Saturday, February 17, 1968 — 6:00 P.M.

# ANNUAL BANQUET AND DANCE

## Robert Treat Hotel Newark, N. J.

See Page 2



Valentine's Day February 11

Volume 14 February, 1968 No. 6

### EXECUTIVE COMMITTEE COLUMN

### Nominations and Appointments for Institute Activities

A major function of the executive committee of the North Jersey Section is the nominations function. Its immediate objective is to provide the continuity of direction that strengthens the section leadership and contributes to its growth. However, this is not the major portion of the nominations committee task, a much more important duty of the committee is the execution of the responsibility of the section to support and contribute to leadership at the Institute level. The North Jersey Section with its membership structure, has a unique responsibility to support headquarters staff with key committeemen and officers. This responsibility derives from the section size and its composition. Being the third largest section in the world implies an obvious nobless obligé. Furthermore, its professional composition, including as it does, BTL, RCA, GE, Westinghouse, ITT, Public Service and others provides an impressive source of leadership from which to draw.

It is to this latter responsibility that the nomination committee addresses itself at this time. The search for competent and willing nominees for international offices and appointments must start at the membership. Your committee is now preparing nominations for the 1969 year and solicits recommendations. The opportunities range from membership on technical and administrative committees to the president of the Institute. Typical nominations cover, Group activities both administrative and technical; Financial, Sections, Editorial and Nomination Committees of the Institute as well as Regional offices and committees. A more complete list can be found in the Spectrum.

Many of you know of nutstanding engineers who can contribute of their skills to the Institute and who heretofore have not had this opportunity. Your suggestions are requested. Please indicate name and proposed activity of any member who wishes to participate to the nominating committee.

> W. L. GLOMB ITT Defense Communications Division 492 River Road Nutley, New Jersey 07110

### ANNUAL DINNER DANCE HONORING NEW FELLOWS

The North Jersey Section Annual Dinner Dance and Reception honoring the newly elected Fellows of the Section will take place on Saturday, February 17, 1968, at 6:00 P.M., in the Georgian Room of the Robert Treat Hotel, 50 Park Place, Newark, New Jersey.

This year, unlike previous years, the dinner will be preceded by a cocktail hour and reception. The price of the dinner includes cocktails as well as a full course prime rib dinner. Following the presentation of the awards, there will be dancing until 1:00 A.M. Adequate parking is available at several nearby locations.

THE LADIES ARE INVITED!

This year, the North Jersey Section is singularly honored to have as the guest speaker, Major General William B. Latta, commander of the United States Army Electronics Command at Fort Monmouth, New Jersey. Major General Latta will speak on the subject, "Fort Monmouth — Highlights of a Half-Century."

For reservations, write, enclosing a stamped, self-addressed envelope, to

MR. J. G. O'GRADY Public Service Electric and Gas Company 200 Boyden Avenue Maplewood, New Jersey 07040 (Phone: (201) 621-6800, Ext. 57-702)

Please forward	tickets	at \$9.75	each to
Name			
Street			Constant of the Operation of Constant of C
Town	S	tate	Zip 🧫

## NORTH JERSEY COMPUTER

Hardware Organization (Part 1) and Applications (Part 2)

### Speakers:

David J. Rathofsky (Part 1) John Seward (Part 2) Burroughs Corporation Paoli, Pennsylvania

Place:

Arnold Auditorium

Bell Telephone Laboratories Murray Hill, N. J.

Date:

Thursday, February 8, 1968 Time:

8:00 P.M.

Pre-meeting Dinner:

6:00 P.M. at Wallys-Tavern-on-the-Hill

Watchung, N. J.

The impending era of LSI (Large Scale Integration) promises to make logic gates — the building blocks of electronic computers — extremely inexpensive. Emphasis in central processor design will shift from minimization of the number of gates, to finding new organizations which provide expanded computing capacity. ILLIAC IV, conceived by Prof. D. L. Slotnick of the University of Illinois and being constructed at Burroughs, is a pioneering effort in this direction with a planned 256 parallel arithmetic units.

Part 1 will deal with functions and organization of the ILLIAC IV hardware, including Processor Element, Processor Element Memory, Control Unit, and the I/O system which includes a B6500 fixed head disc, the I/O Controller, and the Switch.

Part 2 will deal with a number of problems analyzed and programmed for the new organization, including matrix inversion, linear programming, Eulerian flow, a circulation model for the earth's atmosphere, and signal processing. Timing Simulation results and use of the machine on sample problems will be illustrated.

Mr. Rachofsky received the B.S. in Electrical Engineering from the Massachusetts Institute of Technology in 1958 and has worked in the field of design and application of data processing equipment since graduation. He is the Project Manager responsible for Processing Unit and I/O design of ILLIAC IV. His previous projects have included: a real time signal correlator, development and system application of an airborne alphanumeric display system including the general purpose D84 Computer, and a one-million component 7mc data processor.

Mr. Seward holds a B.S. in mathematics from the University of Reading (England) and received an M.S. in applied mathematics from Harvard in 1960, He is a Senior Mathematician of the Advanced Development Department and is presently assigned to the ILLIAC IV group to work on application. Before joining Burroughs in 1960, he was a member of the Staff of the Harvard Computation Laboratory.

## The IEEE Newsletter

Published monthly except July & August by the North Jersey Section of the Institute of Electrical & Electronics Engineers, Inc. Office of Publication: 9 Little John Road, Morris Plains, N. J.

Volume	14	February,	1968	No. 6	;

Deadline for all material is the 25th of the second month preceding the month of publication.

All communications concerning The Newsletter, including editorial matter, advertising, and mailing, should be addressed to:

### THE NEWSLETTER c/o Staff Associates P.O. Box 275 — Morris Plains, N. J. Telephone: 398-5524

Subscription: 75¢ per year through dues for members; \$1.50 per year for non-members. Second Class Postage Paid at Morris Plains, N. J.

### ABOUT ADDRESS CHANGES

### REPORT ALL ADDRESS CHANGES TO: INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS INC., 345 EAST 47th STREET NEW YORK, N. Y. 10017

It is not necessary to inform the North Jersey Section when you change your mailing address. The NEWSLETTER and other section mailings use a list provided by IEEE's national headquarters in New York. This means the Section has no need to maintain a mailing list or addressing plates. Section membership records are changed when Headquarters notifies us.

