

GREAT LAKES DISTRICT MEETING

MADISON, WISCONSIN



MAY 17-19, 1951

**Headquarters
Hotel Loraine**



Central Madison — Headquarters hotel at right center

Calverne Aerial—De Pere, Wis.

MEETING FEATURES

The AIEE Great Lakes District Meeting to be held at the Hotel Loraine in Madison, Wisconsin, May 17 through 19, 1951, having as its theme "Application of Fundamental Theory" is designed to appeal to all electrical engineers regardless of their specialization.

Every effort is being made to include Student members of the AIEE in all activities to permit maximum contact with practicing engineers. Students may attend the regular luncheons and banquet, may take the inspection trips, and attend any of the sessions. Special graduate and undergraduate sessions will be held on Friday and Saturday morning. Student wives are invited to attend all the functions arranged for the ladies.

In addition to the technical sessions, there will be luncheons, banquet, Student banquet, special ladies' program, and inspection trips.

All technical sessions, including the Student sessions, will be held at the Hotel Loraine. The Student Chairmen and Faculty Counselors meeting will be held at the University of Wisconsin, Electrical Engineering and Mechanics Building. Luncheons except the Ladies' Luncheons will be held at the Headquarters Hotel (Lorraine). The regular and Student banquets will be held at the Memorial Union on the University of Wisconsin Campus.

Advance Registration—Please register in advance by promptly filling in and mailing the advance registration card enclosed with this mailed announcement. Complete your registration at the Registration Desk on arrival at the meeting. The Registration Desk will be open beginning in the evening of May 16. A registration fee of \$2 will be charged all members and \$3 for all nonmembers. No fee will be required of enrolled Students or the immediate families of members.

Inspection Trips—Forest Products Laboratory—Thursday, May 17, 2:00 p.m., or Friday, May 18, 2:00 p.m.

This is a U. S. Department of Agriculture research laboratory that directs its work toward increasing knowledge about wood and

wood products. A great deal of work has been done at this laboratory on wood strengths, preservation and utilization; on paper, packaging, laminating and wood fabrication.

Electrical Engineering and Mechanics Building—Thursday, May 17 at 2:00 p.m., or Friday, May 18 at 10:00 a.m. or 2:00 p.m.

This is a new building which has been occupied less than one year and contains all laboratories and classrooms of the electrical engineering and mechanics departments. The laboratories and educational facilities as well as the materials used in construction are most modern.

Veterans Hospital—Friday, May 18, 10:00 a.m.

This is a \$7,000,000 nearly completed 500-bed hospital, built on a 23-acre tract overlooking Lake Mendota, containing 8 floors and penthouse; and necessary heating and laundry departments. The connected electrical load will be 18,000 kva, and 1,200 lighting fixtures and 550,000 feet of wire will be used in the building. It contains the latest in interior wiring materials.

Utilities Tour—Inspections at convenience of those wishing to visit plants.

The city of Madison is supplied with electricity and natural gas by the Madison Gas & Electric Company. Electricity is generated by a local steam plant having a capacity of 70,000 KW. The Wisconsin Power & Light Company has offices in Madison and furnishes electricity to central and southern Wisconsin. One of their newest steam plants with two 25,000 KW units installed is at Beloit. The unique feature of this plant is that the steam and electric generating equipment are not separated by any of the building structure.

In addition to the inspection trips listed above, the ladies will take a tour of the University of Wisconsin and the Arboretum. There are many points of interest in Madison such as the University of Wisconsin, Capitol, machine tool industry, scenic drives, etc.,

Continued on page 4

AIEE Great Lakes District Meeting — Program — Madison, Wis., May 17-19, 1951

ADVANCE COPIES OF PAPERS

Members may obtain preprints of numbered papers at the uniform price of 30c each (60c each to nonmembers), by sending enclosed order form and remittance to the AIEE Order Department, 33 West 39th Street, New York 18, N. Y. Mail orders (particularly from out-of-town members) are advisable, inasmuch as an adequate supply of each paper at the meeting cannot be assured. Coupon books in \$9 denominations are available for those who wish to avoid remittance by check or otherwise. Most of the papers ultimately will be published as AIEE Proceedings and in the Transactions. *District Papers* denoted by *DP.*** are intended for presentation only and are not available.

