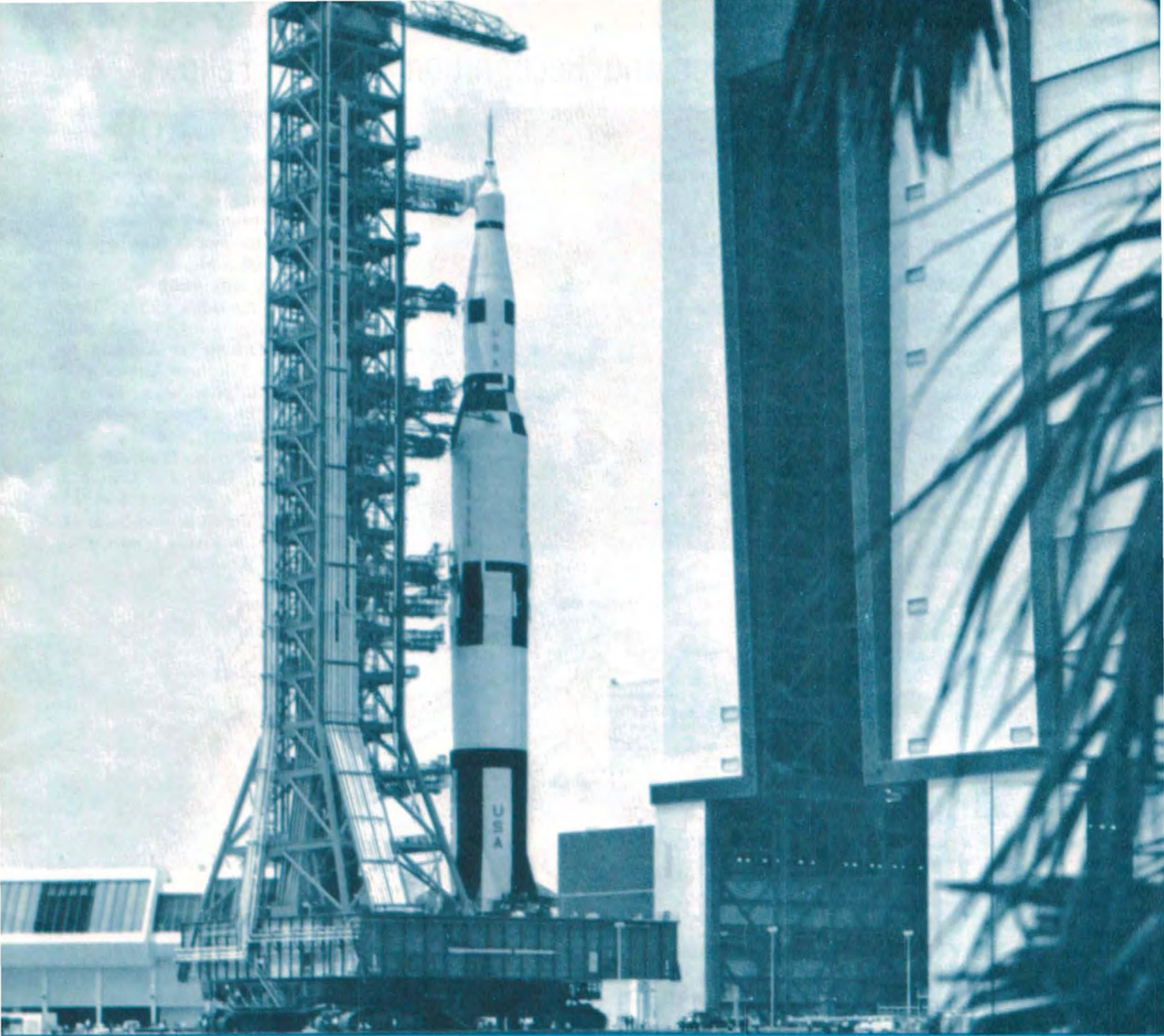


The IEEE
Newsletter
The Magazine of the North Jersey Section

Relay Communications in Project Apollo
Bell Telephone Laboratories, Whippany, N. J. February 20

Annual Section Dinner Dance
Governor Morris Inn, February 15

Volume 15, Number 6
February, 1969

Annual Section Dinner and Recognition of New Fellows

The North Jersey Section Annual Dinner Dance honoring the newly elected Fellows of the Institute who are members of the North Jersey Section will be held on Saturday evening, February 15, 1969, at the Governor Morris Hotel, Whippany Road, Morristown, New Jersey.

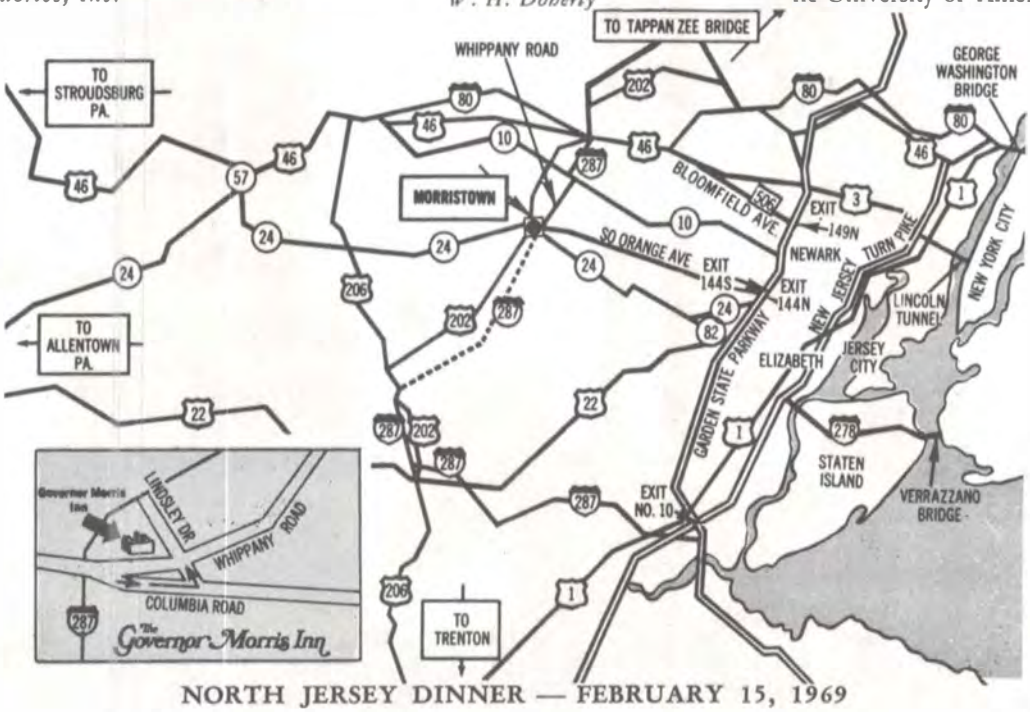
Honored guests include:

W. F. Chow, *Bell Telephone Laboratories*
L. Dwon, *American Electric Power Service Corp.*
J. L. Flanagan, *Bell Telephone Laboratories*
U. F. Gianola, *Bell Telephone Laboratories*
R. E. Gray, *ITT Federal Laboratories*
J. B. Minter, *Components Corp.*
F. H. Shepard, *Shepard Laboratories, Inc.*

W. H. Doherty

A Dutch Treat cocktail hour will begin at 6:00 P.M. followed by dinner (London Broil) at 7:00 P.M. The guest speaker this year will be Mr. W. H. Doherty, Assistant to President, Bell Telephone Laboratories. Following the presentation of the awards there will be dancing until 1:00 A.M.

Mr. Doherty's talk, which will be of equal interest to the ladies, will be "Electrical Engineering — Old and Still Young." Mr. Doherty is Assistant to President at Bell Telephone Laboratories, Inc., Murray Hill, New Jersey. He is a Fellow of the IEEE, a former member of its Board of Directors, and a past recipient of the Morris N. Liebmann Memorial Prize. Mr. Doherty is Chairman of the Board of Engineering Societies Library in New York City and holds an honorary Doctor of Science from Catholic University of America.



NORTH JERSEY DINNER — FEBRUARY 15, 1969

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

Dr. M. M. Irvine
Bell Telephone Laboratories
Whippany, New Jersey 07981 (201) 386-4141

Please forward.....tickets at $5.00 each to (Checks payable to N. J. Section IEEE):

NAME .....

STREET .....

TOWN .....

STATE ..... ZIP .....

I would like to share a table with the following:

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The IEEE **Newsletter**

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Volume 15 February 1969 No. 6

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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.

NORTH JERSEY SECTION OFFICERS 1968-1969

J. G. O'Grady

M. M. Irvine

Chairman ..... Joseph G. O'Grady
Vice Chairman ..... Merle M. Irvine
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Secretary ..... Robert G. Sokalski
Member-at-Large ..... Harry Clark
Member-at-Large ..... Carl C. Torell
Jr. Past Chairman ..... Bernard Meyer

Relay Communications in Project Apollo

At a joint meeting of the North Jersey Section and Comm Tech Group on February 20th, Mr. J. T. Raleigh of Bellcomm, Inc. will discuss Relay Communications in Project Apollo.

The Project Apollo space vehicle has many different communications and tracking equipments. The most interesting system configurations are used during the lunar mission phases. Each of the radio links is used for voice and some form of telemetry or tracking. All of these systems were developed to meet specific requirements of the program. The requirements will be reviewed and the functional design of the overall communications systems between the men on the moon and Earth will be discussed.

The full duplex voice conferencing configuration for the astronauts on the lunar surface uses three VHF links and relay through the Unified S-Band system. Biomedical data and space suit telemetry from each astronaut is also relayed to the Earth.

About the Speaker

Mr. James T. Raleigh was born in St. Paul, Minnesota on June 28, 1934. He received the B.S. degree in Engineering Science at the Pennsylvania State University in 1957. He joined the staff of the Bell Telephone Laboratories, Inc., Murray Hill, New Jersey, and worked on crystal frequency standards and telephone transmission measuring equipment. In August 1962, Mr. Raleigh transferred to Bellcomm, Inc., Washington, D. C. At Bellcomm, he has been doing system studies and analysis of communication systems for the National Aeronautics and Space Administration, Office of Manned Space Flight. In particular, Mr. Raleigh has worked with the NASA Centers in the areas of the Unified S-Band System and the VHF voice system requirements and design.

The cover shows an Apollo/Saturn V Facilities Test Vehicle being moved to a launch pad.

Time: Thursday, February 20, 1969; 8:15 P.M.

Place: Bell Telephone Laboratories, Whippany, N. J.

Pre-Meeting Dinner: 6:15 P.M.; Llewellyn Farms, at Intersection of Routes 10 and 202, Morris Plains.

CALENDAR

Saturday, February 15

North Jersey Section — **Annual Dinner Dance Honoring New Fellows and Award Winners,** Governor Morris Inn, Morristown, N. J. 6:00 P.M.

Wednesday, February 19

P & I Division — **Solid State Logic as Applied to Elevator Systems,** Con Ed Auditorium, 4 Irving Place, N. Y. C. 6:30 P.M.

Thursday, February 20

New York Comm Tech — **Lecture Series — "FM Systems,"** New York Telephone Co., 140 West Street, N. Y. C. 6:30 P.M.

North Jersey Section and Comm Tech — **Relay Communications in Project Apollo,** Bell Telephone Laboratories, Whippany, N. J. 8:15 P.M.

Thursday, February 27

Metropolitan Electron Devices — **Recent Advances in Avalanche and Transferred Electron Devices,** ITT Laboratories, Nutley, N. J. 8:00 P.M.

Wednesday, March 19

North Jersey Power — **Ferroresonance on Distribution Systems,** Punchbowl Room, Jersey Central/New Jersey Power and Light Company, Madison Avenue at Punchbowl Road, Morristown, N. J. 7:30 P.M.

LECTURE SERIES — SPRING, 1969

SEMI-CONDUCTOR DEVICES AND THEIR USE IN POWER APPLICATIONS

This seven-session study group is intended to give a broad background on the range of power type semi-conductors available today and their capabilities in relation to present day industrial control technology. The presentation will be oriented toward updating and broadening the basic knowledge of engineers, technicians, sales, plant and maintenance personnel. Coverage will also include operation and application of those devices that will be available in the near future.

The instructors will be some of the top expert's from leading manufacturers of semi-conductor devices and control systems.

March 20, 1969 — Introduction

Evolution of power semi-conductors, variety of power devices in use today and a glance at what is just beyond the horizon.

Instructor to be announced
Westinghouse

April 3, 1969 — Basic Circuitry

Rectifiers and SCR circuits, Basic A.C. phase control, including theory of operation, capabilities, and application to such products as pumps, fans, and hoists.