### NEWSLETTER STAFF

Editor	David T. Wiener
Business Manager	M. M. Perugini
Feature Editor	Fred T. Grampp
Student Activities Editor	Alan H. Stolpen
Associate Editor	Martin Hollander
Associate Editor	Emil C. Neu

### NORTH JERSEY SECTION OFFICERS 1967-1968

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Past Chairman	Stephen	A. N	Aallard

Executive Committee Meetings at Verona Public Library First Wednesday of Month 7:30 P.M.

### 1968

February	7	April 3	
March 6		June 5	
May 1			

All IEEE Members Welcome

### The Newsletter, February 1968

### STUDENT NEWS

**Stevens Institute of Technology** 

The General Electric Co. has invited the student branch of the IEEE to tour their High Voltage production facilities in Philadelphia, Pa.

Date and time to be announced on Campus IEEE bulletin board.

On Dec. 20, 1967 forty four members of the Stevens Institute of Technology student branch of the IEEE were bussed by IBM to their Fishkill, N. Y. components plant where they observed the production of IBM's SLT logic substrate. The group was impressed with the use of an IBM 1401 computer in the quality assurance monitoring of the devices built onto the substrates.

The trip was arranged by Professor Stanley Smith. The tour was conducted by Professor Harry W. Phair.



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## CALENDAR

Thursday, February 8

JOINT METROPOLITAN — ENGINEERING MANAGEMENT \_\_\_\_\_\_\_ 8:00 P.M. — "Are Engineers Properly Trained to Enter the Engineering Profession" — Panel Discussion at Island Inn Motel, Old County Road, Westbury, Long Island.

NORTH	JERSEY COMPUTER
8:00 P.M Murray Hill,	- ILLIAC 4, Arnold Auditorium, Bell Telephone Laboratories, N. J.
	Wednesday, February 14
NEW YOR	K — POWER AND INDUSTRIAL
6:30 P.M. — moderated by Auditorium, 5	"The All Electric Commercial Building" Round Table Meeting Vic Buck of Pope, Evans & Robbins at General Electric Company 570 Lexington Avenue, New York, N. Y.
WESTCHES 8:00 P.M. — Center, Yorkt	<b>STER-ROCKLAND SUB-SECTION</b> — EDUCATION Computer Assisted Instruction at IBM — J. J. Watson Research town Heights, New York.
N V SPOT	Thursday, February 15
N L SELL	Turning Deints in Computer Design at Dumoughs Comp. (05
Third Avenue	3 (40th St.), New York.
A March That are deal	Saturday, February 17
NORTI	I JERSEY SECTION
ANNUAL	DINNER DANCE AND RECEPTION
6:00 P.M 1:0	00 A.M. — The Georgian Room, Robert Treat Hotel, 50 Park Place,
Newark, New	Jersey.
	Wednesday, February 21
PRINCETO	N MAGNETICS
8:00 P.M. —	BORAM (Block Oriented Random Access Memory) at Murray
Hall, Room 1	20, Rutgers University, New Brunswick, N. J.
NORTH	JERSEY SECTION STUDY GROUP
7:00 P.M. — Punchbowl Re	Fundamental Concepts and Design Systems at Jersey Central oom, Madison.
	Sunday, February 25
NORTI	I JERSEY RELIABILITY
8:00 P.M	Reliability and failure analysis of MOS circuits.
	Tuesday, February 27
NEW YORK	K POWER AND INDUSTRIAL DIVISION
12:30 P.M	Thomas & Betts Plant Tour at 36 Butler Street. Elizabeth. New
Jersey.	
JOINT MET	FROPOLITAN INSTRUMENTATION
AND MEAS	UREMENT
9:00 A.M and technique	A one day seminar on modern D.C. radiometric instrumentation 
	Wednesday, March 6
IOINT ME	TROPOLITAN INSTRUMENTATION
AND MEAS	UREMENT
THE TRACE	

7:00 P.M. — Western Union Auditorium, 160 West Broadway, New York, N. Y. First of seven lectures on standards of electrical measurements.

### Wheeler Laboratories, Inc.

Subsidiary of Hazeltine Corporation Consultation — Research — Development Radar and Communication Antennas Microwave Assemblies and Components Laser Devices and Applications Harold A. Wheeler and Engineering Staff Main office: Great Neck, N. Y. HUnter 2-7876 Antenna Laboratory: Smithtown, N. Y.

### NORTH JERSEY RELIABILITY Reliability and Failure Analysis of MOS Circuits

Time:

February 25th — 8:00 P.M. Place:

Kearfott Systems Division Aerospace Group Plant #10 Auditorium General Precision Systems Inc. 150 Totowa Road Wayne, New Jersey

### Speaker:

John Cocking, Mgr. of Quality Assurance General Instruments Micro Electronic Division Hicksville, Long Island, New York Directions:

Route #46 West, right turn on to River View Drive (the road alongside of Two Guys from Harrison), at the end of River View Drive turn right on to Totowa Road.

Meals:

A group will meet for a Dutch Treat dinner before the meeting at the Holiday Inn, Route #46 East at the circle of Route #23 and #46.

### New York Power and Industrial Division

### **Thomas & Betts Plant Tour**

The New York Power and Industrial Division has arranged a tour of the Thomas & Betts plant in Elizabeth on Tuesday, February 27, 1968. In addition to the tour a buffet lunch, compliments of the Thomas & Betts Company, will be provided.

The details are as follows:

Date: February 27, 1968

#### Time:

12:30 P.M.

Place:

Thomas & Betts Company, 36 Butler Street, Elizabeth, New Jersey; take New Jersey Turnpike to Exit 13; from exit turn right onto Atlantic Street; at first block turn right onto Third Avenue for seven blocks; just before railroad crossing turn left onto Butler Street; Thomas & Betts plant and parking is in middle of second block.

Bus transportation will also be available. The bus will leave the Holland Hotel, 351 West 42nd Street, New York City, at 11:30 A.M.

