- 2:00 p.m.—Planning and Coordination Committee.....Room 626
- 2:00 p.m.—Edison Medal CommitteeRoom 526
- 2:00 p.m.—Electronics Transformers SubcommitteeRoom 528
- 4:00 p.m.—Communication Switching SystemsRoom 530
- 4:00 p.m.—Wire Communications SystemsRoom 532
- 4:00 p.m.—Radio Communications SystemsRoom 534
- 5:00 p.m.—Power Transformer & Inductor W. G.Room 626
- 7:30 p.m.—Forum of Technical Committee Chairmen
Hollywood Room

Friday, October 11

- 9:00 a.m.—Board of DirectorsSuite 440
- 9:00 a.m.—Industrial ControlRoom 528
- 12:00 noon—Luncheon—Board of DirectorsSuite 440
- 2:00 p.m.—Board of DirectorsSuite 440
- 2:00 p.m.—Switching Surges Working GroupRoom 528

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MEMORANDUM

LOCATION OF ALL MEETING ROOMS

Basement Level	Cub Room
Lower Level	Terrace Casino
Street Level	Hotel Lobby
Mezzanine Floor	Burgundy Room Cotillion Room Embassy Room Hollywood Room
First Floor	Ballroom Parlor B, C, D
Second Floor	Venetian Room Parlor E, F, G Walnut Room
Third Floor	Clark Room Madison Room
Fourth Floor	Room 427 Suite 440
Fifth Floor	Rooms 526 to 534
Sixth Floor	Rooms 626 to 634