Thursday, May 17

9:00 a.m.—Registration

10:00 a.m.—Opening Session

Crystal Ball Room
J. R. NORTH, Presiding

Official Welcome. Honorable Walter J. Kohler, Governor of Wisconsin.
New Problems of the Institute. Titus G. LeClair, President, American Institute of Electrical Engineers.
Corona Effects on Transmission Lines. C. F. Wagner, Westinghouse Electric Corp.
Presentation of the Best Paper Prizes for 1949-1950 in District No. 5.

12:00 noon—Luncheon (Hotel Loraine)

12:15 p.m.—Ladies' Luncheon (University of Wisconsin Memorial Union)

2:00 p.m.—Inspection Trips

Forest Products Laboratory.
Electrical Engineering and Mechanics Building.
Utility Tour.

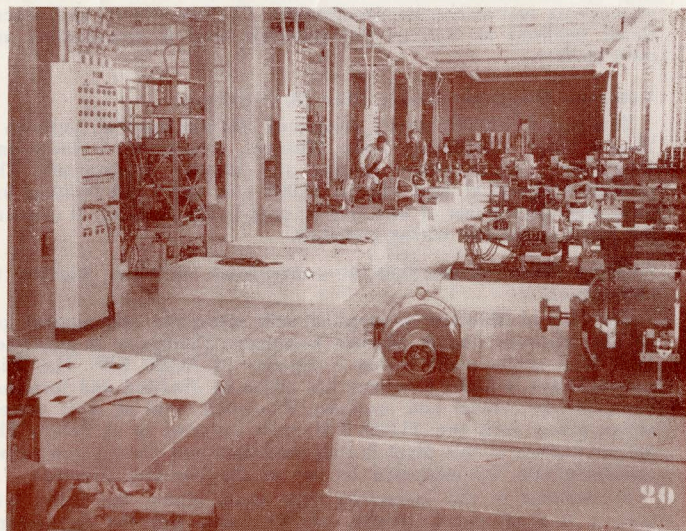
2:30 p.m.—Ladies' Tour of City, University of Wisconsin, and Arboretum.

2:00 p.m.—Generating Stations Equipments

Crystal Ball Room
J. P. MADGETT, Jr., Presiding

51-157. An Engineering Approach to Control Room Lighting. V. L. Dzwonczyk, American Gas and Electric Service Corp.

DP.** Control System of the New 60,000 K.W. Edgewater Generating Station of the Wisconsin Power and Light Company. G. Schilstra, Wisconsin Power and Light Co.



The Electrical Dynamo Laboratory in the new Engineering building at the University of Wisconsin

DP.** Unique Induction Generator Hydro Plant. H. H. Brown, Wisconsin Michigan Power Co.

51-158. Squirrel Cage Induction Generator for Power Generation. ACO.* T. C. Tsao, Consolidated Edison Co. of N. Y., Inc.; N. F. Tsang, University of Minnesota.

2:00 p.m.—Induction Motors

Main Dining Room
S. BECKWITH, Presiding

51-159. A contribution to the Theory of the Deep-bar Induction Motor. J. F. H. Douglas, Marquette University.

51-160. Split-Winding Starting of Three-Phase Motors. P. L. Alger, H. C. Ward, Jr., F. H. Wright, General Electric Co.

DP.** Performance Characteristics of the Doubly-Fed Induction Machine. G. W. Staats, Allis-Chalmers Mfg. Co.

DP.** Application of Thevenin's Theorem in Induction Motor Theory. B. S. Willis, Iowa State College.