Tickets are required and can be obtained by sending a stamped selfaddressed envelope to Frank R. Postma, c/o The Okonite Company, 1144 Clifton Avenue, Clifton, New Jersey 07013 by February 20, 1968. Competitors of Thomas & Betts will not be permitted and thus ticket requests should include the individual's company and position. Those planning to use the bus should also include a check for \$1.75 payable to "Power and Industrial Division, IEEE, New York" with their ticket requests.

### PROFESSIONAL GROUP OFFICERS

#### Automatic Control (G-23)

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N. Y. Section, IEEE

## **EDUCATIONAL PROGRAM - SPRING 1968**



## REVIEW STUDY GROUPS - FOR PROFESSIONAL ENGINEER EXAMINATIONS

This program is designed to prepare candidates for Professional Engineer License examinations in New York and New Jersey. The N. Y. State Board permits graduates of approved schools to take Parts I and II and qualify for "Engineer-in-Training."

### ENDORSED BY NYSSPE

### STRUCTURAL PLANNING AND DESIGN (IEEE-ASME)

Review for Part I, N. Y. Exam., Part II, N. J. Exam. Planning, design construction of buildings and similar structures in timber, steel and concrete, including beams, columns, foundations, piles, girders, riveted and welded sections. Intensive work in problem solving techniques with emphasis on the AISC and ICI codes. Printed notes available.

MONDAYS, Starting Feb. 5, 1968, 6:15-8:30 P.M., 18 Sessions North Cafeteria, 19th fl., Con Edison Co., 4 Irving Place, N. Y. C.

### ENGINEERING ECONOMICS AND PRACTICE (IEEE-ASME)

Review for Engineering Economics Section of Part III, N. Y. Exam. Economic comparisons, fixed and operating costs, accounting and cost analysis, valuations, contracts, etc.

TUESDAYS, Starting Feb. 6, 1968, 6:30-8:30 P.M., 18 Sessions Auditorium, 19th fl., Con Edison Co., 4 Irving Place, N. Y. C.

### MECHANICAL ENGINEERING (ASME)

Review for Mechanical Engineering Section of Part III, N. Y. Exam. Application of mechanical engineering principles to modern practice, shafts, flywheels, springs, gears and other machine elements, steel and heat treatment, internal combustion engines, air compressors, gas turbines, steam power plant cycles and equipment, refrigeration, heat transfer, air conditioning and other special subjects.

WEDNESDAYS, Starting Feb. 7, 1968, 6:30-8:30 P.M., 19 Sessions Rm. 240, Ebasco Bldg., 2 Rector St., N. Y. C.

### ELECTRICAL ENGINEERING AND APPLICATIONS (IEEE)

Review for Electrical Engineering Section of Part III, N. Y. Exam. Electrical Engineering Principles and Applications of: transformers, a-c and d-c machines, transmission lines, filters, networks, impedance matching, bridges, coupled circuits, resonance, harmonics, transients, three phase power, amplifiers, and electronic circuits. Features methods of problem solution based on examinations of past 7 years. Printed notes and past examinations available. Instructors: P. ZARAKAS, Consolidated Edison Co., Inc.

WEDNESDAYS, Starting Feb. 7, 1968, 6:30-8:45 P.M., 18 Sessions Rm. 1427, Con Edison Co., 4 Irving Place, N. Y. C.

### **BASIC ENGINEERING SCIENCES (ASME-IEEE)**

Review for Part II, N. Y. Exam., Part I, N. J. Exam. Practical applications of hydraulics, thermo-dynamics, mechanics, and electrical principles.

THURSDAYS, Starting Feb. 1, 1968, 6:30-8:30 P.M., 19 Sessions North Cafeteria, 19th fl., Con Edison Co., 4 Irving Place, N. Y. C.

#### REGISTRATION INFORMATION

FEES: For all courses except course No. 17 and 23:

- \$20 to members of I.E.E.E., A.S.M.E., I.E.S., NYSSPE \$30 — to all others.
  - For course No. 17:
- \$25 to members.
- For course No. 23: \$30 — to members.
- \$30 to all others. \$40 — to all others.

For advanced registration, except in Courses No. 17, 20 and 22 (mailed one week before 1st session) deduct \$5.00 from fee.

REGISTRATION: Fill out ONE form (see back page) for EACH course attended and mail with payment to the following:

For courses No. 12 to 16

make checks or money orders payable to:

"POWER & IND. GROUP, N.Y. SECT., I.E.E.E." and mail to: David Hawkins, Vice Chairman, Educational Committee, I.E.E.E., Consolidated Edison Co., Room 1250S, 4 Irving Place, New York, N. Y. 10003. Tel. (212) 460-6166.

Instructor: A. PAULLOW, Consolidated Edison Co., Inc.

For course No. 17 make checks or money orders payable to: "I.E.S. NEW YORK SECTION"

and mail to: D. L. Barnwell, Educational Chairman, I.E.S., PATH, Room 200, 265 West 14th St., New York, N. Y. 10011, Tel. (212) 620.7759.

For courses No. 18, 19, 21 and 23

make checks or money orders payable to:

"POWER & IND. GROUP, N.Y. SECT., I.E.E.E." and mail to: Lewis Burnett, Vice Chairman, Educational Com-mittee, I.E.E.E., Consolidated Edison Co., Room 1132, 4 Irving Place, New York, N. Y. 10003, Tel. (212) 460-6363.

For courses No. 20 and 22 make checks or money orders payable to:

"ASME METROPOLITAN SECTION"

and mail to: Eli Kleinman, Educational Committee, A.S.M.E., Metropolitan Section, Dept. of Hospitals, Bureau of Eng. & Maint., 241 Church St., New York, N. Y. 10013. Tel. (212) 566-6940.

### (Registration Forms on Back Page)

Instructor: M. KURTZ, P.E.

and J. F. BATES, Gibbs & Hill, Inc.

COURSE NO. 22

### COURSE NO. 21

### COURSE NO. 18

Manhattan College

COURSE NO. 19

COURSE NO. 20

Instructor: O. ONDRA, Professor of Civil Engineering

Instructor: F. BLACKWOOD, American Can Co.



