

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS



**FALL**  
**GENERAL MEETING**

**Program**

*Please retain for use during  
entire meeting*

**MORRISON HOTEL**  
**CHICAGO, ILLINOIS**  
**OCTOBER 9 - 14, 1960**

## GENERAL INFORMATION

For the sixth year, the Fall General Meeting of the AIEE is being held in Chicago. The Meeting Headquarters is again the Morrison Hotel. The social activities, technical sessions and committee meetings occupy the entire facilities of the Morrison during the five day meeting.

At the General Session to be held on Monday afternoon, October 10, the Institute's Medal for outstanding service in Electrical Engineering Education will be awarded to Dr. Ernst Weber, President, Polytechnic Institute of Brooklyn and the presentation of the William M. Habirshaw award to Selden B. Cray, System Analysis Engineer, Electric Utility Engineering Section, General Electric Company. In addition, the Morris E. Leeds award to Perry A. Borden, Associate Professor of Electrical Engineering, University of Dayton and The David Sarnoff award to Rudolf Kompfner, Director of Electronics and Radio Research, Bell Telephone Laboratories, Inc., will be made. W. T. Larner, Chairman, The Chicago Section and F. W. Bush, Vice President, The Fifth District, will give the welcoming address. A Report by President C. H. Linder will follow the principal address by Dr. Ernst Weber, President of Polytechnic Institute of Brooklyn.

**Registration Fees Required.** Registration is joint with the National Electronics Conference this year. Those registering for the AIEE may also register for the NEC, if requested at the time of registration, without payment of additional fee. Those registering at NEC may also register for AIEE by payment of difference in registration fee. Registration Fees are \$6.00 for members and \$10.00 for nonmembers. Wives and women guests of members and nonmember registrants are paying a registration fee of \$2.00. Students, children and invited nonmember authors register without 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 28, 1960. 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 \$.50 each (\$1.00 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, New York. 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, OCT. 9

- 4:00 p.m. Welcome Tea
- Registration Begins

#### MONDAY, OCT. 10

- 9:00 a.m. Ladies' Coffee Hour
- 10:00 a.m. Insulated Conductors  
Linear Control Systems  
Data Transmission
- 2:00 p.m. General Session  
Data Transmission

#### TUESDAY, OCT. 11

- 9:00 a.m. Trip to Commonwealth Edison Company  
Combinational Logic  
Power Generation  
Substations  
Relays  
Non Linear Control Systems  
Data Communications  
Management Planning Aspects of Future Man Power Shortages  
Industrial and Commercial Power Systems
- 10:00 a.m. Ladies' Shopping Tour and Luncheon
- 2:00 p.m. Trip to Cook Technological Center  
Suggested Computer Symbols and Notations  
Semiconductor Rectifying Devices and Inverters — I  
Power Generation  
Supervisory Systems  
Protective Devices  
Discrete Data Control Systems  
Industrial & Commercial Power Systems

#### WEDNESDAY, OCT. 12

- 8:30 a.m. Trip to Acme Steel Company
- 9:00 a.m. Introduction to Sequential Logic  
Semiconductor Rectifying Devices & Inverters — II  
Communication Switching I  
Substations Symposium  
Radio Communication Systems  
Wire Communications
- 11:00 a.m. Ladies' Fashion Show and Brunch
- 1:00 p.m. Trip to Motorola, Inc.

**WEDNESDAY, OCT. 12**

- 2:00 p.m.** Sequential Logic  
Radio Communication Systems  
Substations  
Rotating Machinery  
Wire & Data Communication
- 2:30 p.m.** Trip to Commonwealth Edison IBM and Dispatch
- 6:00 p.m.** Fall Frolics

**THURSDAY, OCT. 13**

- 9:00 a.m.** Computer Application to Power System Engineering  
Switchgear & Substations  
Rotating Machinery  
Industrial Control  
Solid State Devices  
Communication Switching II  
Automation in Electric Power Systems
- 9:30 a.m.** Trip to Illinois Bell Systems #2 Toll Office
- 12:00 Noon** Ladies' Surprise Luncheon
- 1:00 p.m.** Trip to Argonne Research Reactor CP-5
- 1:30 p.m.** Trip to Sun Times Building
- 2:00 p.m.** Transmission, Distribution & Substations  
Basic Sciences  
Economics of System Planning & Operation  
Rotating Machinery  
Communication Switching III  
Digital Computer Techniques

**FRIDAY, OCT. 14**

- 9:00 a.m.** Electric Circuit Theory  
Transmission & Distribution  
Transformers  
Mining Industry  
Logical Design of Digital Computers  
Economics of Peaking Sources
- 2:00 p.m.** Electric Circuit Theory  
Transformers  
Mining Industry  
Analog & Simulation Techniques  
Penelec 460 KV Prototype Line

**Monday, October 10**

**10:00 a.m.—Insulated Conductors**

Cotillion Room  
Chairman: E. MERRELL, Phelps Dodge Copper Products Corp.  
INSULATED CONDUCTORS COMMITTEE

- 60-1219. Development of a Continuous Extrusion Machine for Sheathing Cable with Lead Alloys. S. F. Radtke, Lead Industries Asso.; C. J. Snyder, Anaconda Wire and Cable Co.; C. C. Childress, John Robertson Co., Inc.
- 60-1220. Calculation of Steady-State and Transient Ratings of Electric Wire. R. W. Stineman, G. W. McIntyre; Boeing Airplane Co.

**10:00 a.m.—Data Transmission**

Scheduled at the National Electronics Conference  
Hotel Sherman  
Chairman: H. SHERMAN, Massachusetts Institute of Technology  
COMMUNICATION THEORY COMMITTEE

- CP.\* Modulation and Signal Selection for Digital Communication. R. M. Lerner, Massachusetts Inst. of Technology.
- CP.\* Binary Codes for Error Control. W. W. Peterson, Massachusetts Inst. of Technology.
- CP.\* Notes on the Transmission of Data at 740 Bauds Over Practical Circuits. P. A. Chittenden, Signals Research and Development Establishment, United Kingdom.
- CP.\* Data Transmission Performance on Long-Haul Telephone Facilities. P. V. Dimock, Bell Telephone Labs., Inc.
- CP.\* Comandor Effects on Data Signals. E. Enriquez, Hughes Aircraft Co.
- CP.\* The Testing of Digital Data Transmission Channels and Circuits. R. G. Enticknap, Massachusetts Inst. of Technology.
- CP.\* Measured Error Distributions on Bell A-1 Facility Over Various Media. E. J. Hofman, Massachusetts Inst. of Technology.

**10:00 a.m.—Linear Control Systems**

Grand Ballroom  
Chairman: F. C. WEIMER, Ohio State University  
FEEDBACK CONTROL SYSTEMS COMMITTEE

- 60-1186. An Automatic Root Locus Plotter Using an Analog Computer. F. E. Liethen, USAF; C. H. Houppis, J. J. D'Azzo, Air Force Inst. of Technology.
- 60-1187. A Direct Method of Compensating Linear Feedback Systems. F. Mariotti, Hewlett-Packard Co.
- 60-1237. A Graphical Approach to Motors Time Response. J. Miro, II Case Inst. of Technology.
- 60-864. Application of Silicon Controlled Rectifiers in a Transistorized High-Response D-C Servo System. C. Cantor, U. S. Naval Weapons Plant (Re-presented for Discussion only).
- 60-258. Investigation of the Relative Merits of the Transient Speed Performance of Tachometer-Regulated and of Voltage-Regulated D.C. Drives for Both Compensated and Uncompensated Motors. H. L. Steinmetz, Allis-Chalmers Mfg. Co.; T. J. Higgins, University of Wisconsin (Re-presented for Discussion only).

MONDAY (continued)

2:00 p.m.—General Session

Grand Ballroom  
L. E. RANDALL, General Chairman, Presiding

Welcome: W. T. LARNER, Chairman, The Chicago Section  
F. W. BUSH, Vice President, The Fifth District

"Profession, Society and Engineering Education,"

Dr. Ernst Weber, President, Polytechnic Institute of Brooklyn

Address: President C. H. LINDER

Awards Presentation: S. REID WARREN, JR., Chairman  
Recognition Awards Committee

1. MEDAL IN ELECTRICAL ENGINEERING EDUCATION—  
Dr. Ernst Weber, President, Polytechnic Institute of Brooklyn.

2. WILLIAM M. HABIRSHAW AWARD—Selden B. Crary, System Analysis Engineer, Electric Utility Engineering Section, General Electric Company.