2:00 p.m.—Communication Circuits

Pompeian Room
V. C. RIDEOUT, Presiding

DP.** Non-linear Element Applications to T and π Networks. C. J. O'Connor, G. W. Valenta, H. E. Ellithorn, University of Notre Dame.

DP.** Characteristics of Twin-T and Bridged-T Networks. J. L. Poteracke, M. V. Braunagel, H. E. Ellithorn, University of Notre Dame.

DP.** The Realization of a Transfer Ratio with Complex Zeros in the Form of a Three-Terminal R-C Network. P. F. Ordnung, G. S. Axelby, H. L. Krauss, W. P. Yetter, Yale University.

DP.** Determination of the Resistance of a Homogeneous Screen of Linear Conductors. J. P. Ballantine, University of Washington.

51-161. Hum and Stability Problems of Power Line Synchronization in Television. W. L. Hughes, Iowa State College.

2:00 p.m.—Unique Field Mapping Procedures

Colonial Room
L. C. LARSON, Presiding

DP.** A Direct-Current Network Analyzer for Wave-Equation and Field-Mapping Problems. G. W. Swenson, Jr., University of Wisconsin.

DP.** The Use of the Electrolytic Tank in Investigating Heat Flow Inside Magnet Coils. J. D. Horgan, Marquette University.

DP.** Mapping Techniques Applied to Fluid Mapper Patterns. A. D. Moore, University of Michigan.

2:00 p.m.—Servomechanisms

N. L. SCHMITZ, Presiding

DP.** Multiple Mode Operation of Servomechanisms. D. C. McDonald, Cook Research Labs.

DP.** Transient Response of Two-Phase Induction Motor Type Servomotor. K. Fong, University of Illinois.

51-163. Transient Response of Small, Two-Phase Induction Motors. A. M. Hopkins, Northwestern University.

DP.** Transfer Function for a Two-Phase Induction Servo Motor. L. O. Brown, Jr., University of Illinois.

6:30 p.m.—Banquet—Informal. (For Registrants, Guests, Ladies, and Students.) Memorial Union, University of Wisconsin

Friday, May 18

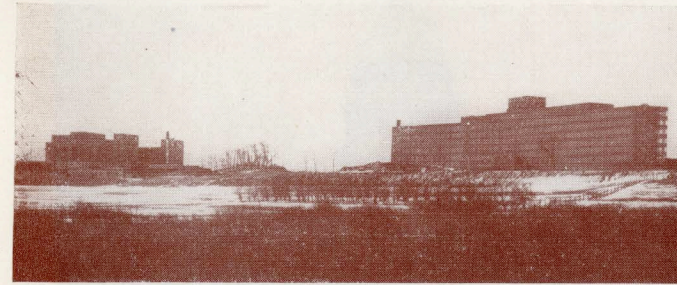
8:30 a.m.—Undergraduate Student Technical Papers

Pompeian Room

9:30 a.m.—Transmission and Distribution

Crystal Ball Room
E. J. KALLEVANG, Presiding

DP.** Design Features of a New 138 Kv Transmission Line. F. Linder, Dairyland Power Cooperative.



Forest Products Laboratory (Left) Veterans Hospital (Right)

DP.** Analysis of Subsequent Faults. H. K. Amchin, American Gas and Electric Service Corp.; E. T. B. Gross, Illinois Institute of Technology.

DP.** Symmetrical Components as Applied to Protective Relaying. W. K. Sonnemann, Westinghouse Electric Corp.

DP.** Low Cost Regulation of Rural Distribution Lines. H. C. Brem, Allis-Chalmers Mfg. Co.

DP.** Three-Phase Dielectric Power-Factor Measurements on Cables. L. W. Matsch, Illinois Institute of Technology.

51-165. Effect of the Duration of Voltage Dip on Cyclic Light Flicker. L. Brieger, Consolidated Edison Co. of N. Y., Inc. Presentation by title only for discussion.