**Metropolitan Section** 

NEW YORK SECTION IEEE POWER & INDUSTRIAL DIV. PLEASE POST ON BULLETIN BOARD -

# **EDUCATIONAL PROGRA**

### COURSE NO. 12

## SYSTEM STABILITY

### MONDAYS, 6:30 to 8:30 p.m.; Starting March 4, 1968

Ebasco Auditorium, 2 Rector Street, New York, New York Course Coordinator: EMERY FABRI Consolidated Edison Co. Tel. (212) 460-6072

March 4 Introduction & Synchronous Machines 1. Review of direct and quadrature axis reactances and time constants and per unit system.

Speaker: G. LOEHR, Consolidated Edison Co.

- March 11 Transmission of Power Part I 2. Equivalent T and Pi, Phasor equations for power, circle diagram of transmission line. Speaker: G. LOEHR, Consolidated Edison Co.
- March 18 Transmission of Power Part II 3 Control of megawatt and megavar flow. Speaker: G. LOEHR, Consolidated Edison Co.
- March 25 Criteria for Stability and 4 **Generator Capability Curves**

Phasor diagrams and equivalent circuit of generator and motor determination of steady state limit curve. Speaker: J. OLIVER, Amer. Electric Power

5. April 1 **Introduction to Steady State Stability** Single machine system, transmission system, operating connections.

Speaker: L. BRIEGER, Consolidated Edison Co.

6. April 8 The Swing Equation

Inertia, electromagnetic and shaft torque, swing curves, stored energy of large steam turbogenerators. Speaker: H. Y. TSIEN, Public Serv. Elec. & Gas

7. April 15 Solution of the Swing Equation

Step by step swing curve calculations. Speaker: H. Y. TSIEN, Public Serv. Elec. & Gas

8. April 22 Equal Area Criterion Critical angle, discontinuity in the accelerating power, reclosing breakers.

Speaker: L. BRIEGER, Consolidated Edison Co.

9. April 29 Multimachine Stability and Stability **Dígital Computer Programs** 

Speaker: L. BRIEGER, Consolidated Edison Co.

### 10. May 6 Overall System Design

System design for stability with regards to transmission lines, generators, loads, shunt capacitors, frequency changes, system interconnections, etc.

Speaker: W. WOOD, Public Service Elec. & Gas

COURSE NO. 13

## APPLICATION AND DESIGN PEAKING UNITS

### TUESDAYS, 6:30 to 8:30 p.m.; Starting March 5, 1968

Brooklyn Union Gas. Co. Auditorium, 195 Montague Street, Brooklyn, New York Course Coordinator: JOHN TAMBASCO Eastern Division F.E.C. Tel. (212) 264-7367

Application of low cost packaged gas turbine and diesel units for peaking, area protection and power station cranking service has expanded tremendously over the past 10 years. Hydro and pumped storage peaking where available has also expanded. This course is aimed at providing an up-dated picture of the peaking art in theory and application.

March 5 System Peaking Problem 1. Economic evaluation and justification of peaking capacity, model studies.

Speaker: From Westinghouse

#### March 12 Steam Unit Approach 2.

Steam unit applications - base load; peak load and spinning reserve requirements.

- Speaker: R. R. BENNETT, Ebasco Services Inc.
- 3. March 19 Hydro Peaking Pumped storage plants and applications. Speaker: From Allis-Chalmers
- March 26 Diesel Plant Applications 4. Design characteristics, economics, typical installations. Speaker: J. G. CRONIN, Electro-Motive Div., General Motors
- **April 2 Gas Turbine Plant Applications** 5. System requirements and economics Speaker: From General Electric
- April 9 Gas Turbine Plant Design Part I 6. General Electric Co. plant concepts.

Speaker: From General Electric

- April 16 Gas Turbine Plant Design Part II 7. Westinghouse plant concepts. Speaker: From Westinghouse
- 8. April 23 Gas Turbine Plant Design Part III Worthington plant concepts.

Speaker: From Worthington

April 30 Gas Turbine Plant Design — Part IV 9. Pratt & Whitney plant concepts.

Speaker: From Pratt & Whitney

10. May 7 Future Peaking Plant Development Peaking requirements and types at peaking plant amid nuclear base load units.

Speaker: From Westinghouse

COURSES ARE OPEN TO THE PUBLIC

- Special Study Groups



## **SPRING - 1968**

COURSE NO. 14

## INTRODUCTION TO COMPUTERS AND PROGRAMMING

### WEDNESDAYS, 6:30 to 8:30 p.m.; Starting Mar. 6, 1968

Consolidated Edison Co., Rm. 1701-S, 4 Irving Place, New York, New York Course Coordinator: VINCENT DEVINCENZO Consolidated Edison Co. Tel. (212) 460-6162

This course covers two computer languages, numerical methods, and computer programs and techniques available for engineering solving. Future hardware and techniques will also be discussed.

1. March 6 Computer Systems Basic computer hardware and their functions, numbering systems.

Speaker: From General Electric Co.

- 2. March 13 Computer Language Part I Flow diagrams, programming in BASIC and FORTRAN. Speaker: From General Electric Co.
- 3. March 20 Computer Language Part II Programming in BASIC and FORTRAN. Speaker: From General Electric Co.
- 4. March 27 Engineering Problems Critical Path Scheduling, design calculations, economic evaluations, heat losses. Speaker: J. A. SALIN, Ebasco Services

April 3 Matrix Theory

Definitions, Matrix addition, subtraction, and multiplication with computers. Speaker: From General Electric Co.

- 6. April 10 Power System Studies Load flow, stability and short circuit studies. Speaker: From General Electric Co.
- 7. April 17 Distribution System Studies Economic design of distribution systems. Speaker: M. W. GANGEL, General Electric Co.
- 8. April 24 Engineering Data Banks Storage of data for engineering planning, designing, pricing, construction, operating, maintaining and accounting.
  - Speaker: DON LYLE, Ebasco Services
- 9. May 1 Digital Control Event logging load frequency control, load dispatching, time sharing performance calculations. Speaker: I. E. CAMPBELL, General Electric Co.
- 10. May 8 Graphics

5.

Description of latest hardware and software advances in graphic display area.

Speaker: From IBM

COURSE NO. 15

## NEW DEVELOPMENTS IN POWER ENGINEERING

### THURSDAYS, 6:30 to 8:30 p.m.; Starting Mar. 7, 1968

Consolidated Edison Co., Rm. 1701, 4 Irving Place, New York, New York Course Coordinator: VINOD KOTECHA Consolidated Edison Co. Tel. (212) 460-6293

The course provides a comprehensive survey of the new developments in the power engineering in both Europe and the United States.