3. MORRIS E. LEEDS AWARD—Perry A. Borden, Associate Professor of Electrical Engineering, University of Dayton.

4. THE DAVID SARNOFF AWARD—Rudolf Kompfner, Director of Electronics and Radio Research, Bell Telephone Laboratories, Inc.

5. FIRST AWARD OF THE MERVIN J. KELLY AWARD—  
Dr. Mervin J. Kelly, retired Chairman of the Board, Bell Telephone Laboratories, Inc.

Dr. Kelly will receive his award at the 1961 Winter General Meeting because of his anticipated absence from the United States.

2:00 p.m.—Data Transmission

Scheduled at the National Electronics Conference

Hotel Sherman  
Chairman: H. SHERMAN, Massachusetts Institute of Technology  
COMMUNICATION THEORY COMMITTEE

CP.\* The Design of Data Transmission Systems. R. G. Enticknap, R. M. Lerner; Massachusetts Inst. of Technology.

CP.\* Model of Error-Burst Structure in Data Transmission. P. Mertz, Consultant to the RAND Corp. and Lincoln Laboratory.

CP.\* Coded Feedback Communication Systems. J. J. Metzner, K. C. Morgan; New York Univ.

CP.\* A High Capacity Data Transmission System for Conveying up to 5400 Bit/Sec Over Private Line, Voice Frequency Telephone Facilities. F. Morioka, A. Garabedian, Collins Radio Co.; D. Doubleday, Rome Air Development Center.

CP.\* Applications of Redundant Codes to a Digital Communication System. R. Lal Sharma, Collins Radio Corp.

CP.\* Transmission Frequency Characteristics of Sample Telephone Circuits. N. N. Ulguray, Hughes Aircraft Co.

CP.\* Some Results in the Measurement of Impulse Noise on Several Telephone Circuits. H. L. Yudkin, Massachusetts Inst. of Technology.

## Tuesday, October 11

9:00 a.m.—Combinational Logic

Hotel Sherman  
Chairman: E. J. SCHUBERT, Monitor Systems, Inc.  
COMPUTING DEVICES COMMITTEE

60-1199. Switching Function Canonical Forms Based on Commutative and Associative Binary Operations. P. Calingaert, Harvard Computation Lab.

TUESDAY (continued)

CP.\* Some Methods for Simplifying Switching Circuits Using Don't Care Conditions. J. T. Chu, Radio Corp. of America.

CP60-1223. Minimization of Multiple-Output Switching Circuits. R. B. Polansky, Massachusetts Inst. of Technology.

CP.\* Truth Functions Realizable by Single Threshold Organs. C. C. Elgot, IBM Corp.

CP60-1261. Single Stage Threshold Logic. R. O. Winder, RCA Labs.

59-1123. An Algorithm for Determining Minimal Normal Forms of an Incomplete Truth Function. T. H. Mott, Jr., RCA Labs.

59-1191. Algorithms for Logical Design. A. E. Randlev, J. P. Roth, I. E. G. Wagner; IBM Research Center.

9:00 a.m.—Power Generation

Cottillion Room  
Chairman: B. G. A. SKROTZKI, Power Magazine  
POWER GENERATION COMMITTEE

CP.\* Thermionic Power Generation. J. Coltman, Westinghouse Research Labs.

CP.\* Fuel Cell Developments. J. N. Platner, Allis-Chalmers Mfg. Co.

CP.\* Possibilities for Magneto-hydrodynamic Power Generation. R. J. Rosa, Avco-Everett Research Lab.

9:00 a.m.—Substations

Venetian Room  
Chairman: H. FOSSUM, Pioneer Service & Engineering  
SUBSTATIONS COMMITTEE

CP60-1227. Cylindrical Cast-In-Place Foundations for Substations. C. B. Shell, Ohio Edison Co.; R. C. Adler, Commonwealth Associates, Inc.

CP.\* Standardization of Transformer Foundation Designs. A. H. Tiermann, Jr., Virginia Electric and Power Co.

CP.\* Planning and Design of Distribution Substations for Load Densities of 20 to 30 MW per Square Mile. R. M. McCuis-tion, E. F. Wilson, J. M. McReynolds; Houston Lighting and Power Co.

9:00 a.m.—Relays

Clark Room  
Chairman: L. F. FERRI, Commonwealth Associates, Inc.  
RELAYS COMMITTEE

60-1238. Protective Relaying Systems Using Pilot-Wire Channels. III H. W. Lensner, Westinghouse Electric Corp.

CP60-1247. Coaxial Cable for Protective Relaying Communications. J. R. Linders, The Cleveland Electric Illuminating Co.

60-1267. A Relay Designed to Meet Automatic Reclosing Requirements of Ring Bus Substations. L. A. Davidson, V. M. Hines; Oklahoma Gas and Electric Co.

CP60-1274. Protection of Multiterminal and Tapped Lines. W.G. Report, Line Relay Protection Subcommittee of AIEE Relay Committee, H. P. Sleeper, Chairman.

CP60-1281. Distribution Circuit Protection Idaho Power Company. M. E. Byrne, J. N. Haroian, Idaho Power Co.

9:00 a.m.—Non Linear Control Systems

Hollywood Room  
Chairman: J. GIBSON, Purdue University  
FEEDBACK CONTROL SYSTEMS COMMITTEE

CP.\* Self-Adaptive Systems for Automatic Control of Dynamic Performance by Controlling Gain, Phase Shift, Gain Margin, Phase Margin, or Slope. G. Vasu, National Aeronautics and Space Administration.

**TUESDAY (continued)**

- CP.\* A Linear Switching Condition for Third Order Positive-Negative Feedback Control Systems. S. J. Garrett, Westinghouse Electric Corp.
- CP60-1239. Saturated Instrument Servos with Discontinuous Damping. K. W. Han, G. J. Thaler; U. S. Naval Postgraduate School.
- 60-1266. Optimum Nonlinear Bang-Bang Control Systems with Complex Roots—Part I, System Synthesis. P. Chandaket, Royal Thai Navy; C. T. Leondes, University of California.

**9:00 a.m.—Data Communications**

Promenade Room

Chairman: R. M. GRYB, Bell Telephone Labs.

DATA COMMUNICATION COMMITTEE

- CP60-1221. A Quaternary Frequency-Shift Data Transmission Subset. N. A. Zellmer, Lenkurt Electric Co.
- CP.\* An Experimental Four Phase Transmission Modem. L. A. Weber, Bell Telephone Labs., Inc.
- CP.\* Digital Data Transmission Test Sets. F. K. Becker, Bell Telephone Labs., Inc.
- CP.\* A 1600 Bit/Sec Data Terminal for the Switched Telephone Network. C. W. Carter, (Retired) formerly with Bell Telephone Labs., Inc., S. Brand (Deceased) formerly with Bell Telephone Labs., Inc. and Lockheed Electronics.
- 60-790. "Datacom" Unit—An Experimental Data Transmission Subset. I. R. E. Stoeffels, Automatic Electric Labs., Inc. (Re-presented for Discussion only).
- CP.\* Punched Card Transmission on Telegraph Switching Systems. R. Steeneck, Western Union Tel. Co.

**9:00 a.m.—Management Planning Aspects of Future Man Power Shortages**

Exhibit North

Chairman: R. W. McFALL, Litton Industries

MANAGEMENT COMMITTEE

- CP.\* The Next Hundred Years. J. R. Weir, California Inst. of Technology.
- CP.\* Immediate Problem and Suggested Solutions. S. B. Ingram, Bell Telephone Labs., Inc.

**9:00 a.m.—Industrial & Commercial Power Systems**

Exhibit Center

Chairman: L. DOLKART, Consulting Electrical Engineer

INDUSTRIAL & COMMERCIAL POWER SYSTEMS COMMITTEE

- 58-1258. Characteristics of an Electric Resistance Furnace Load. II. W. A. Stelzer, The Dow Chemical Co.
- 60-1182. A-C System Voltage Nomenclature for Industrial and Commercial Power Systems. AIEE System Voltage Nomenclature W.G. of the Codes and Standards Subcommittee of the Industrial and Commercial Power Systems Com., D. S. Brereton, Chairman.
- CP.\* Growing Electrical Pains in a Rapidly Expanding Chemical Plant. R. B. Russell, Westinghouse Electric Corp.; D. C. Richardson, S. A. Berry, U. S. Industrial Chemical Co.