9:30 a.m.—Industrial Electronics

Main Dining Room
R. R. BENEDICT, Presiding

51-166. Ignitrons for Frequency-Changer Welders. R. R. Rottier, General Electric Co.

51-167. Ignitron Rectifier Power for Dynamometers. E. L. Hulla, ACO.* T. H. McGreer, J. W. Strumpfer, Westinghouse Electric Corp.; E. G. Morehouse, Studebaker Corp.

51-168. A Gas Tube Inverter with the Supply Voltage Below the Breakdown Voltage. J. M. Cage, J. C. Schuder, Purdue University.

DP.** A Wave Generator for the Dynamic Plot of Receiving Tube Characteristics. J. E. Yule, Marquette University; G. Koehler, University of Wisconsin.

9:30 a.m.—Computing Devices and Techniques

Colonial Room
J. F. CALVERT, Presiding

51-170. A Diode Bridge Limiter for Use with Electronic Analog Computers. R. J. Medkeff, Askania Regulator Co.; R. J. Parent, University of Wisconsin.

51-171. Analog Computer Solution of a Nonlinear Differential Equation. H. G. Markey, V. C. Rideout, University of Wisconsin.

51-172. Differential Analyzer Study of Harmonic Power Generation with Nonlinear Impedance Element. P. E. Russell, H. A. Peterson, University of Wisconsin.

DP.** An Integrally Synchronized, General Purpose Magnetic Drum Digital Computer. G. M. Amdahl, University of Wisconsin.

9:30 a.m.—Basic Sciences

W. RICHTER, Presiding

51-173. Dependence of Direct Sparkover Voltage of Gaps on Humidity and Time. P. B. Jacob, Jr., Mississippi State College; G. M. L. Sommerman, Northwestern University.

51-174. Calculation of the Capacitance of a Circular Annulus by the Method of Subareas. T. J. Higgins, D. K. Reitan, The University of Wisconsin.

DP.** The Magnetic Cross Valve. H. J. McCreary, Automatic Electric Co.

DP.** Magnetic Amplifier Analysis Using Flux-Change Theory. P. M. Kintner, University of Illinois.

DP.** Change of Units and Conversion Formulas. V. P. Hessler, University of Illinois.

DP.** Electric and Magnetic Units and Dimensions. G. R. Town, Iowa State College.

51-175. The Transient Response of Magnetic Amplifiers—Cases of Negligible Commutation. L. A. Finzi, D. P. Chandler, Carnegie Institute of Technology; D. C. Beaumariage, Bethpage, L. I. Presentation by title only for discussion.

9:30 a.m.—Feedback Control Devices

L. A. HESSE, Presiding

DP.** Compensated Synchronous Alternator. H. F. Storm, General Electric Co.

DP.** The Measurement and Control of Moisture in Textile Slashing. C. V. Bullen, R. E. Schuette, Barber-Colman Co.

DP.** Progress on a Unified Terminology for Feedback Control System. H. W. Cory, Allis-Chalmers Mfg. Co.

DP.** Ignorable Quantities in Feedback Controllers. R. W. Jones, Northwestern University.

10:00 a.m.—Inspection Trips

Veterans Hospital.

Electrical Engineering and Mechanics Building.

12:00 noon—Luncheon (Hotel Loraine)

1:30 p.m.—Ladies' Luncheon followed by Style Show and Bridge. Manchester's Madison Room.

2:00 p.m.—Inspection Trips

Forest Products Laboratory.

Electrical Engineering and Mechanics Building.