1. March 7 Nuclear Power

Present and future outlook with special emphasis on economy and Breeder Reactor Developments in the United States.

Speaker: From Westinghouse

- 2. March 14 Nuclear Power History and the present state of Nuclear Power Generation Developments in Europe. Speaker: AKE MOLINE, ASEA Electric, Vasteras, Sweden
- 3. March 21 New Developments in ERV 500 KV, 750 KV and 1150 KV Substation and Transmission.

Speaker: From English Electric, England

- 4. March 28 High Voltage Direct Current Transmission Systems and recent developments in HVDC. Speaker: OLON BERGLAND, ASEA Electric, Sweden
- 5. April 4 Underground Cable Developments Special emphasis on EHV underground transmission and distribution.

Speaker: DR. R. BURRELL, Con Edison, New York

- 6. April 11 Underground Residential Distribution New developments in URD and Transmission.
  - Speaker: From General Electric Co.
- 7. April 18 Magnetohydrodynamics Background and the present state of technology in MHD. Speaker: DR. J. TENO, AVCO, Everrett Research, Mass.
- 8. April 25 Electrogasdynamic Power Generation Speaker: MEREDITH GOURDINE, Gourdine Systems Inc., Livingston, N. J.
- 9. May 2 Cryogenics

Speaker: DR. H. M. LONG, Linde Products, Division of Union Carbide, Tonawanda, N. Y.

- 10. May 9 Engineering Aspects of Fluidics Speaker: From Automatic Switch Co., N. J.
- 11. May 16 Super Batteries and Electric Vehicles New developments in electric storage systems. Speaker: ROBERT ARONSON, Electric Fuel Propulsion, Inc., Ferndale, Michigan
- 12. May 23 The Art of Pollution Control

Developments in pollution control and outlook.

Speakers: R. G. RAMSDELL, O. G. HANSON, Consolidated Edison Co. of New York

## COURSE NO. 16 - FACILITIES ELECTRICAL DESIGN

This will be a 20 session course in Facilities Electrical Design for Industrial, Commercial and Governmental Applications. The course will be oriented toward the man with engineering school background and about five years of design experience. In addition to lectures on voltage problems, equipment selection, fault currents and distribution methods, there will be an emphasis on System Planning and the Coordination problems between the Electrical Design group and the other design groups involved in the design of the whole facility. Examples of specific facilities, such as industrial plants (and perhaps a hospital or shopping center) will be offered. Homework assignments will be assessed by both students and instructors. Each lecturer will present 10 sessions,

THURSDAYS, Starting Feb. 1, 1968, 6:30-8:30 P. M., 20 Sessions General Electric Auditorium, 570 Lexington Ave. (51st St.), N. Y. C. COURSE COORDINATOR: HARRY JOHNSON, Automatic Switch Co., Tel: (212) DI 4-3765

### COURSE NO. 17 FUNDAMENTALS OF LIGHTING THURSDAYS, 7:00-9:00 p.m.; Starting February 1, 1968

Holophane Light & Vision Institute, 1120 Ave. of Americas, 13th Floor, New York, N. Y. (Entrance: West 43rd St.)

Course Coordinator: D. L. BARNWELL The Port of N. Y. Authority Tel: (212) 620-7759

A basic course covering the important fundamentals, problems, and techniques of the various lighting fields. Special attention is given to current problems and trends. All subjects will be discussed from the practical standpoint of the contractor, engineer or designer in the field.

1. February 1 Scier	ce of Lighting Speaker: E. Berger, Holophane Co.	insight into the process	s of reading which will foster co
2. February 8 Light	ing Fundamentals Speaker: E. Berger, Holophane Co.	1. March 7 Intra	oduction to Speeded Reading
3. February 15 Ligh	<b>t Sources</b> eaker: B. V. MCLEAN, General Electric Co.	2. March 14 The	First Step
4. February 29 Con	trol of Light Speaker: C. W. CLARKSON, Corning Glass	3. March 21 Me	chanics of Reading
5. March 7 Lighting	Design Speaker: Irving Fishman, Wald & Zigas	4. March 28 Par	agraph Patterns and Functio
6. March 14 Circuit	Design Speaker: Irving Fishman, Wald & Zigas	5. April 4 Adjus	ting Rate
7. March 21 Curren Store Lighting	t Concepts of Office and	6. April 11 Artic	cle Patterns
Speake	r: JULES HORTON, Syska & Hennessy, Inc.	7. April 18 Artic	cle Patterns
8. March 28 Industr Lighting Installation	ial Lighting and Economics of ons Speaker: DONALD ROWAN, Holopbane Co.	8. April 25 Sum	marizing
9. April 4 Outdoor Speake	Lighting r: W. C. CLEMENT, Westingbouse Electric	9. May 2 Broade	ening Horizons
10. April 11 "Heat w	vith Light" Deaker: DONALD THOMAS, Sylvania Electric	10. May 9 Evalua Continued Impr	tion and Planning for rovement
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I intend to apply	Fee Paid \$ (Cash, Check, M.O.) Date By	□ NON-MEMBER I intend to apply for membership in	Fee Paid \$ (Cash, Check, Date By

Instructors: C. GOLDSTEIN, P.E., Walter Kidde Construction and H. WOLCOFF, M.E., Naval Facilities Engineering Command

## COURSE NO. 23 SPEED READING FOR ENGINEERS THURSDAYS, 6:30-8:30 p.m.; Starting March 7, 1968

Room 503, Con Edison Co., 4 Irving Place, N. Y. C.

Instructor: E. E. COING, Assistant to Director of Educational Work, Public Service Electric & Gas Co. Former member of NYU School of Commerce faculty. Has over 30 years experience teaching courses for business and industry.