**2:00 p.m.—Suggested Computer Symbols and Notations**

Hotel Sherman

Chairman: T. H. MOTT, JR., R.C.A. Laboratories

COMPUTING DEVICES COMMITTEE

- 60-1224. Proposed Symbolology for Digital Systems. AIEE Report I Prepared by an Ad Hoc Group of the Subcommittee Logic and Switching Circuit Theory, T. H. Mott, Jr., Chairman.

**TUESDAY (continued)**

- CP60-1225. A Dictionary of Switching Theory Terms: Preliminary Draft. AIEE Report Prepared by an Ad Hoc Group of the Subcommittee Logic and Switching Theory, T. H. Mott, Jr., Chairman.

**2:00 p.m.—Semiconductor Rectifying Devices & Inverters—I**

Promenade Room

Chairman: H. P. WEIRICH, Fansteel Metallurgical Corp.

SEMICONDUCTOR RECTIFIERS COMMITTEE

- CP.\* High Voltage, High Current Silicon Transistors. C. Carroll, R. Roth, J. Steiner, Westinghouse Electric Corp.
- CP.\* The Application of Silicon High Power Transistors in Inverter Circuits. T. E. Ebert, Westinghouse Electric Corp.
- CP.\* 100 Ampere Silicon "Trinistor" Controlled Rectifier. T. C. New, E. W. Torok, J. Krawczykiewicz, R. Kuehn, Westinghouse Electric Corp.
- CP60-1278. Turn-Off Considerations for the Design of a High-Power Inverter Circuit Using the SCR. E. C. Olson, Power Equipment Co.
- CP.\* Commutation and Destructive Oscillations in Diode Circuits. I. Somos, General Electric Co.

**2:00 p.m.—Power Generation**

Cotillion Room

Chairman: E. G. A. SKROTZKI, Power Magazine

POWER GENERATION COMMITTEE

- CP.\* Power Generation and Cooling with Thermoelectric Materials. F. W. Rosi, RCA Labs.
- CP.\* Power from Nuclear Reactions. J. J. Grebe, The Dow Chemical Co.
- CP.\* The Development of "Income" Sources of Power. P. E. Benner, J. B. McClure, A. G. Mellor, General Electric Co.

**2:00 p.m.—Supervisory Systems**

Venetian Room

Chairman: J. O. NOEL, Illinois Power Co.

SUBSTATIONS, TELEMETERING AND POWER GENERATION COMMITTEES

- CP60-1233. Factors in the Design and Application of Digital Telemetering. E. W. Head, Control Corp.
- CP60-1234. A New Solid State Supervisory System. G. E. Guy, P. W. Schirmer; General Electric Co.
- CP.\* Supervisory and Telemetering Equipment for the Laurel Pipeline. K. E. Willson, Laurel Pipeline Co.; P. W. Schirmer, H. N. Hickock, P. D. Woodruff, General Electric Co.
- 60-1235. Remote Control of Cooling Tower Fans. R. J. Davis, Black III & Veatch (Re-presented for Discussion only).

**2:00 p.m.—Protective Devices**

Clark Room

Chairman: H. O. STOELTING, Line Material Industries

PROTECTIVE DEVICES COMMITTEE

- 60-1193. A Surge Impedance Analogue of a Large Generating Plant III Switchyard. H. R. Armstrong, B. D. Miller; The Detroit Edison Co.
- CP.\* Lightning Protection in Multi-Line Stations. W. G. of AIEE Lightning Protective Devices Subcommittee, W. S. Price, Chairman.

TUESDAY (continued)

- CP60-1262. Preliminary Report on System Classification and Voltage Rating Investigation for Application of Distribution-Type Lightning Arresters. AIEE W.G. of Lightning Protective Devices Subcommittee, W. S. Price, Chairman.
- CP60-1277. A Proposal to Use the Concept of the Coefficient of System Grounding in AIEE Standards. G. D. Breuer, General Electric Co.
- CP60-1275. Thermal Ratings and Temperature Limits for Neutral Grounding Devices. J. C. Russ, General Electric Co.

2:00 p.m.—Discrete Data Control Systems

Hollywood Room

Chairman: J. E. BERTRAM, International Business Machines Corp. 33

FEEDBACK CONTROL SYSTEMS COMMITTEE

- 60-1240. Statistical Analysis of Amplitude-Quantized Sampled-Data II Systems. B. Widrow, Stanford University.
- 60-1242. Optimum Linear Filtering of Signals Prior to Sampling. II P. M. DeRusso, Rensselaer Polytechnic Inst.
- 60-1243. Optimum Transmission of Continuous Signal Over a II Sampled Data Link. S.S.L. Chang, New York University.
- CP60-1241. Transient Response with Sampled-Data Control Systems by Use of a Sampling Time Locus. D. S. Childress, G. V. Lago, L. M. Benningfield; University of Missouri.

2:00 p.m.—Industrial & Commercial Power Systems

Exhibit Center

Chairman: C. B. STOUGHTON, Aluminum Co. of America

INDUSTRIAL & COMMERCIAL POWER SYSTEMS COMMITTEE

- CP.\* Critical Process Synchronous Motor Drives and Their Power Supply. F. P. Brightman, General Electric Co.
- CP60-1245. Application Experience with Cable Having Corrugated Metal Sheaths. W. K. Freeman, P. H. Ware, Simplex Wire and Cable Co.
- CP.\* Industrial Wiring Systems Incorporating Troughs, Trays and Ladders. L. H. Selden, Rome Cable Corp.

Wednesday, October 12

9:00 a.m.—Introduction to Sequential Logic

Venetian Room

Chairman: T. C. BARTEE, Massachusetts Institute of Technology

COMPUTING DEVICES COMMITTEE

- CP.\* Introduction to Sequential Circuits. I. S. Reed, Rand Corp.
- CP.\* Introduction to State Diagrams and Tables. E. J. McCluskey, Princeton University.
- CP.\* Derivation of Completely and Partially Specified State Tables. J. P. Runyon, Bell Telephone Labs., Inc.
- CP.\* Simplification of State Tables. S. H. Unger, Bell Telephone Labs., Inc.
- CP.\* Circuit Synthesis from State Tables. M. Phister, Jr., Thompson-Ramo-Wooldridge.

9:00 a.m.—Semiconductor Rectifying Devices & Inverters—II

Exhibit North

Chairman: L. W. BURTON, General Electric Co. 86

SEMICONDUCTOR RECTIFIERS COMMITTEE

- CP60-1276. Design Considerations for the Transistor Saturable Current Transformer Amplifier (Morgan Circuit). S. P. Jackson, Power Equipment Co.

WEDNESDAY (continued)

- CP.\* A Silicon Controlled Rectifier with Improved Commutation. W. McMurray, D. P. Shattuck; General Electric Co.
- CP.\* A Controlled Rectifier Static Inverter for Intermittent Aircraft Duty. P. D. Corey, A. L. Wellford; General Electric Co.
- CP60-1293. The SCR as a Building Block in Power Conversion Systems. J. L. Fink, T. W. Macie, General Electric Co.
- 60-211. Effective Value of Direct Voltage Ripple. E. J. Diebold, I Perkin Engineering Corp. (Re-presented for Discussion only).
- 60-69. Power Semiconductor Ratings Under Transient and Intermittent Loads. F. W. Gutzwiller, T. P. Sylvan; General Electric Co. (Re-presented for Discussion only).
- 60-68. Transient Thermal Impedance of Semi-Conductor Devices. I E. J. Diebold, W. Luft; International Rectifier Corp. (Re-presented for Discussion only).

9:00 a.m.—Communication Switching I

Illinois Bell Telephone Building, Morris, Illinois

(See Inspection Trip)

Chairman: W. KEISTER, Bell Telephone Laboratories

COMMUNICATION SWITCHING SYSTEMS COMMITTEE

- CP.\* Field Trial of an Experimental Electronic Telephone Switching System. A. E. Joel, W. B. Quirk; Bell Telephone Labs., Inc.
- CP.\* Equipment Design for an Electronic Telephone System. D. C. Kochler, Bell Telephone Labs., Inc.
- CP.\* A Gas-Tube Space Division Network for an Electronic Telephone System. K. S. Dunlap, R. L. Simms; Bell Telephone Labs., Inc.
- CP.\* Logic Design and Programming an Electronic Telephone System. J. A. Harr, R. B. Smith; Bell Telephone Labs., Inc.
- CP.\* A 2.2 Megabit Photographic Store for an Electronic Telephone System. T. S. Greenwood, Bell Telephone Labs., Inc.
- CP.\* A 16,000 Bit Temporary Memory for an Electronic Telephone System. J. E. Mack and R. M. Genke, Bell Telephone Labs., Inc.
- CP.\* Maintenance and Administration Methods in an Electronic Telephone System. W. Ulrich, Bell Telephone Labs., Inc.
- CP.\* Power Supply and Distribution for an Electronic Telephone System. D. H. Smith, Bell Telephone Labs., Inc.