R. W. Fox, Appl. Engr.
Semi-Cond. Products Dept., General Electric

April 10, 1969 — D.C. Motor Control Applications

Variable speed D.C. controls for D.C. drive systems including special industrial requirements, regulators, systems and system protection.

B. G. Wheeler, Mgr.
Drive Systems Div., Cutler Hammer

April 17, 1969 — A.C. Motor Control Applications

A.C. variable frequency drives, theory of operation, application and use in industry today, and future developments.

D. L. Schoen, Manager
Variable Frequency Drives, Reliance Electric Co.

April 24, 1969 — Transportation Power and Control

1st Hour — Solid state control for ignition systems, switching circuits, and propulsion.

J. McCartney, Ch. Engr.
Wagner-Tung-Sol

2nd Hour — Electric powered vehicles.

Dr. Victor Wouk, Mgr.
Electronic Research, Gulton Ind.

May 1, 1969 — Heating and Air Conditioning

Both industrial and residential applications for automatic sensing and control of burners, fans and heating cycles; fan modulation for air conditioning and condenser units; spark ignition systems; automatic sequencing of electric heaters; and future humidity and overall comfort index control.

Instructor to be announced
Klixon Div. Texas Instruments

May 8, 1969 — Lighting, Appliance, & Power Tool Control

Application of solid state controls to universal and small a-c motors, dimming and high-frequency lighting, and future developments, featuring RFI effects, system protection, and interference effects on solid state devices.

TIME . . . . . 6:30-8:30 P.M. Thursday evenings — beginning March 20, 1969.

PLACE . . . . . Punch Bowl Room, Jersey Central - New Jersey Power & Light Co., Madison Ave. at Punch Bowl Road, Morristown, N. J.

FEE . . . . . $30.00 to members of IEEE, ASME, AIME, ASCE, etc.; $35.00 to non-members.

SPECIAL OFFER — A $5.00 savings for advance registrants whose mail registrations are received prior to March 13, 1969.

ADVANCE REGISTRATION FORM

Mail to: Peter A. Drobach, General Electric Company
25 E. Willow Street, Millburn, New Jersey 07041
Phone: (201) 376-9000

Please enroll me in the **SEMI-CONDUCTOR DEVICES AND THEIR USE IN POWER APPLICATIONS** Course, Spring 1969.

Name..... Tech Society.....

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Check or Money Order Enclosed _____ Member $25.00 (after March 13, $30.)

_____ Non-Member $30.00 (after March 13, $35.)

Make checks payable to: North Jersey Section IEEE

Using Ferroresonance on Distribution Systems

The March meeting of the North Jersey Power Group will be a general one at which Alfred E. Kilgour will present the topic Analyzing and Understanding Ferroresonance on Distribution Systems.

Ferroresonance is the same phenomenon on distribution feeders as it is on tranmission lines, but its causes and effects are generally different. An analysis plus simulation helps to explain these differences. Ferroresonance on distribution circuits appears to be occurring more frequently as more and more sections of underground cable are being added to overhead feeders. This analysis plus results obtained using a demonstrator are an aid toward gaining an insight into the nature of ferroresonance encountered on distribution systems.

About the Speaker

Alfred E. Kilgour received his B.S. from Albian College and his BSEE from M.I.T. While at M.I.T., Mr. Kilgour was a Cooperative Student with General Electric Co. Following graduation he spent one year with Hanna Furnace Company (Subsidiary of Great Lakes Steel Corporation). He then worked as an Electrical Engineer, Technical Planning Section Commonwealth and Southern Corporation, in Michigan, for a period of three years. Since 1942, Mr. Kilgour has been associated with Allis-Chalmers in application and engineering concerning switchgear, circuit breakers and systems engineering of Power, Transmission and Distribution Systems.

Some of Mr. Kilgour's Professional Achievements include: Project Coordinator for Field Rebuilding 500 KV Power Transformers; Senior Systems Engineer sponsoring construction and operation of Simulator for EHV-AC/DC Transmission System jointly with Edison Electric Institute and University of Wisconsin; Project Engineer, Extra High Voltage Direct Current Test Facility—(EHV-d.c.) for Bonneville Power Administration—1,000,000 v d.c.; and participation in the development and application and control of electrical equipment for C Stellerator Project at Princeton, New Jersey. The Stellerator is a research device for studying problems associated with producing controlled thermo-nuclear energy. And participation in field test programs related to oil circuit breaker development as applied to overhead lines (23 kv) and gas filled cables (138 kv). Mr. Kilgour is also a Senior Member of the IEEE Power Group, and Industry and General Applications Group. He has a number of technical papers to his credit.

Time: Wednesday, March 19, 1969; 7:30 P.M. Meeting is open to all interested. *Place:* Punchbowl Room, Jersey Central/New Jersey Power and Light Company, Madison Avenue at Punchbowl Road, Morristown, New Jersey.

Student Affairs

CALENDAR

Newark College of Engineering Day Branch

February 4 — The Engineering Division of the Aluminum Corporation of America will sponsor a panel discussion on the topic of Plant Engineering in Room 311-F at 2:00 P.M. *February 11* — Dr. Hoffman of NASA will discuss the role of Engineering in the success of the Apollo 8 and other NASA programs. The meeting will be held in Room 311-F at 2:00 P.M. Non-IEEE Members are cordially invited.

February 18 — A lecture on the field of Modern Power Engineering will be presented by the Public Service Electric and Gas Co. in Room 311-F at 2:00 P.M.

Fairleigh Dickinson University

The Fairleigh Dickinson Student Branch sponsored a ski outing to the Snow Bowl Ski Resort in Milton, New Jersey, on January 22nd, during the interterm recess. In addition to expanding active membership in the IEEE, the Branch acknowledged past student activity by subsidizing the cost of the ski facilities in a direct proportion to the group interest and participation shown by the individual members over the past school term.

At present, three Fairleigh Dickinson students are completing their entries for the forthcoming Metropolitan Student Council Paper Writing Contest.

Newark College of Engineering

On December 4th, thirty-four members of the NCE Student Chapter (Day Branch) were taken on a guided tour of the facilities of the U S Army Electronics Command at Fort Monmouth, New Jersey. Besides the sections on Microwave Devices and Power Sources, two areas of high student interest were the Tactical Avionic Systems Simulator, which simulates the flight operation of the HUEY Combat Helicopter, presently in action in South Vietnam, and the Section on Low Frequency Sound Propagation (in the range of 0.01 to 16 Hertz).