This course is designed to help engineers to keep abreast of the literature in their fields, and of their general reading. It improves reading speed and retention through skills taught and practiced. It releases reading power held back by inefficient habits and attitudes. Engineers may expect improved speed in their readetention of information, and an g which will foster continuing

1 ho9 op	2. March 11 Competer Longue
2. March 14 The F	irst Step
3. March 21 Mech	anics of Reading
4. March 28 Parag	graph Patterns and Functions
5. April 4 Adjustin	ig Rate inseriord 12 denoid at
5. April 11 Article	Patterns
7. April 18 Article	Patterns
8. April 25 Summa	rizing
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). May 9 Evaluatio	on and Planning for
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### NORTH JERSEY SECTION

Study Group

Spring, 1968

### 8 Sessions

### **Electrical Underground Residential Distribution**

Sessions will cover various design, installation and operating criteria.

### Feb. 21 — Fundamental Concepts and System Design

Evolution of URD-plat layout analysis-Primary system design - Transformer and secondary system design.

### Feb. 28 — Cable Design and Application

Primary, secondary and service cable designs for direct burial, duct, and cable in conduit systems — Cable construction, standards and tests — Cable ampacity.

### March 6 — Terminations and Splicing

Design theory — Dielectric stresses, Environmental factors. Application Engineering — Terminal devices, splice devices.

### March 13 — Transformer Design and Application

Design criteria — Industry standards and tests — Loading — Internal switching and overcurrent devices — Review present and future designs of U.R.D. transformations.

### March 20 - System Sectionalizing and Protection

Sectionalizing equipment — types and designs available, manual and automatic schemes. Protective equipment overcurrent and lightning.

### March 27 — Installation Practices, Operation and Maintenance

Trenching methods — Cable installation — Equipment installation — Operating Procedures, Testing and Fault locating methods.

### April 3 — High Rise Apartment Distribution Systems (Vertical URD Systems)

System layout, Equipment available, Grounding, System Protection and coordination.

### April 10 — Three Phase Commercial and High Density Garden Apartments

Primary System Design — Sectionalizing and overcurrent protection — Ferroresonance — Transformer and secondary system design — Equipment types and designs.

Time	•	•							7:00 P.M. to 9:00 P.M.	- Wednesday Evenings - Feb. 21 to April 10, 1967
Locatio	m				•				Punchbowl Room, Jerse at Punchbowl Road, Mo	y Central Power and Light Company, Madison Avenue rristown, New Jersey.
Fee			•	•				•	\$25.00 to members (I.E.I or early registrations.	E.E., ASME, etc.); \$35.00 to non-members. \$5.00 discount
									Registration will be I	mited to 75.
						Ser	d B	legis	ration Forms To: MR. Jerse Mad Mor Phon	P. E. WATSON ey Central Power & Light Co. ison Avenue at Punchbowl Road ristown, New Jersey ne: 539-6111, Extension 417
							_	F	EGISTRATION FO	RM — U.R.D.
Name										
Firm						******				Phone
			(	Check	E	nelos	ed		Member: \$20.00	; \$25.00 after Feb. 14

Non-Member: \$30.00 .....; \$35.00 after Feb. 14

Please make checks payable to: North Jersey Section, I.E.E.E.

### Westchester-Rockland Sub-Section **Computer Assisted** Instruction

The February meeting of the Westchester-Rockland Subsection will feature a talk on "Computer Assisted Instruction" by Dr. E. N. Adams, Director of Assisted Instruction at the IBM T. J. Watson Research Center.

The concept of "Teaching Machines", developed over the past decade, has advanced to a state where considerable experimentation and trial use is being made with educational computer terminals.

Three techniques incompassing both aural and visual interactions with the student, can take advantage of the highly flexible control possible through modern digital computers. This meeting will feature a "hands-on" demonstration of typical educational terminals. The featured section for this meeting will be the IEEE group on education.

Date:

February 14, 1968

Time: 8:00 P.M.

Place:

IBM - T. J. Research Center Yorktown Heights, New York (Taconic Parkway at Route 134) Coffee will be available during a social

period starting at 7:30 P.M. Members and their guests are cordially invited.

### **PRINCETON MAGNETICS BORAM** (Block Oriented Random Access Memory)

The primary aim of the BORAM program is to replace the mechanically driven computer secondary memories with an all-electronic memory which contains no moving parts. This will result in higher reliability, particularly for military applications, and also in much greater speeds. One approach in this program is based on the use of a traveling acoustic pulse to write and read a thin film memory. A second approach uses a traveling domain wall to accomplish the same purpose.

Date:

Wednesday, February 21, 1968 Time: 8:00 P.M. Place: Murray Hall - Room 120 **Rutgers University** New Brunswick, N. J. Speaker: Mr. David Hadden U. S. Army Electronics Command Fort Monmouth, N. J. **Pre-meeting Dinner:** 6:00 P.M. Alumni-Faculty Club 199 College Avenue New Brunswick, New Jersey Reservations: Mrs. Helen Yefko Department of **Electrical Engineering Rutgers University** 247-1766, Extension 6325

### Joint Metropolitan Engineering Management

### What

Are engineers properly trained to enter the engineering profession? -A panel discussion.

### When:

Thursday, February 8, 1968 6:00 P.M.

### Where:

Island Inn Motel (near Roosevelt Field) Old Country Road Westbury, Long Island

### Format:

Cocktails (at cash bar): 5:30 P.M. Dinner: 6:30 P.M. Program: 8:00 P.M.

Discussion by members of the teaching profession on the training of new engineers.

Discussion by members of the engineering management on the problems associated with new engineers. Discussion by participants and the panel.

### The Panel:

Dr. A. Berlad Chairman, Department of Mechanics College of Engineering State University of N. Y. Prof. Jerome Klosner Department of Aerospace Engineering and Applied Mechanics Brooklyn Polytechnic Institute Prof. Richard Dolin Department of Engineering Science Hofstra University Hempstead, Long Island Mr. Wilfred O. Uhl Manager of Electrical Engineering Long Island Lighting Company Hicksville, Long Island Mr. A. J. Hendler Director of Engineering Division Airborne Instrument Labs. Deer Park, Long Island Mr. Fred A. Donennebrink Engineering Manager Grumman Aircraft Company Bethpage, Long Island

### **Moderator:**

Mr. Joel Greene Deputy General Manager **Special Projects** Kollsman Instrument Corporation Elmhurst, New York

### Participants:

Engineers, supervisors, executives professors and members of the teaching profession, (IEEE-EMG Members and Guests)

By Reservation Only: Total price of dinner and workshop is \$6.00 ("cash bar" is extra)

Make your check to "Met. EMG/IEEE" and mail to our Treasurer: Mr. Stanley Kramer, 14 Thunderbird Drive, Oakland, N. J. 07436

For more information call: Joel Greene 212 - 899-5600, Ext. 508/509.