9:00 a.m.—Symposium on "Use of Reclosers in Distribution Substations"

Cotillion Room

Chairman: L. M. OLMSTEAD, Electrical World

SUBSTATIONS COMMITTEE

- CP.\* R. B. Bailey, Southern Services Inc. 60-1295
- CP.\* W. L. Carey, Portland General Electric Co., 60-1299
- CP.\* R. W. Flugum, Westinghouse Electric Corp. 60-1316
- CP.\* D. W. Gant, Commonwealth Edison Co. 60-1317
- CP.\* R. W. Jenkins, Baltimore Gas & Electric Co. 60-1331
- CP.\* L. F. Martin, Union Electric Co. 60-1342

9:00 a.m.—Radio Communication Systems

Hollywood Room

Chairman: P. T. SPROUL, Bell Telephone Labs.

RADIO COMMUNICATION SYSTEMS COMMITTEE

- 60-1248. Interstitial Channels for Doubling TD-2 Radio System Capacity. H. E. Curtis, T. R. D. Collins, Bell Telephone Labs., Inc.; B. C. Jamison, American Tel. & Tel. Co.
- 60-1207. The 57-A Microwave Path Protection System. D. H. Hesselgrave, M. H. Kebby; Lenkurt Electric Co., Inc.

**WEDNESDAY (continued)**

- CP.\* Transmissions of Radar Data Over Microwave Relay Facilities. P. Hertel, Jr., Collins Radio Co.  
 CP.\* A Microwave Radio Relay Link for High Definition Radar. F. H. Stelter, J. Sedik, Raytheon Co.

**9:00 a.m.—Wire Communications**

Promenade Room

Chairman: O. G. SMITH, Illinois Bell Telephone Co.

**WIRE COMMUNICATION SYSTEMS COMMITTEE**

- CP.\* The Subscriber Loop Bridge Lifting Problem and Some Methods of Solution. L. Hochgraf, Bell Telephone Labs., Inc.  
 CP.\* Exchange Plant Transmission Maintenance. I. M. Ellestad, Northwestern Bell Telephone Co.  
 CP60-1250. A Speakerphone System for Large Conference Rooms. L. R. Huggler, The Bell Telephone Co. of Penna.  
 CP60-1279. Transistor Control of Vacuum Tube Speakerphone Circuits. F. S. Ingraham, Michigan Bell Telephone Co.

**2:00 p.m.—Sequential Logic**

Venetian Room

Chairman: J. P. RUNYON, Bell Telephone Labs.

**COMPUTING DEVICES COMMITTEE**

- CP.\* Boolean Matrices Applied to Sequential Circuit Theory and Threshold Logics. R. S. Ledley, George Washington University.  
 CP60-1272. A Method for Factoring the Action of Asynchronous Circuits. W. D. Frazer, D. E. Muller, University of Illinois.  
 60-1211. Assignment of Carry-Variables in Iterative Networks. E. J. McCluskey, Princeton University.  
 CP60-1226. E-Algebras in Switching Theory. W. Semon, Harvard University.  
 CP.\* The Decision and Synthesis Problems in Semi-Modular Switching Theory. J. H. Shelly, IBM Corp.

**2:00 p.m.—Radio Communication Systems**

Hollywood Room

Chairman: C. R. KRAUS, Bell Telephone Co. of Penna.

**RADIO COMMUNICATION SYSTEMS COMMITTEE**

- CP60-1280. Noise Loading Test of A Complete Frequency Division Multiplex Voice Point-to-Point Communication System. L. P. Yeh, Page Communications Engineers, Inc.  
 CP60-1249. An Automatic Communications System for Air Traffic Control. C. V. Barnett, Radio Corp. of America.  
 CP.\* Remote Outage Location by Means of VHF Radio Systems. M. Cooper, Motorola Inc.  
 CP.\* Antenna Matching Unit for H-F Vehicular Whip. J. R. Gruber, G. J. Seward; Avco Corp.

**2:00 p.m.—Substations**

Cotillion Room

Chairman: H. FOSSUM, Pioneer Service and Engineering Company

**SUBSTATIONS COMMITTEE**

**(ROUNDTABLE DISCUSSION)**

**2:00 p.m.—Rotating Machinery**

Clark Room

Chairman: L. C. SCHAEFER, Century Electric Co.

**ROTATING MACHINERY COMMITTEE**

- 60-1254. Auxiliary Winding Design for Split-Phase Motors. L. W. Buchanan, N. Maupin; Westinghouse Electric Corp.

**WEDNESDAY (continued)**

- CP60-1255. Performance Calculations on Phase Converters, Single Phase A-C Drag Cup Tachometer Generators and Single Phase Brakes. P. H. Trickey, Wright Machinery Co.  
 60-1208. Digital Techniques in Commutation Design. H. K. Kesavan, III H. E. Koenig; Michigan State University. (Re-presented for Discussion only).  
 60-1209. A New Criterion for Satisfactory Commutation. H. K. Kesavan, H. E. Koenig; Michigan State University. (Re-presented for Discussion only).  
 60-1256. Computer Design of Capacitor-Start Motor Start Windings. III A. E. Hartman, G. V. Mueller; Robbins & Myers, Inc.

**2:00 p.m.—Wire and Data Communications**

Promenade Room

Chairman: D. E. ZIMMERMAN, G T & E Service Corp.

**WIRE COMMUNICATION SYSTEMS AND DATA COMMUNICATION COMMITTEES**

- 60-1195. Telephone Influence Factor (TIF) and its Measurement. I W. C. Ball, Bell Telephone Labs., Inc.; C. K. Poarch, Edison Electric Inst.  
 60-1251. A Transistorized Cable Carrier Repeater. C. G. Griffith, I Lenkurt Electric Co.  
 CP.\* Standard Data Transmission Tests. F. T. Andrews, Bell Telephone Labs., Inc.  
 CP60-1217. Precision Envelope Delay Measurements at Audio Frequencies. T. M. Stump, Stromberg-Carlson Co.  
 CP60-1252. A Low-Pass Gaussian-Response Filter Design. J. Otterman, International Tel. & Tel. Co.

**Thursday, October 13**

**9:00 a.m.—Computer Application to Power System Engineering**

Cotillion Room

Chairman: J. E. VANNESS, Northwestern University

**SYSTEM ENGINEERING COMMITTEE**

- 60-1214. A Digital Approach to Power System Engineering—I. M. B. III Reed, G. B. Reed, Michigan State University; J. L. McKinley, H. K. Polk, R. V. Hugo, W. J. Martin, Public Service Co. of Colorado.  
 60-1215. A Digital Approach to Power System Engineering—II. M. B. III Reed, G. B. Reed, Michigan State University; J. L. McKinley, H. K. Polk, R. V. Hugo, W. J. Martin, Public Service Co. of Colorado.  
 CP60-1201. Optimized Transmission Tower Spotting on Digital Computer. V. Converti, E. J. Hyland, D. E. Tickle; Arizona Public Service Co.  
 60-1263. Loss Formula Determination by a New Method Which III Locates the Equivalent System Load Point. D. R. Hockman, Consumers Power Co.; A. L. Toalston, D. C. Harker, Commonwealth Associates, Inc.

**9:00 a.m.—Switchgear and Substations**

Venetian Room

Chairman: J. B. OWENS, ITE Circuit Breaker Co.

**SWITCHGEAR & SUBSTATIONS COMMITTEES**

- CP60-1183. A New Automatic High Speed Grounding Switch. K. A. Thallner, I-T-E Circuit Breaker Co.

THURSDAY (continued)

- 60-1213. Power Circuit Breaker Insulation Coordination—The Required Minimum Volt-Time Characteristics for Power Circuit Breakers. O. Naef, American Electric Power Service Corp.; C. E. Asbury, Commonwealth Associates, Inc.
- 60-1189. Proposed AIEE Standard for Low Voltage Cartridge Fuses III 600 Volts or Less. AIEE Low Voltage Cartridge Fuse. W.G. of the Switchgear Committee, J. C. Lebens, Chairman.
- CP60-1236. Line Entrance Gaps for Protection of Substation Insulation. T. F. Watson, Jr., R. Hiatt; Commonwealth Associates, Inc.