High amplitude sound waves in this frequency range are generated during rocket blast-off, and to the amazement of the Student Members, it was mentioned that a recent (pre-Apollo 8) Cape Kennedy launching was monitored by a low frequency air mounted microphone located in North Carolina.

The associated work being done on Low Frequency Emergency Communications via ground implanted transducers was also new to the students, and created great interest.

Student Paper Contest

The Newark College of Engineering Student Paper Writing Contest, a joint effort of the Day and Evening Student Branches of the IEEE, will be held on April 19th. Authors of competing papers have been encouraged to enter the Metropolitan Student Council Contest, for past NCE winners have also won prizes in the larger Metropolitan contest.

Advances In Avalanche and Transferred Electron Devices

Remarkable progress is being made in increasing the power output and efficiency of avalanche and transferred electron microwave amplifiers and oscillators. A presentation by Dr. Fred Sterzer will review the various modes of operation of these devices, with emphasis on physical models that aid in the design of optimum devices and circuits.

About the Speaker

Dr. Fred Sterzer received his B.S. degree in physics from the College of the City of New York in 1951, and his M.S. and Ph.D. degrees from New York University in 1952 and 1955, respectively. He joined RCA in 1954, and is now Director of the RCA Microwave Applied Research Laboratory at the David Sarnoff Research Center in Princeton, New Jersey. His work has been in the field of microwave spectroscopy, microwave tubes, light modulators and demodulators, and microwave solid-state devices.

Time: Thursday, February 27, 1969; 8:00 P.M.

Place: International Telephone and Telegraph Laboratories, Nutley, N. J.

Pre-Meeting Dinner: 6:00 P.M.; Copperhead Restaurant, South of Route 3 at Park Avenue Exit.

Solid State Conference

The 1969 International Solid State Circuits Conference will be held February 19-21, 1969 on the campus of the University of Pennsylvania and at the Sheraton Hotel, Philadelphia, Pa.

The keynote address will be delivered by J. A. Morton of Bell Laboratories. It will be on strategy and tactics for integrated electronics. The traditional Wednesday-Thursday evening discussions will be held at the Sheraton Hotel.

Programs with registration forms can be obtained from Lewis Winner, 152 West 42 St., New York, N. Y. 10036.

Report from the:

Membership Chairman

Membership in the IEEE has increasing importance now. We have all witnessed the rapid changes in our industry. Fast moving technological advances make many things obsolete over night. The same obsolescence takes a serious toll in employment. A constant need to keep abreast of current technological and industrial trends exists and a professional society like the IEEE fills this need.

The benefits of IEEE membership are outlined in hundreds of headquarters publications and handouts. The needs of IEEE may not be as well known. In our own unique North Jersey Section attendance at and participation in local IEEE activities are ever present problems. A survey which might lead to more popular activities has been suggested; for if the IEEE is to recruit successfully it must better know the growing number of practicing engineers. To obtain this information the North Jersey IEEE Membership Committee has started to collect membership data correspondent with the various company locations of members. Newsletter publicity and a computer printout of these data will be obtained. The Committee will then ask its members about the following:

1. *Time Conflict.* A potential member often states that the day does not hold enough hours to meet his present obligations and that membership in the IEEE would simply add strain.

2. *Meetings Conflict.* Both members and non-members give argument against attending professional meetings. Again, this stems from the long working hours of the average engineer, his frequent business trips, and his numerous existing obligations for meetings — religious, musical, education, civic, and the like. He asks, "Why, then, should I give up one of my rare evenings at home to attend an IEEE meeting?"

3. *The Impact of Television.* TV may be undermining IEEE meeting attendance because network programs can be highly attractive and are more readily accessible than meetings.

4. *The Changing Communication Environment.* To some, the traditional role of the Institute in publishing and disseminating technical information seems less essential today than it was during the early 1930's, when the IRE and IEE were operating. Potential members offer the opinion that there is more electronics information in today's daily newspapers, news magazines, and trade magazines, than existed earlier. The flow of technical literature, often initially classified documents, is presently expedited by many private and government organizations. Too often, some feel, a subject is worn out before it can be presented at IEEE meetings and in publications.

5. *Lack of Involvement.* Some engineers believe that IEEE should expand its member participation by actively seeking solutions to current urban communications problems, air and ground traffic automation, and other contemporary problems.

Responses to these questions will enable us to better meet your professional needs.

The IEEE is one professional society that has always advanced the state of the art. We have published articles on every new idea that has ever swept the electronics industry. While we don't often predict, we frequently get people thinking. It is true that IEEE needs you and your friends — but also true that you and your friends need IEEE.

Maitland M. Lorin,
Chairman, Membership Committee

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N. Y. Section, IEEE — Power and Industrial Div.

Metropolitan Section — ASME

EDUCATIONAL PROGRAM — SPRING 1969

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) — STUDY GROUP NO. 14

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. 3, 1969, 6:15-8:30 P.M., 18 Sessions
North Cafeteria, 19th fl., Consolidated Edison Co., 4 Irving Place, N. Y. C.

Instructor: O. ONDRA, *Professor of Civil Engineering*, Manhattan College

ENGINEERING ECONOMICS AND PRACTICE (IEEE-ASME) — STUDY GROUP NO. 15

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. 4, 1969, 6:30-8:30 P.M., 18 Sessions
Auditorium, 19th fl., Consolidated Edison Co., 4 Irving Place, N. Y. C.

Instructor: R. E. MENDOZA, Public Service E. & G. of N. J.

MECHANICAL ENGINEERING (ASME) — STUDY GROUP NO. 16

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. 5, 1969, 6:30-8:30 P.M., 19 Sessions
Room 1238, Parsons-Juden Corp., 26 Broadway, N. Y. C.

Instructor: M. KURTZ, P.E.

ELECTRICAL ENGINEERING AND APPLICATIONS (IEEE) — STUDY GROUP NO. 17

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.*

WEDNESDAYS, Starting Feb. 5, 1969, 6:30-8:30 P.M. 18 Sessions
Room 1427, Consolidated Edison Co., 4 Irving Place, N. Y. C.

Instructors: L. E. BURNETT, Consolidated Edison Co.
S. SONSKY, U. S. Naval Applied Science Laboratory

BASIC ENGINEERING SCIENCES (ASME-IEEE) — STUDY GROUP NO. 18

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. 6, 1969, 6:30-8:30 P.M., 19 Sessions
North Cafeteria, 19th fl., Consolidated Edison Co., 4 Irving Place, N. Y. C.

Instructor: A. PAULLOW, Consolidated Edison Co.