2:00 p.m.—Undergraduate Student Technical Papers

Pompeian Room

2:00 p.m.—Graduate Student Technical Papers

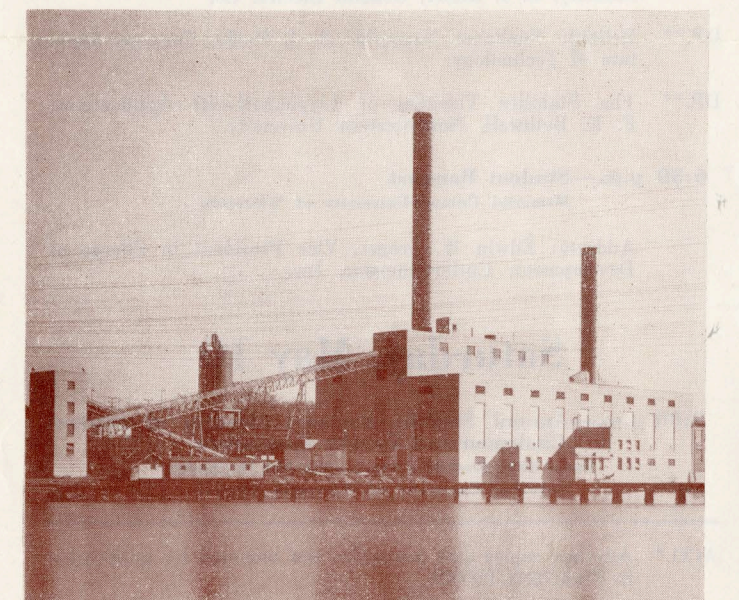
2:00 p.m.—Electrical Machinery

Crystal Ball Room
W. A. LEWIS, Presiding

51-176. Transient Analysis of Rotating Machines and Stationary Networks by Means of Rotating Reference Frames. Y. H. Ku, Massachusetts Institute of Technology.

51-177. A Design Method for Polyphase Reluctance Synchronous Motors. C. H. Crouse, Robbins & Myers, Inc.

DP.** Effects of Unbalanced Loading in a Core Type Transformer. C. V. Mueller, Purdue University.



Blackhawk Generating Station, Wisconsin Power & Light Co.

- DP.** Fundamentals and Applications of Eddy-Current Power Devices. G. H. Fredrick, Dynamatic Corp.
- DP.** Self Starting, Self Compensating Synchronous Motor. K. L. Hansen, Milwaukee, Wisconsin.
- 51-178. Improved Core Form Transformer Winding. E. J. Grimmer, W. L. Teague, Westinghouse Electric Corp. Presentation by title only for discussion.

2:00 p.m.—Electrical Measurements

Main Dining Room
R. E. JOHNSON, Presiding

- DP.** The Three-Phase Oscilloscope as an Harmonic Analyzer in Power Systems. E. B. Kurtz, R. H. Burkhardt, State University of Iowa.
- 51-179. A Complex Wave Synthesizer. G. Ferrara, R. L. Nadeau, University of Detroit.
- 51-180. Piezoelectric Crystals as Sensing Elements of Pressure, Temperature and Humidity. E. A. Roberts, P. Goldsmith, Armour Research Foundation.
- DP.** Free Convection Heat Transfer From Electrically Heated Wires. E. A. Farber, University of Wisconsin.

2:00 p.m.—Waveguides and Particle Accelerators

Colonial Room
A. BRONWELL, Presiding

- DP.** Proton Dynamics in a Linear Accelerator. B. V. Haxby, H. A. Miller, University of Minnesota.
- 51-181. A Variable Frequency Excitation System for a 70 MEV Synchrotron. J. D. Ryder, University of Illinois; J. P. Palmer, Oak Ridge National Laboratory.
- 51-162. Shielded Dielectric-Rod Waveguides. R. E. Beam, H. M. Wachowski, Northwestern University.
- 51-164. Dielectric Loading for Waveguide Linear Accelerators. G. I. Cohn, G. T. Flesher, Illinois Institute of Technology.
- DP.** Acoustic Boundary—Layer Losses in Waveguide. R. F. Lambert, University of Minnesota.

2:00 p.m.—Symposium on Nonlinear Electric Circuit Analysis

T. J. HIGGINS, Presiding

- DP.** Almost Sinusoidal Oscillations in Systems with Several Degrees of Freedom. H. S. Schaffner, University of Illinois.
- DP.** Current Practices of Solving Nonlinear Problems Arising in Industry. E. J. Keller, General Electric Co.
- DP.** Reliable Nonlinear Networks. R. J. Duffin, Carnegie Institute of Technology.
- DP.** The Stability Theorem of Liapounoff—Its Applications. F. E. Bothwell, Northwestern University.