9:00 a.m.—Rotating Machinery

Hollywood Room

Chairman: R. F. HORRELL, Electric Machinery Mfg. Co.

ROTATING MACHINERY COMMITTEE

- 60-1191. Saturation Factors for Leakage Reactance of Induction III Motors. P. D. Agarwal, University of Massachusetts; P. L. Alger, Rensselaer Polytechnic Inst.
- 60-1257. Reclosing Transients in Induction Motors with Terminal III Capacitors. F. P. deMello, G. W. Walsh; General Electric Co.
- 60-165. Equivalent Circuits and Performance Calculations of Canned III Motors. P. D. Agarwal, University of Massachusetts. (Represented for Discussion only).
- CP60-1258. Intermittent Duty Motors. S. Noodleman, B. A. Wesche Electric Co.
- CP.\* Direct Temperature Sensing For Motor Overload Protection. W. J. Martiny, General Electric Co.

9:00 a.m.—Industrial Control

Clark Room

Chairman: A. H. MYLES, E. C. & M. Div., Square D Co.

INDUSTRIAL CONTROL COMMITTEE

- CP.\* Electronic Timing and Control Device as Used in Short-Circuit Testing. H. W. Mikulecky, Line Material Industries.
- 60-1204. Design of an Inductive Load for D-C Control Circuit Devices. II C. T. Evans (Retired), (formerly with Cutler-Hammer Inc.) R. Hyink, Cutler-Hammer, Inc.
- DP59-645. Electro-Magnetic Brake with Controllable Torque. C. A. Lister, Square D Co.
- CP60-1244. High Accuracy Speed Control of a Paper Machine. L. R. Hulls, R. Tickell; Remington Rand Univac (Both authors formerly with Canadian Westinghouse Co. Ltd.)

9:00 a.m.—Solid State Devices

Exhibit Center

Chairman: S. K. GHANDHI, Philco Corp.

SOLID STATE DEVICES COMMITTEE

- CP.\* New Microwave Possibilities Using Bulk Semiconductors. H. Jacobs, F. A. Brand, F. A. Meindl, M. Benanti, U. S. Army Signal Research and Development Labs.; R. Benjamin, Monmouth College.
- CP.\* Micro-Alloy Diffused Varactors for Parametric Application. J. Spratt, M. Fortini, N. Hoffman, Philco Corp.
- CP.\* Dynamic Breakdown and Turn-Off Gain in PNP Switches. J. M. Goldey, A. N. Baker, I. M. Mackintosh, I. M. Ross, Bell Telephone Labs.
- CP.\* The Cryosar and Its Applications. R. H. Rediker, A. L. McWhorter, Massachusetts Inst. of Technology.
- CP.\* Gallium Arsenide Transistors. M. E. Jones, E. C. Wurst, Jr., Texas Instruments Co.

THURSDAY (continued)

9:00 a.m.—Communication Switching II

Walnut Room

Chairman: F. D. REESE, Automatic Electric Labs.

COMMUNICATION SWITCHING SYSTEMS COMMITTEE

- CP.\* Design of Basic Circuits for Electronic Switching Systems. A. F. Perkins, Stromberg-Carlson Co.
- CP60-1292. Role of Test Engineer in Assuring Reliability of Electronic Switching Systems. G. A. Power, Stromberg-Carlson Co.
- CP60-1269. Logic Schematic Drawings for Electronic Switching Systems. H. Pitlik, Stromberg-Carlson Co.
- CP.\* A Survey of Methods of Sorting Letters by Machine. M. M. Levy, Levy Associates.

9:00 a.m.—Automation in Electric Power Systems

Promenade Room

Chairman: G. W. BILLS, North American Aviation

COMPUTING DEVICES COMMITTEE

- CP.\* Applications of Automatic Systems to Power Plants. C. Jones, Daystrom Pacific.
- CP.\* Present and Future Automation in the Bonneville Power Administration System. J. P. Jolliffe, Bonneville Power Administration.
- CP.\* Control of Interconnecting Systems. C. Nichols, Leeds and Northrop Co.
- CP.\* The Huntington Beach Automatic Steam Plant. J. Vivian, Southern California Edison Co.

2:00 p.m.—Transmission, Distribution and Substations

Venetian Room

Chairman: R. F. STEVENS, Bonneville Power Administration

SUBSTATIONS AND TRANSMISSION & DISTRIBUTION COMMITTEES

- CP.\* NEAR—A Mass Warning and Signalling System Operating Through the Electric Utility Network. H. L. Stout, Midwest Research Inst.
- CP.\* NEAR System Signal Generators at Substations. R. I. Kopan, Midwest Research Inst.; T. J. Twomey, General Electric Co.
- CP.\* Transmission and Distribution of the NEAR Signal. A. Laudel, Jr., Midwest Research Inst.
- CP60-1284. Project EHV—System Design & North Station Equipment. C. B. Lindh, General Electric Co., and S. H. Law, Western Mass. Electric Co.

2:00 p.m.—Basic Sciences

Exhibit North

Chairman: W. D. ROWE, Westinghouse Electric Corp.

BASIC SCIENCES COMMITTEE

- CP60-1282. Magnetization and Pull Characteristics of Mating Magnetic Reeds. R. L. Peek, Jr., Bell Telephone Labs., Inc.
- CP60-1283. Minimization of Boolean Functions by the Binary Sieve Method. F. B. Hall, Argonne National Lab.
- CP60-1387. The Application of Statistical Quality Control to Meter Testing. C. L. Matz, Commonwealth Edison Co.

2:00 p.m.—Economics of System Planning and Operation

Cotillion Room

Chairman: J. A. SALIN, Ebasco Services, Inc.

SYSTEM ENGINEERING AND POWER GENERATION COMMITTEES

- 60-1194. The Effect of Unit Size, Reliability, and System Service III Quality in Planning Generation Expansion. C. J. Baldwin, C. A. DeSalvo, Westinghouse Electric Corp.; H. D. Limmer, Public Service Electric and Gas Co.



**THURSDAY (continued)**

- 60-1265. Hydro-Thermal Economic Scheduling Computational Experience with Co-ordination Equations. P. L. Dandeno, The Hydro-Electric Power Commission of Ontario. (Re-presented for Discussion only).
- 60-181. Digital Calculation of Three-Phase Short-Circuits by Matrix Method. H. E. Brown, C. E. Person, Commonwealth Edison Co.; L. K. Kirchmayer, General Electric Co.; G. W. Stagg, American Electric Power Service Corp. (Re-presented for Discussion only).
- 60-1185. Application of Probability Methods to Generating Capacity Problems. AIEE Probability Applications W. G., L. K. Kirchmayer, Chairman. (Re-presented for Discussion only).

**2:00 p.m.—Rotating Machinery**

Hollywood Room

Chairman: H. D. SNIVELY, General Electric Co.

**ROTATING MACHINERY COMMITTEE**

- CP60-1202. Simple Equivalent Electric Circuit for Synchronous Motors Under Synchronous Operation. J. F. H. Douglas, J. K. Sedivy, Marquette University.
- 60-1259. Digital Computer Study of the Resynchronizing of a Turbo-Alternator. R. N. Sudan, Cornell University. (Re-presented for Discussion only).
- 60-1196. Some Characteristics of Ionization Under Direct Voltage Stress. B. V. Bhimani, General Electric Co. (Re-presented for Discussion only).
- 60-639. New Contactless Precision DC Hoist Has Wide Speed Range and Torque Control. A. Hansen, J. H. Karlson, R. Mierendorf; The Louis Allis Co.
- CP60-1270. A Brushless D-C Excited A-C Generator Having Inherent Voltage Regulation. K. M. Sparrow, Lima Electric Motor Co., Inc.

**2:00 p.m.—Communication Switching III**

Clark Room

Chairman: H. F. MAY, Bell Telephone Labs.

**COMMUNICATION SWITCHING SYSTEMS COMMITTEE**

- CP.\* General Survey of Direct Distance Dialing. A. E. Ritchie, Bell Telephone Labs., Inc.
- CP.\* The Independents Convert to D.D.D. F. L. Kahn, Automatic Electric Labs.
- 60-1210. The New Nationwide Telephone Numbering Plan. O. Myers, Bell Telephone Labs., Inc.
- CP60-1222. All-Number Calling and World-Wide Dialing. C. M. Conway, American Telephone & Telegraph Co.
- CP.\* Automatic Number Identification. D. H. Pennoyer, Bell Telephone Labs., Inc.
- CP60-1253. Direct Distance Dialing of Telephone Calls in the Panel and No. 1 Crossbar Systems. E. L. Erwin, Bell Telephone Labs., Inc.