REGISTRATION INFORMATION

GROUPS #	FEES	PAYABLE TO	MAIL TO
14, 15, 17	$25 Members IEEE, ASME, NYSSPE $35 all others	"POWER & IND. GROUP, N. Y. SECTION, IEEE"	*Lewis Burnett,* Vice Chairman Educational Committee, IEEE, Consolidated Edison Co., Rm. 1326, 4 Irving Place, New York, N. Y. 10003. Phone: (212) 460-6363
19	$20 Members IEEE, ASME, NYSSPE $35 all others		
16, 18	$25 Members, IEEE & ASME only $35 all others	"ASTME METROPOLITAN SECTION"	*Eli Kleiman,* Educational Committee, ASME, Metropolitan Section, Dept. of Hospitals, Bureau of Engineering & Maintenance, 241 Church St., N. Y., N. Y. 10013 Phone: (212) 566-6940
20, 21, 22, 23	$20 Members IEEE, ASME, NYSSPE $30 all others	"POWER & IND. GROUP, N. Y. SECTION, IEEE"	*David Hawkins,* Vice Chairman Educational Committee, IEEE, Consolidated Edison Co., Rm. 1250S 4 Irving Place, New York, N. Y. 10003. Phone: (212) 460-4094

Fill out one registration form (see back page) for each group and mail with payment.

NEW YORK SECTION IEEE
POWER & INDUSTRIAL DIV.

PLEASE POST ON BULLETIN BOARD — A

EDUCATIONAL PROGRA

STUDY GROUP NO. 20

NUCLEAR PLANT DESIGN

MONDAYS, 6:30 to 8:30 p.m.; Starting March 3, 1969

Consolidated Edison Company.
4 Irving Place, New York, New York 10003

Group Coordinator: E. N. MERCOURIS, Gibbs & Hill, Inc., Tel. 565-4300 X560
Group Instructor: F. D. HUTCHINSON, Gibbs & Hill, Inc.

This series of lectures in three parts will take 1½ years to complete. Registration will be made for each part separately.

Part I & II covering the basics are scheduled to be given by the same speaker. Part III will deal with modern nuclear reactor power plants now in operation and/or under construction with emphasis on the engineering, control, systems and construction with speakers representing Authorities (AEC & Argonne National Laboratory), Manufacturers (Reactor, system & components), Engineers Designers Constructors — Consulting Engineers and Suppliers, Financing and Insurance Companies.

1. **March 3 Introduction; Basic Atomic & Nuclear Structure**
   Review atomic structure, particle weights and charges, nuclide chart, nuclear reactions.
2. **March 10 Nuclear Cross-Section, Half-Life, Alpha and Beta Decay, Gamma Rays**
3. **March 17 Fission Process**
   Liquid drop model; decay chains, fission neutrons, delayed and prompt; fission products; decay schemes; chain reactions.
4. **March 24 Criticality**
   Sub-, super-, and prompt; and *mu* and *eta*.
5. **April 7 Multiplication Factor**
   Four-factor formula; resonance escape probability, thermal utilization, fast fission factor, leakage, reproduction factor.
6. **April 14 Infinite and Effective Multiplication Factors**
   Reactivity: negative, positive, dollars worth.
7. **April 21 Fission Product Poisoning**
   Xenon-135; production, equilibrium, decay, burn-out, override; Samarium-149.
8. **April 28 Long Term Reactivity Effect**
   Chemical Shim control; return time.
9. **May 5 Reactivity Coefficients**
   Temperature, void, fuel depletion, power, pressure, doppler, and effects of core life on these coefficients.
10. **May 12 Reactor Control**
    Start-up, period, and methods of control of PWR plant.
11. **May 19 Reactor Control**
    Start-up, period, and methods of control of BQR plant.
12. **May 26 Reactor Control**
    Start-up, period, and methods of control of GCR plant.

STUDY GR

PRINCIPLES AND APPLICATI

TUESDAYS, 6:30 to 8:30 p.m.; Starting March 4, 1969

Brooklyn Union Gas Co. Auditorium
195 Montague Street, Brooklyn, New York

Group Coordinator: J. TAMBASCO, FEC, Tel. 264-7367
Group Sponsor: F. G. WELLS, Long Island Lighting Co.
Instructors: A. W. PEABODY, Ebasco Services
C. G. SIEGFRIED, Ebasco Services

1. **March 4 The Corrosion Mechanism and the Conditions Under Which It Can Occur**
   Principles of electro-chemical theory of corrosion, types of corrosion cells encountered, polarization and effect on corrosion rate, and effect of environmental factors.
2. **March 11 Principles of Selecting Materials for Better Corrosion Control**
   Selection of materials for resistance to specific environments (aboveground and underground), effect of dissimilar metals in underground or submerged systems, use of the small-anode-large-cathode principle, electrical isolation with metallic materials, and non-metallics as substitutes for metallic materials.
3. **March 18 Principles Involved in Using Paints and Coatings in Corrosion Control**
   Function of paints and coatings in corrosion control, types of material, effect of environmental conditions, importance of surface preparation, and value of good application specifications and inspection.
4. **March 25 Cathodic Protection — What It Is and How It Controls Corrosion**
   Theory of cathodic protection, effectiveness, types of structures where cathodic protection is applicable, criteria used for determining degree of protection attained, galvanic anode systems versus impressd current systems, special problems associated with amphoteric metals, and electrical measurement techniques.
5. **April 1 Cathodic Protection Design Principles**
   Factors involved in selecting system type (galvanic or im-

STUDY GR

HIGH VOLTAGE

WEDNESDAYS, 6:30 - 8:30 p.m.; Starting Mar. 10, 1969

Consolidated Edison Company, Room 1701
4 Irving Place, New York, New York 10003

Course Coordinator: J. GRAVES, Con Edison, Tel. 460-3991
Course Sponsor: D. HAWKINS, Con Edison

This study series will analyze the economic and technical problems for a High Voltage DC System. Operation of DC links between AC systems, relaying, grounding and corrosion problems will be discussed.

1. **March 10 Introduction to HVDC**
   Survey of plan and operating installations, corrosion problems and telephone interference, grounding practices.

. GROUPS ARE OPEN TO THE PUBLIC

M — Special Study Groups SPRING 1969

UP NO. 21

S OF CORROSION CONTROL

pressed current), design of anode installations, effect on other structures, installation considerations, and materials used for installations.

6. **April 8 Corrosion Surveys as a Prerequisite to Effective Corrosion Control Designs**
Importance of having full details on all facets of any corrosion control program, discussion of types of information to be sought, and discussion of survey techniques applicable to specific situations.