6:30 p.m.—Student Banquet

Memorial Union—University of Wisconsin

Address: Edwin W. Seeger, Vice President in Charge of Development, Cutler-Hammer, Inc.

Saturday, May 19

9:00 a.m.—Annual Student Business Meeting of Student Chairmen and Faculty Counselors

Room 2033 Electrical Engineering and Mechanics Building, University of Wisconsin Campus



Wisconsin Capitol — Taken from top of Headquarters Hotel

MEETING FEATURES — Continued from page 1

which those attending the meeting may wish to see. Members desiring to see any points of interest should make their desires known at the Registration Desk and arrangements will be made to show them whatever they wish to see.

General Information—Detailed information may be obtained at the Registration Desk, and the Bulletin board near the desk will contain notices concerning the meeting and other events. Please consult it frequently.

Hotel Reservations—Members planning to attend the Great Lakes District Meeting are urged to make hotel reservations now, or as early as possible to be sure of accommodations. Mr. E. J. Kallevang, chief engineer, Wisconsin Power & Light Company, 122 West Washington Avenue, Madison 1, Wisconsin, asks that you send a copy of your request for reservations to him. Please mention that you are attending the AIEE meeting when you make your reservation.

Room rate schedules for four hotels in Madison are:

Hotel Loraine (Headquarters), 123 West Washington Ave., Madison, Wis.
Single rooms \$4.00 to \$6.00, Double Rooms \$8.00 to \$10.00.

Edgewater Hotel, 666 Wisconsin Avenue, Madison, Wis.
Single rooms \$6.00 to \$10.00, Double rooms \$10.00, Twin \$12.00.

Park Hotel, 22 South Carroll Street, Madison, Wis.
Single rooms \$3.50 to \$5.00, Double rooms \$5.00 to \$9.00.

Piper's Belmont Hotel, 31 North Pinckney Street, Madison, Wis.
Single rooms \$3.50 to \$5.00, Double rooms \$5.00 to \$8.00.

Accommodations at motor courts are available. Early reservations are necessary. Rates at motor courts approximate \$4.00 for single and \$5.50 for double occupancy. Three motor courts which are close to Madison are:

Hamacher Motel (On S.T.H. 12, 13, and 14).
5101 University Avenue, Madison, Wis.

Mid-View Apartment Motel (S.T.H. 12 and 13).
Middleton, Wis.

Blue Spruce Motel (S.T.H. 12 and 18).
1901 East Broadway, Madison, Wis.

Members of the **District Meeting Committee** are as follows: Carl C. Crane, Chairman; Harold A. Peterson, Vice-Chairman; W. T. Stephens, Secretary; J. R. Hafstrom, Treasurer; Messrs. H. Cole, C. D. Malloch, I. B. Baccus, A. H. Lovell, C. E. Parks, D. D. Ewing, Eric T. B. Gross, J. F. Calbert, J. D. Ryder, M. S. Coover, H. S. Dixon, H. E. Hartig, J. F. H. Douglas, W. Richter, members at large; Technical Program, T. J. Higgins; Inspection Trips, L. A. Hesse; Entertainment and Sports, G. Ansel; Transportation, F. D. Mackie; Publicity, R. E. Purucker; Finance, G. C. Neff; Registration and Housing, E. J. Kallevang; Ladies' Activities, Mrs. W. T. Stephens; Student Activities, Dr. John Baird.

Issued by

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

33 West 39th Street, New York 18, N. Y.

PRINTED IN U.S.A.

ACO.* Advance copies only available; not intended for publication in TRANSACTIONS.

DP.** District paper; no advance copies are available; not intended for publication in TRANSACTIONS.