**2:00 p.m.—Digital Computer Techniques**

Exhibit Center

Chairman: W. C. CARTER, International Business Machines Corp.

**COMPUTING DEVICES COMMITTEE**

- 60-1184. Teaching the Uses of Digital Computers at the Technical University of Denmark. O. I. Franksen, Rensselaer Polytechnic Inst.
- 60-654. Error Correcting Codes for Correcting Bursts of Errors. J. E. Meggitt, IBM Research Labs. (Re-presented for Discussion only).

**THURSDAY (continued)**

- CP.\* The Design of a High-Speed General Purpose Digital Computer Using Magnetostrictive Lines. M. Palevsky, R. M. Beck, J. Mitchel; Packard Bell Computer Corp.
- 60-1200. Magnetic Memory Drum Design. E. B. Carne, Melpar, Inc.
- CP60-1205. Information Storage and Retrieval Part II—Equipment Applications. A. F. Glimm and R. D. Greenway, General Electric Co.
- CP.\* Optimization of Computer Capability Through Programming and Logical Design. G. H. Smith, Autonetics.

**Friday, October 14**

**9:00 a.m.—Electric Circuit Theory**

Exhibit North

Chairman: T. J. HIGGINS, University of Wisconsin

**BASIC SCIENCES COMMITTEE**

- 60-1285. Quantitative Study of Low Frequency Hysteresis Loops of Polarized Polycrystalline Barium Titanate. G. W. Marks, D. A. Hanna; U. S. Navy Electronics Laboratory.
- CP.\* Subarea Determination of the Capacitance of Closed Circular Cylinder. B. Weinberg, T. J. Higgins; University of Wisconsin.
- 60-1288. On the Response of Linear Systems to Periodic Excitations. W. R. LePage, R. McFee; Syracuse University.
- CP60-1287. Linear Segment Function Generation. I. E. Perlin, J. R. Garrett; Georgia Institute of Technology.

**9:00 a.m.—Transmission and Distribution**

Exhibit Center

Chairman: E. L. KANOUSE, City of L. A., Dept. of Water and Power TRANSMISSION & DISTRIBUTION AND SUBSTATIONS COMMITTEES

- CP60-1198. Concrete Guy Anchor Tests. C. S. Buchholz, General Electric Co.
- CP60-1268. Transmission Line Construction in Lakes. A. V. Price, Ebasco Services, Inc.
- CP60-1273. Effect of Bundle-Conductor Field Influence on EHV Transmission Line Design. R. W. Harmon, Ohio Brass Co.
- 60-1206. Decoupling of Transmission Lines to Radio Influence Voltages. S. B. Griscom, D. F. Shankle, E. R. Taylor, Jr., Westinghouse Electric Corp.; R. H. Schломann, American Electric Power Service Corp.

**9:00 a.m.—Transformers**

Venetian Room

Chairman: C. H. BJORQUIST, Bonneville Power Administration

**TRANSFORMERS COMMITTEE**

- CP60-1197. A Special Control Scheme for Load Tap Changers on a Rectifier Transformer. J. F. Brubaker, C. C. Haley; Westinghouse Electric Corp.
- 60-1246. The Analytical and Graphical Determination of Complete Potential Transformer Characteristics. J. L. Settles, W. R. Farber, E. E. Conner; Westinghouse Electric Corp.
- 60-1190. Thermal Limits of Transformers for Short Circuit Conditions. AIEE W.G. on Methods of Making Temperature Rise Tests, S. Bennon, Chairman.

FRIDAY (continued)

9:00 a.m.—Mining Industry

Hollywood Room

Chairman: R. C. W. CROM, International Mineral and Chemical Corp.  
MINING INDUSTRY COMMITTEE

- CP.\* Design and Application of Synchronous Motors for Torque Limited Ball Mill Drive. H. S. Robinson, D. R. McAllister; Westinghouse Electric Corp.
- CP.\* Wheel Excavator for Open Pit Mines. A. M. Vance, Westinghouse Electric Corp.
- CP.\* Single Versus Dual Voltage Systems in Open Pit Mines. R. T. Taylor, Peabody Coal Co.

9:00 a.m.—Logical Design of Digital Computers

Clark Room

Chairman: T. H. MOTT, JR., R.C.A. Laboratories  
COMPUTING DEVICES COMMITTEE

- CP60-1228. Computer Design Using Index Arithmetic. A. S. Fraenkel, University of California.
- CP.\* A 4-Megacycle, 24-Bit Checked Binary Adder. M. E. Homan, IBM Corp.
- CP.\* Forcing Circuitry-Sequential Building Blocks for Logical Design. R. M. Meade, IBM Corp.
- 60-1188. Current-Operated Diode Logic Gates. H. Reinecke, Jr., Non-Linear Systems, Inc. (Formerly with Massachusetts Inst. of Technology).
- CP60-1229. Logical Design by Regression (Matrix Logic VII). E. J. Schubert, Monitor Systems Inc.
- 60-1181. Universal Modulus (Matrix Logic VI). E. J. Schubert, I Monitor Systems Inc.
- 60-805. Analog and Threshold Building Blocks for Variable-Radix Adders and Other Logic Networks. J. Sklansky, RCA Labs. (Re-presented for Discussion only).

9:00 a.m.—Economics of Peaking Sources

Cottillon Room

Chairman: E. A. CHURCH, Boston Edison Co.  
SYSTEM ENGINEERING & POWER GENERATION COMMITTEES

- CP60-1264. Comparison of Peaking Sources. A. C. Sugden, Long Island Lighting Co.
- CP.\* Economics of Hydro Peak Plants. H. Teekman, Hydro-Electric Power Commission of Ontario.
- CP60-1271. System Economics of Peaking Sources. R. D. Camburn and O. A. Lentz, Commonwealth Associates, Inc.

2:00 p.m.—Electric Circuit Theory

Exhibit North

Chairman: T. J. HIGGINS, University of Wisconsin  
BASIC SCIENCES COMMITTEE

- CP60-1289. A Modified Limiting Nonlinear Theory of Eddy-Current Phenomena in Solid Iron. W. L. Shevel, Jr., IBM Corp.
- CP60-1290. A Method of Calculating Gain and Phase Margins from Pole-Zero Diagrams. F. H. Schlereth, General Electric Co.
- CP60-1291. Z-Transform Techniques for the Analysis of Systems. F. P. deMello, General Electric Co.
- CP.\* History of the Operational and Transform Calculus as Used in Electric Circuit Analysis: Part II. T. J. Higgins, University of Wisconsin.

FRIDAY (continued)

2:00 p.m.—Transformers

Venetian Room

Chairman: C. W. MILLER, Westinghouse Electric Corp.  
TRANSFORMERS COMMITTEE

- 60-1192. Some Aspects of Ground Current Measurements During III Transformer Impulse Tests. L. C. Aicher, Allis-Chalmers Mfg. Co.
- CP.\* Hydro-Mechanical Shunting Networks for Sound Reduction in Transformers. L. R. Toothman, Pennsylvania Transformer Division of the McGraw-Edison Co.

2:00 p.m.—Mining Industry

Hollywood Room

Chairman: V. HENDRICKSON, Pittsburgh and Midway Coal Mining Co.  
MINING INDUSTRY COMMITTEE

- CP60-1260. Design of a Power System for a New A-C Mine. F. G. Hamner, R. B. Bailey, Southern Services Inc.
- CP.\* The Use of Storage Batteries in Underground Mines. E. Harding, Exide Industrial Division.
- CP.\* Trolley Charging of Batteries. R. B. Driesbach, General Electric Co.

2:00 p.m.—Analog and Simulation Techniques

Clark Room

Chairman: G. W. BILLS, North American Aviation Inc.  
COMPUTING DEVICES COMMITTEE

- 60-1203. A New Function Generator. C. W. Eggers and T. W. Sze; I University of Pittsburgh.
- 60-1230. The Analog Solution of Some Functional Analysis Problems. K. K. Graupe, Boeing Airplane Co.
- CP60-1212. Information Presentation Systems. H. G. McGuire, T. L. Stoddard; General Electric Co.
- CP60-1231. System Simulation for Performance Analysis: Reliability, Loads, and Queues. L. P. Farmer, A. F. Glimm, H. P. Lee; General Electric Co.
- CP60-1232. Bibliography on Analog-To-Digital Conversion. M. E. Frank, Thompson-Ramo-Wooldridge Products Co.
- 60-122. A Comparison of Digital Differential Analyzer and General I Purpose Equipment in Guidance Systems. M. M. Dickinson, IBM Corp. (Re-presented for Discussion only).