### **RESERVATION FORM**

To: S. KRAMER 14 Thunderbird Drive Oakland, N. J. 07436

l (we) wish to register f ning dinner-seminar on Thur ary 8, 1968. I understand t of the dinner and workshop	or sda he is	your eve- iy, Febru- total cost \$6.00. A
check for	is	enclosed.
Name		
Position		
Company		
Phone No.		
Address		
Zip		

Make checks payable to "Metropolitan Chapter, EMG/IEEE."

### **Atomic Second Adopted As** International Unit of Time

A new definition of the international unit of time, the "second," was adopted by the 13th General Conference on Weights and Measures at its meeting on October 13 in Paris. The second has now been defined in terms of a characteristic rate of the cesium-133 atom.

The General Conference on Weights and Measures, convened every few years, is a meeting of delegates from the countries (now numbering 40 and including the United States) adhering to the Treaty of the Meter. It is the principal body concerned with working out international agreements on physical standards and measurements. At the conference it was agreed overwhelmingly that the moment had come to replace the existing definition, based on the carth's orbital motion around the sun, by an "atomic definition:" The second is the duration of 9,192,631,770 periods of the radiation corresponding to the transition between the two hyperfine levels of the fundamental state of the atom of cesium-133.

The frequency assigned to the cesium was carefully chosen to make it impossible, by any existing experimental evidence, to distinguish the new second from the "ephemeris second" based on the earth's motion. Therefore, no changes need to be made in data stated in terms of the old standard in order to convert them to the new one.

However, the atomic definition has two important advantages over the preceding definition: (1) it can be realized (i.e., generated by a suitable clock) with sufficient precision,  $\pm 1$  part in a hundred billion (1011) or better, to meet the most exacting demands of current metrology; and (2) it is available to anyone who has access to or who can build an atomic clock controlled by the specified cesium radiation, and one can compare other high-precision clocks directly with such a standard in a relatively short time-an hour or so as against years with the astronomical standard.

JOINT METROPOLITAN
INSTRUMENTATION AND
MEASUREMENTS
SPRING 1968 LECTURE SERIES
STANDARDS OF
ELECTRICAL MEASUREMENTS
A SERIES OF SEVEN LECTURES
MARCH 6 TO MAY 1
TIME - 7:00 - 9:00 P.M.
LOCATION
WESTERN UNION AUDITORIUM
160 W. BROADWAY
NEW YORK, NEW YORK
Send registration forms to:
ED BROWN
Brogan Associates, Inc.
80 Urban Avenue
Westbury, New York 11590
DAN COTTE, JR.
RFL Industries, Inc.
Powerville Road
Boonton, New Jersey
REGISTRATION FORM
(At least one week in advance)
Name
Job Title
Business Address
Phone
Technical Society Affiliation

Check enclosed (Member \$20) (Non-Member \$30) (Student Member \$1)

Please make checks payable to: New York Joint Chapter of Instrumentation and Measurements.

### STANDARDS OF ELECTRICAL MEASUREMENT

Rapid expansion of technology has focused considerable attention on the need to verify the accuracy and repeatability of all types of equipment used in industry. The Bureau of Standards provides the basis for absolute measurement in all fields of science. Individual organizations maintain their own standards of measurement traceable to the Bureau of Standards. This study group will provide the engineer a much needed source of information about standards of measurement. Because the field is quite extensive, the scope will be limited to electrical measurements of high accuracy.

I. March 6, 1968 — INTRODUCTION F. L. HERMACH, Chief Electrical Instrument Section National Bureau of Standards Washington, D. C. 20234

. . . Principle and basic methods of establishing the fundamental electrical standards at the National Bureau of Standards (the volt . . . the ohm) in terms of the defined units of CGS or MKS system. Graphic illustrations of how standards for other electrical quantities are established at the National Bureau of Standards by chains of measurements based on those fundamental standards . . . brief outline of the principles and basic methods for establishing the standards of resistance and reactance, DC and AC voltage, power and energy, and for extending the ranges of measurements by ratio standards . . . how the accuracy of standards and laboratory measurements can be assessed. In conclusion, the speaker will discuss the current problems of traceability of calibration at the National Bureau of Standards.

 II. March 13, 1968 — DIRECT CURRENT RESISTANCE MEASUREMENTS
 A. L. DANEMAN, Leeds and Northrup Company Philadelphia, Pennsylvania
 III. March 27, 1968 — CAPACITANCE

AND INDUCTANCE STANDARDS JOHN F. HERSH, Engineer General Radio Company W. Concord, Massachusetts 01781

- IV A. April 3, 1968 MEASURING DC VOLTAGE AND CURRENT J. C. MELCHER, Head of Instruments and Control Group Market Development Division Leeds and Northrup Company Philadelphia, Pennsylvania
- IV B. W. G. AMEY, Manager Research Division Leeds and Northrup Company Philadelphia, Pennsylvania

V. April 17, 1968 — AC VOLTAGE AND CURRENT MEASUREMENTS AT POWER FREQUENCIES WALTER TROEGER, Supervisor Product Engineering Weston Instrument Inc. Newark, New Jersey

VI. April 24, 1968 — POWER AND ENERGY MEASUREMENTS JOHN PHILBRICK, Specialist Measurements Standards Meter Department General Electric Company Somersworth, New Hampshire

VII. May 1, 1968—R.F. MICROWAVE VOLTAGE STANDARDS MEASUREMENTS WALLACE F. WHITE Project Engineer Ballantine Laboratories, Incorporated Boonton, New Jersey

### N. Y. Section and Computer Group Turning Points in Computer Design

Computer users have already altered our society and are planning for even greater change. More rapid and far reaching changes become possible with each new wave of machines. But what if computer design followed a different course to the present . . . if designers at important decision points had turned differently? Would other decisions have produced far more "power" and change or less? Or would little be different?