7. **April 15 Applications of Corrosion Control on Underground Piping and Cables**
Use of cathodic protection alone versus coatings supplemented with cathodic protection, types of cathodic protection systems, special considerations for cables versus piping, and typical applications.

8. **April 22 Applications of Corrosion Control at Electric Generating Stations and Industrial Plant Facilities**
Types of structures where corrosion control can be a specific problem at conventional and nuclear generating stations and at industrial plants, discussion of corrosion control measures applicable for various structure types, and typical applications.

9. **April 29 Applications of Corrosion Control on Electric Distribution Systems**
A discussion of corrosion control problems associated with electric distribution systems including underground residential distribution (URD) systems, applicable corrosion control methods, and discussion of installation techniques.

10. **May 6 Maintenance of Corrosion Control Systems**
The importance of adequate maintenance to reliable corrosion control system operation, development of systematic maintenance procedures, and establishment of record systems together with routine review thereof for full corrosion control effectiveness.

P NO. 22

RECT CURRENT

2. **March 19 Converter Circuits and Grid Control**
Basic valve arrangements, rectifier and inverter characteristics, valve firing methods.

3. **March 26 Reactive Power Requirements and Regulation**
Invertor compounding, weak AC systems, power direction control, sources of reactive power.

4. **April 9 Stability of AC/DC Systems**

5. **April 16 Harmonics and Filtering Requirements**
Current and voltage harmonics on the AC system.

6. **April 23 Insulation Requirements, Corona and Radio Noises**

7. **April 30 Protection of HVDC Systems**

8. **May 7 HVDC Cables**

STUDY GROUP NO. 23

POWER SYSTEM INTERCONNECTIONS

THURSDAYS, 6:30 to 8:30 p.m.; Starting March 6, 1969

Consolidated Edison Company, Room 1701
4 Irving Place, New York, New York 10003

Group Coordinator: E. I. Fabri, Tel. (212) 460-6072
Consolidated Edison Co.

This study series will deal with the design of power systems and interconnections between power systems. Analysis of stability criteria, switching surge, relay applications, and operating problems will be presented.

1. **March 6 Power Systems**
General design criteria — Selection of voltage, conductor, equipment, bus configurations. Economic considerations.
Speaker: C. C. Boon, Ebasco Services Inc.

2. **March 13 Transmission Systems**
Modern construction methods — problems of maintenance.
Speaker: from American Electric Power Corp.

3. **March 20 Transmission Systems**
Protective relaying and metering — primary and backup protection. Distance and pilot wire relaying.
Speaker: W. C. New, General Electric Co.

4. **March 27 Power System Stability**
Design criteria — steady state stability — transient stability.
Speaker: L. Brieger

5. **April 10 Transmission Systems**
Carrier and audiotone relaying — solid state relays — effect of relaying on stability.
Speaker: L. J. Blackburn, Westinghouse Electric Corp.

6. **April 17 Power Systems**
Switching surges — transient network analyzer studies — digital computer studies.
Speaker: from General Electric Co.

7. **April 24 System Interconnections**
General planning criteria — power pools — coordination problems — economic considerations.
Speaker: W. Wood, Public Service Electric & Gas

8. **May 1 System Interconnections**
Operating problems — megawatt and megavar control — power interchange.
Speaker: to be announced

9. **May 8 System Interconnections**
Operating of energy control centers — use of computers — frequency control load saving methods.
Speakers: J. E. Deegan, E. I. Fabri, Consolidated Edison Co.

10. **May 15 System Interconnections**
Overall system design — new developments — use of DC — future trends.
Speaker: W. J. Balet, Consolidated Edison Co.

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N. Y. Section, IEEE
Power and Industrial Div.

EDUCATIONAL PROGRAM — SPRING 1969

Metropolitan Section
ASME

INDIVIDUAL IMPROVEMENT STUDY GROUP

COURSE NO. 19

SPEED READING FOR ENGINEERS

THURSDAYS, 6:30 - 8:30 p.m.; Starting March 6, 1969

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 reading, greater comprehension and retention of information, and an insight into the process of reading which will foster continuing individual growth.

1. **March 6 Introduction to Speeded Reading**
2. **March 13 The First Step**
3. **March 20 Mechanics of Reading**
4. **March 27 Paragraph Patterns and Functions**
5. **April 3 Adjusting Rate**
6. **April 10 Article Patterns**
7. **April 17 Article Patterns**
8. **April 24 Summarizing**
9. **May 1 Broadening Horizons**
10. **May 8 Evaluation and Planning for Continued Improvement**

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Solid State Logic as Applied to Elevator System

The February general meeting of the Power and Industrial Division of the IEEE will present a 30-minute color movie, "Briefing on Integrated Circuits," by the Fairchild Semi-Conductor Division. Talks on salient points will be delivered by Mr. Gerald E. Gollub, Technical Consultant/East Coast Fairchild Semi-Conductor, and Mr. Melvyn Hirsch, Manager of Research and Development, Otis Elevator Company. Topics will include Medium Scale Integration applicable to Elevator Systems, and the application of solid-state technology to elevator systems, including (1) technical design, (2) economy, (3) hardware selection, (4) packaging, and (5) the effects of new technology on application engineering, manufacturing, construction, and service.

About the Speaker

Mr. Gollub received his Bachelor's Degree in Electrical Engineering (BEE) at The City College of New York (1964) and his Masters Degree in Electrical Engineering (MEE) at New York University (1966). Prior to his appointment as Technical Consultant / East Coast for Fairchild Camera & Instrument Corp. he worked as a Design Engineer in the Micro Circuit Research and Development Section of Sperry Gyroscope Company. Mr. Gollub is a member of Tau Beta Pi, Eta Kappa Nu & the IEEE.

Mr. Hirsch received his B.E.E. from Rensselaer Polytechnic Institute in June, 1954, and at that time joined the Otis Elevator Company as an Application Engineer in the Control Systems Dept. He was transferred to the Research and Development Group in September, 1961 and was appointed supervisor within the department in June, 1967, with responsibility for development of solid-state operating and group systems controls. Mr. Hirsch was appointed to his present position as Manager of Research and Development in October, 1968.

Time: Wednesday, February 19, 1969; 6:30 P.M.

Place: Con Edison Auditorium, 19th Floor, 4 Irving Place, N. Y. C.

Refreshments: 6:00 P.M.