2:00 p.m.—Penelec 460 KV Prototype Line

Cottillon Room

Chairman: R. W. CASWELL, Commonwealth Edison Co.  
TRANSMISSION AND DISTRIBUTION COMMITTEE

- CP.\* Structures and Towers. C. M. Ferguson, W. R. Cover, P. L. Lumnitzer; Pennsylvania Electric Co.
- CP.\* Models and Field Investigation of Lightning. S. J. Polaski, C. M. Ferguson, Pennsylvania Electric Co.; D. J. Heller, F. A. Fisher, General Electric Co.
- CP.\* Preparatory Radio Influence Study. R. J. Bacha, E. S. Kocsan, Pennsylvania Electric Co.; W. C. Guyker, West Penn Power Company.

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 publication as follows:

- I COMMUNICATION AND ELECTRONICS.
- II APPLICATION AND INDUSTRY.
- III POWER APPARATUS AND SYSTEMS.

**SOCIAL ACTIVITIES**

A **Reception Tea and Hospitality Hour** opens the social activities on Sunday afternoon, October 9 at 4 p.m. The Reception will be held in the Cotillion Room until 6 p.m. The Hospitality Hour is sponsored by the Chicago section, AIEE, for members and their families. Members of the Ladies' Activities Committee are present to welcome the wives.

The **Fall Frolics** is being held on Wednesday, October 12, at the world famous Chez Paree nightclub. Top entertainment is being provided in addition to a good dinner. Taking over the entire nightclub, an exclusive cash bar for AIEE opens at 6 p.m. Dinner will be served at 7:30 p.m. Showtime is 9 p.m. Dinner and the first show will be \$12.50 per person, including all taxes and gratuities. No cover or minimum will be charged for the midnight show.

**LADIES' ACTIVITIES**

Mrs. G. Leslie Welch, and co-chairmen Mrs. Frances Cox and Mrs. Pierre Cassidy have planned a full week of activities for the wives of AIEE members attending the Fall Meeting. A welcoming tea will be given from 4 to 6 p.m. in the Cotillion Room of the Morrison Hotel on **Sunday**, October 9th, for members, their wives and guests. On **Monday**, October 10th, Miss Mary Gordon, Trans-World Airlines, will give a talk in the Promenade Room on world travel. This will be followed by a party featuring a roving caricaturist, and music by Mrs. Edward Schneider.

Chartered busses will take the ladies to Old Orchard Shopping Center on **Tuesday**, October 11th. They may shop and browse before meeting for lunch at the Crabapple, and they will hear a review of a current book by Purdy Meissner.

**Wednesday**, October 12th, includes a showing of early-winter fashions at a brunch to be held high-in-the-sky in the Morrison Hotel's Carousel Room.

After luncheon at the Chicago Athletic Club on **Thursday**, October 13th, the ladies will be treated to a Surprise Program.

Each morning during the Fall General Meeting, **coffee** is served in the Ladies' Headquarters-Hospitality Suite, Rooms 522-524-526 in the Morrison. This suite may be used during the week for cards, tele-viewing and lounging. Registration may be made on Sunday, October 9th, and tickets for each of the activities may be purchased at that time.

**INSPECTION TRIPS**

Many varied and informative trips have been planned for the AIEE members attending the Fall General Meeting.

**Commonwealth Edison Company, Technical Center—Tuesday, October 11th, 9:00 a.m.:** Located eleven miles west of Chicago's loop is the headquarters for the Construction, Distribution Engineering, Transportation, Testing and Meter Departments; and General Shops for this electric utility with over two million customers in Chicago and Northern Illinois.

The tour will include visits by small groups to the following:

**TESTING DEPARTMENT LABORATORY:** Instrument standards; electronics and communications; physical and electrical testing of materials, including insulating liquids and turbine oils, chemical analysis, including x-ray diffraction and spectrographic methods; metallurgical and non-destructive testing; system relay engineering and testing.

**GENERAL SHOPS:** Carpenter, machine, metal and tool repair shops; lineman's protective equipment, washing and testing; production line for distribution transformer reconditioning, including initial and final testing facilities; power transformer and switchgear inspection and testing; high voltage bushing repairing.

**METER SHOP:** Polyphase meter, demand meter and instrument transformer testing; photocell street light control testing and reconditioning; ultrasonic cleaning of meter parts.

**Acme Steel Trip—Wednesday, October 12th, 8:30 a.m.:** Acme Steel's new Chicago steel making plant is the first to combine continuous hot blast cupolas with oxygen converters. This new \$35 million plant with annual capacity of 450,000 tons has two converters and two cupolas. Scrap steel and pig iron are continuously melted in the hot blast cupolas. The molten metal flows into two holding furnaces. Metal is then ladled into the 50-ton capacity converter for a 40-minute steel making cycle. A lance using 100,000 cubic feet of 99.5% pure oxygen per heat burns off the carbon to make various grades of steel. We will also see the steel poured into ingots, the twelve automated soaking pits, and the 6500 HP blooming mill and motor control room. This "instant" steel making facility has attracted world wide interest and also yields lowest investment cost per annual ingot ton in the industry.

**Motorola, Inc., Franklin Park, Ill.—Wednesday, October 12th, 1:00 p.m.:** World's largest plant under one roof for assembly of electronic home-entertainment products. Final production and testing of consumer products, chiefly television and stereo hi-fi.

**Commonwealth Edison Co. IBM and Dispatch—Wednesday, October 12th, 2:30 p.m.:** A "walk-over" trip to the Commonwealth Edison Company's General Office will consist of three parts. The Company's new seven hundred thousand dollar automatic dispatching system which controls 92% of the Company's 5000 MW capabilities will be open for inspection. The group will also be conducted through Edison's electronic computer which is used in preparing nearly twelve million bills annually, or approximately fifty thousand each day. The trip will be concluded with a movie of the Dresden Station, the nation's largest operating nuclear power plant.

**Inspection tour of the Illinois Bell System, Chicago, No. 2 Toll Office—Thursday, October 13th, 9:30 a.m.:** Highlights of the tour will include voice frequency and carrier systems, traffic operating, video control center, card translators, radio rooms, switching center, power facility, emergency power facilities, and automatic message accounting.

**Cook Technological Center—Tuesday, October 11th, 2:00 p.m.:** Cook Technological Center, located 19 miles northwest of the Chicago Loop, conducts advanced research, development and test programs in electronics, mechanical engineering, aerodynamics, meteorology and allied fields for various defense agencies of the U. S. Government as well as for private industry. The tour begins with a short film, "First From Space", showing the launching of the Jupiter C Missile, the re-entry of the nose cone carrying the recovery system and the development activity, including rocket sleds, used to insure the completely reliable functioning of the system. Inspection of the parachute shop and a look at the recovery package will be followed by a visit to the reliability evaluation and testing section. Here, some 70,000 resistors, diodes and transistors are exposed to environmental cycling to simulate in-service conditions. The automated instrumentation used for programming and data taking will be described and explained briefly or at length as desired. The instrument calibration laboratory where the standards are periodically certified by the National Bureau of Standards and the instrumentation section, data handling systems and computers, will

be visited. In the heavy environmental section, the wind tunnel and jet engines, both in and out of operation, will be inspected. Vibration testing will also be going on. Finally the nuclear testing facilities will be visited where one of the largest Cobalt 60 sources known (60,000 to 80,000 curies) is used to provide irradiation. The hot cell and manipulators may be seen.

**Experimental Electronic Switching Center of Illinois Bell Telephone Company, Morris, Illinois—Wednesday, October 12th, 1960, 9:00 a.m. to 5:00 p.m.** For those engineers particularly interested in the technical aspects of electronic telephone switching, a field trip to a trial installation of an experimental system has been arranged by the Bell Telephone Laboratories and the Illinois Bell Telephone Company. On location, the series of papers listed as Communications Switching I will be presented and the system will be displayed. This is an all day trip and arrangements for luncheon on location will be made by the committee. This is a bus trip with a maximum of 80 persons. Tickets are \$3.00 each.