Computer authority James Pomerene, senior staff member at the Armonk headquarters of International Business Machines Corporation will discuss "What if . . ." His critical review of some important turning points is intended to put computer development and some of its effects into perspective for the thoughtful engineer. The meeting will be held Feb. 15 at 7:45 P.M. in the second-floor auditorium of Burroughs Corp., 605 Third Avenue (40th St.). A no-reservations-needed premeeting dinner will be held at Longley's Restaurant, Third Avenue and 39th St., at 6:00 P.M.

### N. Y. POWER AND INDUSTRIAL General Meeting

Subject:

"ELEVATORS—Present and Future" Speakers:

Charles W. Lerch President of Charles W. Lerch & Associates, Elevator Consulting Engineers John Lusti Chief Engineer Otis Elevator Company John Suozzo Manager of Engineering Dept. Elevator Division Westinghouse Electric Corp. William Sturgeon Editor, Elevator World Magazine Place:

Consolidated Edison Company 4 Irving Place New York, N. Y. 19th Floor Auditorium

Date:

Wednesday, March 27, 1968

Time: 6:30 P.M.

0.00 1.00

Refreshments: 6:00 P.M.

### New York Power and Industrial Round Table Meeting

Subject:

The All Electric Commercial Building Under discussion will be the pro's and con's of "The All Electric Commercial Building" in the New York Metropolitan area, having representative sizes of 10,000 sq. ft., 100,000 sq. ft., and 1,000,000 sq. ft. areas. Operating costs, relative maintenance, utility, service, entrance equipment, economic compariSons, and architectural treatments will be included in the presentation. Time for questions and discussion from the floor will be provided.

### Moderator:

Vic Buck—Chief Electrical Engineer Pope, Evans & Robbins 11 East 36th Street

New York, N. Y. 10016

### Speakers:

Paul Greiner — Technical Director

Electric Heating Assoc. Inc.

750 Park Avenue New York, N. Y.

An additional speaker from Westinghouse Corporation will also be present.

Place:

General Electric Company

Auditorium

570 Lexington Avenue New York, N. Y.

Date: We Time:

Wednesday, February 14, 1968

6:30 to 8:30 P.M.

### Joint Metropolitan Instrumentation and Measurement

### Modern DC Ratiometric Instrumentation and Technique

Within the past decade the requirement for precision "DC" observations has increased in volume by orders of magnitude. Not only has the need increased for quick and accurate knowledge of the basic DC parameters — voltage, current, resistance and ratio — but also of many DC related variables such as temperature, strain, AC voltage and current and RF power. Thus, there is a rapidly growing population of workers using precision "DC" or DC related instrumentation and an urgent need for knowledge in the latest DC techniques. Date:

February 27, 1968

Speaker:

Loebe Julie-Julie Research Labs.

Time:

9:00 A.M.

Place:

Western Union Auditorium

60 Hudson Street, New York, N. Y. Topic:

Ratiometrics

A Review of Fundamental Theory

and its Applications in Test,

Calibration and Research.

Relatively recently there have been many significant inventions of DC instrumentation and improvements in measurement technique. Specifically a x10 to x100 advance in accuracy is achievable in the industrial environment. This has led to a rebirth of interest and revolutionary growth in DC related engineering as applied to precision resistance nctworks, Zener diodes, DC bridges and transducers.

At 1:30 P.M. — "Application and Design of Modern Ratio Networks in Analog and Hybrid Computers"

### Speakers:

Ronald Emley and Gavino Spanpanato Electronic Associates, Incorporated Discussion period following each speaker's presentation.

Registration Fee: \$5.00.

Enclosed is a check for \$

for \_\_\_\_\_\_ attendees to the seminar on DC Ratiometric Measurement Techniques.

N	я	m	es	
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Company \_\_\_\_\_ Mailing Address \_\_\_\_\_

Telephone No.

Make check payable to: N. Y. IEEE Joint Chapter I-M.

Mail check and registration to: W. A. KNOOP Gawler-Knoop Company Roseland, New Jersey Phone: 201 - 226-4545

# Two Ballantine Voltmeters for Laboratory, Production, and Q.C. Needs

Ballantine solid state, wide-band voltmeters, one averageresponding and one true-rms responding, feature exceptionally wide frequency ranges, high accuracy over entire 5-inch log scales, and operation from built-in rechargeable battery or line



## BALLANTINE VOLTMETER 2 Hz to 6 MHz

Battery or line-powered--1% accuracy at midband

### MODEL 303

 Voltage range 300 «V to 330 V (models with 20 dB probe, 1 mV to 1000 V) • 1% accuracy, 30 Hz to 1 MHz
 Logarithmic indicator for uniform accuracy over entire 5 inch scale • Average responding • Built-in rechargeable battery (models for line

only) • Isolated signal ground • 40 dB amplifier, 2 Hz to 6 MHz • PRICES: Model 303 (Battery/line/no probe) \$360; Model 303-01 (line only/no probe) \$305; Model 303-50 (Battery/line/with probe) \$410; Model 303-51 (line only/with probe) \$355.

## BALLANTINE TRUE RMS Voltmeter 10 Hz to 20 MHz

### **Battery or line-powered**

### MODEL 323

 Voltage range 300 #V — 330 V (as null detector to 70 #V) • 2% accuracy
 50 Hz to 10 MHz • Logarithmic indicator for uniform accuracy over entire 5 inch scale • True-

RMS responding • Built-in rechargeable battery (optional model for line only) • Isolated signal ground • DC output of 0.1 - 1.0 V for each 10 dB range for application to recorder or DVM where output is proportional to mean square of input ac voltage. • PRICES: Model 323 (Battery/line) \$560; Model 323-01 (line only) \$505.

Write for brochures giving complete details



CHECK WITH BALLANTINE FIRST FOR DC AND AC ELECTRONIC VOLTMETERS/AMMETERS/OMMMETERS, REGARDLESS OF YOUR RE-QUIREMENTS. WE HAVE A LARGE LINE, WITH ADDITIONS EACH YEAR. ALSO AC/DC LINEAR CONVERTERS, AC/DC CALIBRATORS, WIDE RAND AMPLIFIERS, DIRECT-READING CAPACITANCE METERS, AND A LINE OF LABORATORY VOLTAGE STANDARDS FOR 0 TO 1,000 MHz,

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