FM Systems Lectures

The Communications Technology Group of the New York Section is presenting a series of six tutorial lectures on FM applications and theory. The talks will cover the broad range of the frequency modulation field. The stress will be on advances in the art, as well as simplifications and insight gained during the past decade. The coordinator of the series is Dr. Jacob Klapper of the Newark College of Engineering. The lectures are sponsored by the Study Group Committee.

The lectures will be held once weekly between February 20 and March 27. They will be given Thursday evenings, between 6:30 P.M. and 8:30 P.M. in the Little Theater, which is located in the New York Telephone Building at 140 West Street, Manhattan. The location is convenient to all subways and PATH trains.

The schedule and the lecturers are:

February 20 — *Introduction and Capitulation, Dr. Jacob Klapper, Newark College of Engineering.*

This lecture will provide the background and the connecting links for the series.

February 27 — *FM Threshold Extension, John T. Frankle, General Telephone and Electronics*

The active field of FM threshold extension will be given and design methods explored for low threshold FM receivers.

March 6 — *Filtering of FM Waves, Dr. Sol Rosenstark, Newark College of Engineering*

Classical methods will be reviewed and will be placed in perspective with recent progress and engineering use.

March 13 — *FM Equipment, Paul Gruber, Radio Engineering Laboratories*

The progress in the development of FM equipment and its interrelationship with new techniques and components will be explored.

March 20 — *Digital FM, Dr. Jacob Klapper, Newark College of Engineering*

Recent progress of this growing field will be reviewed. A simple look at the error mechanism and the calculation of error rates will be presented.

March 27 — *Single Sideband FM, Dr. K. H. Powers, RCA Laboratories*

The inventor of SSB-FM will lecture on this interesting subject.

Further information may be obtained from Mr. A. Karman of RCA (call (212) 698-7200 Ext. RJ 224). Checks should be made payable to the Comm-Technology Group Chapter, N. Y. Section, IEEE. Enclose a stamped, self-addressed envelope with your order. Please use the form below when ordering your ticket.

FM SYSTEMS LECTURE

Mr. A. Karman
RCA Frequency Bureau, Rm. 730
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New York, N. Y. 10004

Check one

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Report from the:

Awards Committee

Seven members of the North Jersey Section have been elected to the grade of Fellow as of January 1, 1969. We are proud that a relatively large percentage of our membership is so honored. Of course, we are fortunate to be in an area with a large concentration of engineering talent. As a world center of research and development, the area probably will continue to provide a large crop of potential award winners.

It is of interest to note the fields in which these seven men made their contributions:

Chow, Woo Foung	Solid state electronics
Dwon, Lawrence	Education for electric power engineering
Flanagan, James	Hearing fundamentals, more efficient voice transmission
Gianola, Umberto F.	Computer memories and magnetic logic
Gray, Richard R.	Radio communication, wave propagation
Minter, Jerry B.	Radio signal generating and measuring
Shepard, Francis H., Jr.	High speed printers, electronic instrumentation

There appears to be no limit to the spectrum of activities that permit new contributions. Every accomplishment acts only as a stimulus to a new one, often in a new field. The North Jersey Section Executive Committee, in the name of the entire Section membership, offers the new Fellows the warmest congratulations and best wishes for continued success.

The fact that our area is blessed with a large potential of award winners does not guarantee that they will win awards. Two additional ingredients must be added. First, the men who have the endowed ability, the solid training, and the exposure to basic problems must live up to their possibilities and produce. Secondly, at least one colleague must take the time to recognize the performance and sponsor the award. The anonymous sponsors of our award winners should take particularly deep pride in the fact that they contributed this essential factor to the election of the award. The Executive Committee expresses its thanks to the men who have given so much of their time and effort to obtain recognition for their candidates. Let us all remember that we owe each other the consideration that is required for the recognition of performance.

The competition is keen. Each year there are over a thousand men recommended for the Fellow Grade, while only about 125 may be elected. This means that a large number of worthy candidates are left at the threshold. You may be in this group; or, you may be a sponsor of some one in this group. In either case — be of strong heart! Maybe next year is the year of the surprise win.

A. R. D'heedene,
Chairman, Awards Committee
North Jersey Section

New Fellows Of The IEEE

NORTH JERSEY SECTION

Paul W. F. Chow

"For outstanding contributions to solid-state electronics."

Paul W. F. Chow is a member of the Optical Device Department at Bell Telephone Laboratories, Murray Hill, New Jersey.

An electrical engineer, Dr. Chow joined Bell Laboratories in 1966. He initially engaged in the exploratory development of a plated wire store system. He is presently working on research of a computer controlled real time test system.

Dr. Chow has been granted 23 U.S. patents in the area of solid state circuits and memories. He is the author or co-author of four books on solid-state circuit techniques and a number of published technical articles.

A native of Shanghai, China, he received the B.S. degree from Ta Tung University in 1945 and M.S. and Ph.D. degrees from the University of Minnesota in 1952.

He is a member of Eta Kappa Nu and Sigma Xi. He has been elected a Fellow of the Institute of Electrical and Electronics Engineers, effective January 1, 1969.

Dr. Chow lives at 172 River Bend Road, Berkeley Heights, N. J.

Lawrence Dwon

"For contributions to mutual understanding between the electric power industry, the professional societies, and the schools of engineering."

Mr. Dwon is manager of engineering at the American Electric Power Service Corp.

An electrical engineer, he has an MBA in business administration and advanced credits in electronics. He was a member of technical staff at Bell Telephone Laboratories and taught at Brooklyn Polytechnic Institute and Pratt Institute of Technology.

Mr. Dwon belongs to and has been active in IEEE, IES, ECPD and ASEE. He has had over fifty paper published. He has been the chairman of the engineering guidance committee since 1966.

Mr. Dwon is a licensed Professional Engineer in the state of New York. He is listed in Who's Who in Commerce and Industry.

He lives in Mendham, New Jersey with his wife and two sons.

James L. Flanagan

"For contributions to reduced-bandwidth speech communication systems and to the fundamental understanding of human hearing."

James L. Flanagan received the Sc.D. degree in electrical engineering from the Massachusetts Institute of Technology in 1955. While working toward the doctorate, he was a Rockefeller Foundation Fellow. He completed two years of postdoctoral work at M.I.T. and the A.F. Cambridge Research Center, and in 1957 he joined the Bell Telephone Laboratories at Murray Hill, New Jersey In 1961 he became Head of the Speech and Auditory Research Department at Bell Laboratories, and in 1967 he was made Head of its Acoustics, Research Department. His interests have centered on voice communication and its related areas. He has been concerned with signal processing methods for digital transmission of speech, and with fundamental acoustical studies of speech and human hearing. He holds over 20 patents on speech-coding techniques, and is the author of approximately 50 technical papers and a book, *Speech Analysis, Synthesis and Perception* (Springer 1965).