**Argonne Research Reactor CP-5—Thursday, October 13th, 1:00 p.m.:** The Argonne Research Reactor, CP-5, has a vital assignment, to produce abundant radiation, primarily neutrons, for research. To make possible the wide variety of experiments for which CP-5 is used, more than 60 openings penetrate the sides and top of the reactor. Beam holes permit neutrons to emerge from the reactor. It is also possible to place materials inside the core, in areas where neutron density is high. A pneumatic tube called a "rabbit" is used to introduce a substance for irradiation and to withdraw it very quickly, before the results of irradiation are lost. The operating power level of CP-5 will soon be raised from 2,000 kilowatts to 10,000 kilowatts. This increase will make available greater concentrations of neutrons; samples then can be irradiated in a shorter period of time than was possible previously. CP-5, which uses heavy water as moderator and enriched uranium as fuel, is a direct descendant of CP-1, the reactor used to achieve history's first controlled nuclear chain reaction at the University of Chicago on December 2, 1942.

**Chicago Sun Times Building—Thursday, October 13th, 1:30 p.m.:** This is a walking trip through the printing plant of one of Chicago's principal daily newspapers. An unlimited number of persons will be permitted to see its comprehensive operations.

1960 FALL GENERAL MEETING COMMITTEES

**Officers**

L. E. Randall, *Chairman*  
 D. W. Gilman, *Vice Chairman*  
 E. C. Carlson, *Secretary*  
 J. Agosta, *Treasurer*

**Fall Frolics**

D. R. Whitlow, *Chairman*  
 W. R. Cress, *Vice Chairman*  
 Irvin Cooper  
 N. J. Greever

**Hospitality**

J. A. Schneider, *Chairman*  
 John Banas  
 W. J. Cummins  
 William Dres  
 John Endres  
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Mrs. H. R. McConnel, *Chairman*  
Mrs. Joseph Agosta            Mrs. W. O. Schnell  
Mrs. J. S. Ferguson            Mrs. N. I. Soven  
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**Wednesday Brunch**

Mrs. William Lerner, *Chairman*  
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**Thursday Luncheon**

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COMMITTEE MEETINGS

Morrison Hotel  
Chicago, Illinois

Monday, October 10

9:00 A.M.—12:00 Noon	
Power Generation .....	Room 614
Education .....	Room 672
Board of Directors .....	Hollywood Room
9:00 A.M.—5:00 P.M.	
Solid State Devices .....	Room 670
12:00 Noon—2:00 P.M.	
Luncheon—Medalists .....	Walnut Room
4:00 P.M.—6:00 P.M.	
Substations Executive Subcommittee .....	Room 666
Professional Conduct .....	Room 672
W. G. 57.1 Aluminum Substation Conductors .....	Room 651
W. G. on Electronic Loads SR .....	Room 668
W. G. 59.1 Recommended Minimum Clearances .....	Room 645
W. G. 60.1 Aluminum vs. Structural Substructures .....	Room 643
5:00 P.M.—10:00 P.M.	
Computer Systems Subcommittee CD .....	Room 624
7:00 P.M.—10:00 P.M.	
Microsystem Electronics Subcommittee, SSD .....	Room 670
Design Automation Subcommittee of C. D. ....	Room 666
Frequency Range Transformers W. G. of Electronics ..	Room 672
8:00 P.M.—11:00 P.M.	
Board of Directors .....	Walnut Room

Tuesday, October 11

9:00 A.M.—12:00 Noon	
Public Relations .....	Room 651
Communication Theory .....	Room 672
Advancement of Power Engineering Subcommittee of PG .....	Room 624
Semiconductor Rectifier .....	Room 643
TOD Manual Subcommittee .....	Room 668
Pulse Transformer W. G. ....	Room 666
12:00 Noon—5:00 P.M.	
Luncheon—Communication Division .....	Room 670
9:00 A.M.—5:00 P.M.	
Membership .....	Room 601
2:00 P.M.—5:00 P.M.	
Prize Awards .....	Room 664
Research .....	Room 651
Electronics .....	Sherman Hotel
System Planning Subcommittee of S.E. ....	Room 624
2:00 P.M.—10:00 P.M.	
Computing Devices .....	Room 666



## American Institute of Electrical Engineers

- 4:00 P.M.—6:00 P.M.  
Data Communication .....Room 672
- 7:30 P.M.—10:00 P.M.  
Administrative Subcommittee of S.E. ....Room 672

### Wednesday, October 12

- 9:00 A.M.—11:30 A.M.  
Safety .....Room 670
- 9:00 A.M.—12:00 Noon  
Single-Phase and Fractional Horsepower  
Subcommittee .....Room 624  
Computer Application Subcommittee .....Room 601  
TOD Representatives .....Room 641  
System Economics Subcommittee .....Room 651  
System Controls Subcommittee, S.E. ....Normandy Room  
Professional Development and  
Recognition Department .....Room 643  
Application of Probability Methods  
Subcommittee, S.E. ....Room 614  
Science and Electronics Division .....Room 645  
Electric Welding .....Room 626  
Applied Automatic Techniques .....Room 647  
Technical Groups .....Room 664  
Power Division .....Room 649  
Joint W. G. on Power Plant Response .....Parlor G
- 9:00 A.M.—5:00 P.M.  
General Administration Department .....Promenade Room  
W. G. on Red Book Revision I & C P S .....Room 666  
W. G. for Revision of AIEE Standard 32 of PD .....Room 672  
Electric Systems for Commercial Buildings I & C P S..Room 668
- 12 Noon—2:00 P.M.  
Luncheon—Single-Phase and Fractional Horsepower  
Subcommittee .....Room 624  
Luncheon—Administrative Subcommittee of R. M. ...Room 670  
Luncheon—Radio Communication Systems .....Room 645  
Luncheon—Technical Groups .....Room 664
- 12:00 Noon—5:00 P.M.  
Luncheon—General Applications Division .....Room 641
- 2:00 P.M.—5:00 P.M.  
Substation Roundtable Discussion .....Cotillion Room  
Industry Division .....Room 601  
Administrative Subcommittee of R. M. ....Room 670  
System Engineering .....Normandy Room  
Computer Standards Subcommittee of C. D. ....Room 645  
Test Codes Subcommittee of I. C. ....Room 624  
Technical Groups .....Room 664  
Edison Medal .....Room 643  
Electronic Transformers Subcommittee .....Room 649  
P. S. C. Wire Line Protection Subcommittee .....Parlor F  
P. S. C. Executive Subcommittee .....Parlor G  
P. S. C. Methods of Measurement Subcommittee ..Walnut Room
- 4:30 P.M.—7:00 P.M.  
Wire Communications .....Room 651

## Fall General Meeting

- 5:00 P.M.—10:00 P.M.  
Application to Design Evaluation and Simulation  
Subcommittee of CD .....Room 624
- 7:30 P.M.—10:00 P.M.  
Logic & Switching Circuit Theory Subcommittee  
of C.D. ....Room 670

### Thursday, October 13

- 9:00 A.M.—12:00 Noon  
Executive Subcommittee of I & C P S .....Room 672  
Electric Coupling Subcommittee .....Room 668  
Constitution and Bylaws .....Room 643  
Technical Operations Department .....Parlor F  
Electronic Power Transformer W. G. ....Room 670  
Power Systems Communications .....Room 614
- 9:00 A.M.—5:00 P.M.  
Logic & Switching Circuit Theory  
Subcommittee of C.D. ....Room 664  
Electrochemical Standards W.G. ....Room 666
- 12:00 Noon—2:00 P.M.  
Luncheon—D-C Subcommittee of R.M. ....Room 624  
Luncheon—Mining Industry .....Room 645  
Luncheon—Technical Operations Dept. ....Parlor G
- 2:00 P.M.—5:00 P.M.  
Industrial and Commercial Power Systems .....Room 601  
Planning & Coordination .....Parlor F  
D-C Subcommittee of R.M. ....Room 624  
Electric Coupling Subcommittee .....Room 668  
Industrial Control .....Room 670
- 4:00 P.M.—6:00 P.M.  
Induction Machinery Subcommittee of R.M. ....Room 672
- 7:30 P.M.—10:00 P.M.  
Forum of Technical Committee Chairmen .....Venetian Room

### Friday, October 14

- 9:00 A.M.—5:00 P.M.  
Board of Directors Executive .....Suite 440  
Feedback Control Systems .....Room 664

DAILY CALENDAR

	Evening	Happy Hr.	P.M.	Lunch	A.M.	Bkfst
Sunday						
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						



Old Chicago Water Tower