Dr. Flanagan is presently chairman of the IEEE Professional Group on Audio and Electroacoustics. He also is a Fellow of the Acoustical Society of America, a member of its Technical Committee on Speech Communication, and chairman of its Publication Policy Committee. He is a member of the Committee on Hearing and Bioacoustics of the National Academy of Sciences, and is a member of Tau Beta Pi and Sigma Xi.

U. F. Gianola

"For outstanding contributions in the field of computer memories and magnetic logic, and in the activities of professional societies."

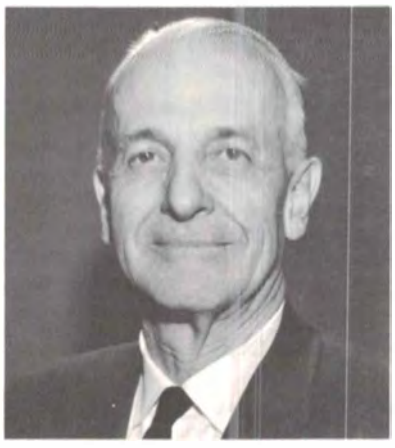
U. F. Gianola is Head of the Fundamental Memory Components Department at Bell Telephone Laboratories, Murray Hill, New Jersey. He is responsible for the exploratory development of memory components for advanced digital computers and electronic switching systems.

Dr. Gianola joined Bell Laboratories in 1953 as a member of the Communications Research Department where he was concerned with exploration of new techniques for communications devices. He transferred to the Components and Solid State Device Division in 1960 and supervised the construction of prototype models of the permanent magnet twistor memory that provides the stored program in the new electronic central offices. He assumed his present post in 1963.

A native of Birmingham, England, Dr. Gianola received the B.S. degree in physics with highest class honors in 1948, and the Ph.D. degree in electron physics in 1951, from the University of Birmingham. Subsequently, he was a post-doctorate fellow in the physics department at the University of British Columbia for two years.

He is a member of the American Physical Society and the Scientific Research Society of America. He was recently elected a Fellow of the Institute of Electrical and Electronics Engineers.

Dr. Gianola has been granted 20 patents. He is the author of 28 published articles.



Richard E. Gray

"For pioneering advances in radio communication, and for contributions in the field of radio wave propagation."

Mr. Gray participated in development of the first transatlantic radio telephone circuit and the first microwave radio telephone link across the English Channel in 1931. This link proved practical and was the forerunner of all modern microwave radio communications systems.

Born and educated in England, Mr. Gray worked in the research and development department of Standard Telephones and Cables, London, an ITT division, from 1924 to 1927. He then transferred to ITT's laboratories in Paris and played an important part in planning and testing commercial radio links between Spain and Argentina, Barcelona and Majorca and Scotland and Ireland.

Mr. Gray joined ITT in Nutley in 1947 and has been engaged in research and development for microwave systems and studies of meteorological and other factors affecting propagation of electromagnetic waves. Presently he is active in studies on the propagation characteristics of ground to space communications at various frequencies.

Jerry Minter

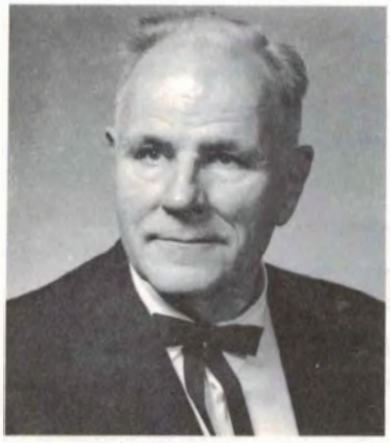
"For contributions to radio signal generating and measuring devices."

Jerry Burnett Minter III has been active in the radio and associated fields since he went "on the air" at age 12 in 1925, station WIEQC. In the ensuing years he has brought outstanding analytical and practical talents to the technical challenges of a growing industry which his own efforts helped create. Officer and owner of several industrial corporations, he has through the years contributed generously of his time, talents and resources to his profession and to the increase and refining of its technology.

Jerry is president of the Components Corporation in Denville which he founded in 1943. Here he invented, developed and marketed an electrical connector of outstanding reliability. Other products have included regulated high-voltage supplies for space probe applications, several closed-circuit television specialty items, an ultrasensitive metal detector, an electronic pattern reader, the HYDROFEED disk recording lathe and the firing equipment of the battleship North Carolina.

Previously Jerry was a co-founder, vice president and chief engineer of the Measurements Corporation, now merged with McGraw-Edison. He was responsible for the developments of a new generation of test instruments.

Jerry was one of the organizers of the Northern New Jersey Subsection IRE (now NJ Section IEEE) and was its first chairman (1947-1948). He represented IRE and AIEE on the Joint Committee on Noise Definitions 1949-1953. He served on the IRE Radio Interference Committee 1944-1953, and on the IRE TV Systems Committee 1955-1959. He is a Fellow and Past President of the Radio Club of America and the recipient of its coveted Edwin H. Armstrong Medal. He is a Fellow and Past President of the Audio Engineering Society. Jerry received his BS in electrical engineering from Massachusetts Institute of Technology in 1934. He has five children and lives with his wife and younger children in Morris Township, New Jersey.



Francis H. Shepard Jr.

"For contributions in the fields of high speed printers and electronic instrumentation."

Francis H. Shepard is an independent consultant and board chairman of Shepard Industries. A mechanical engineer by degree, he has done a considerable amount of electronic development work.

Some of his accomplishments are:

Fuze setter servos and main power drive servos for U. S. Army, Frankford Arsenal.

Super regenerative range-only-radar for the Bureau of Ordinance of the Navy Department.

Saturable reactor radar pulse generator for the Bureau of Standards and U. S. Navy.

Non-linear amplifier complimentary to the human ear for hearing aids and small radios.

Mr. Shepard has nine published papers and has been granted sixty-two patents.

Born in New York City, he received a BSME from Yale University, New Haven, Connecticut, in 1929.

He is a member of IEEE and Radio Club of America. He is a licensed Professional Engineer in the state of New Jersey.

Mr. Shepard lives at 16 Lee Lane, Summit, New Jersey.

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