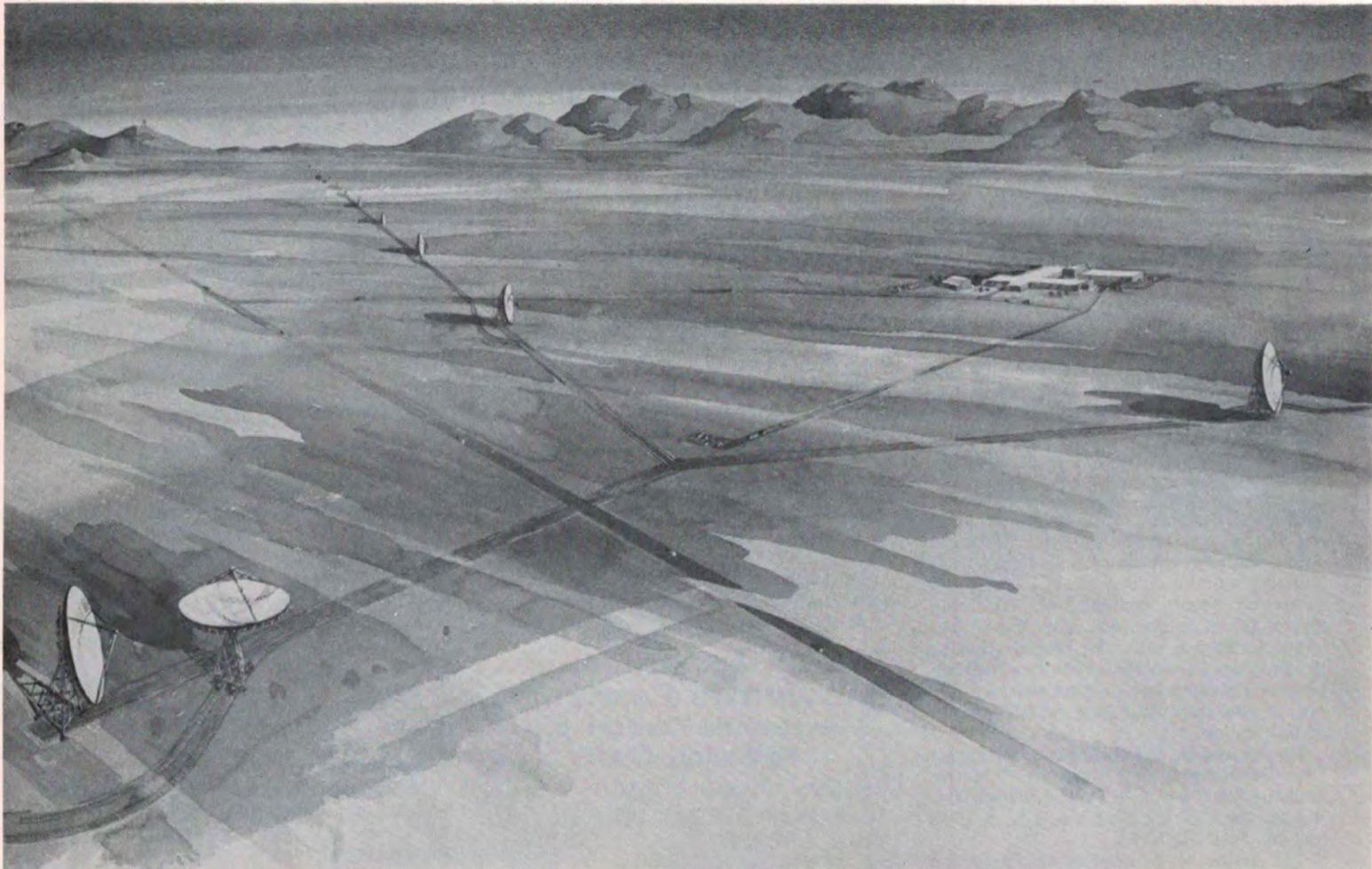




The IEEE

Newsletter

The Magazine of the North Jersey Section



VERY LARGE ANTENNA PROJECT
National Radio Astronomy Observatory

High Resolution Radio Astronomy

By Dr. John W. Findlay

SECTION MEETING – MTT GROUP

April 19 – Arnold Auditorium

**Bell Telephone Labs.
Murray Hill, N. J.**

NOMINEES FOR SECTION OFFICERS

Chairman Bernard Meyer



received his BA and BEE from New York University in 1942 and 1950 respectively. He has been active in the North Jersey Section of the IRE and IEEE as Student Affairs Editor, Managing Editor, and Editor of "The Newsletter." He has also served as Chairman of the Publicity Committee and Chairman of the Publications Committee, and is now vice-chairman of the Executive Committee.

At present he is employed as an Electronics Engineer in the Product Assessment Agency at Fort Monmouth, New Jersey.

Treasurer Merle M. Irvine



is head of the Tactical Program Design Department of the Bell Telephone Laboratories at Whippany, New Jersey. Since 1955, when he started with Bell Labs., he has worked on Defense projects. These included Airborne Bombing and Navigational Systems; system design of a Radar Data Processing System; and the Data Processing System for Nike Zeus and Nike-X.

Mr. Irvine was active for several years on the Program Committee of the North Jersey Section, including one year as secretary and one as chairman. Currently he is Secretary of the Section.

He received his B.S. in Engineering Physics from Montana State College in 1950; his graduate work was in Physics at Lehigh University; there he received his M.S. in 1952 and his Ph.D. in 1955.

Mr. Irvine is a member of: American Physical Society, Society of the Sigma Xi, Association for Computing Machinery, and the Morris County Engineer's Club. He also is listed in the American Men of Science.

Election Procedure

Following are pertinent quotes from the By-Laws of the North Jersey Section:

"Additional nominations may be made by a petition signed by not fewer than 25 voting members of the Section and transmitted to the Secretary for submission to the Executive Committee not later than April 30th. The petition must certify that the persons nominated have agreed to serve, if elected." The Section Secretary is Mr. Merle M. Irvine, Bell Telephone Laboratories, Whippany, N. J. "The election of officers shall take place at the May general meeting of the Section unless the Executive Committee decides that a mail ballot is required. In case a mail ballot is used, it shall be sent out to all voting members not later than May 10 and shall be returnable not later than one month from the date of mailing. In the case of a mail ballot the Chairman shall appoint at least three tellers having the approval of the Executive Committee to count the mail ballot within one week after the closing date for returns."

Vice Chairman Joseph G. O'Grady



holds the position of Assistant Laboratory Engineer at the Maplewood Testing Laboratory of the Public Service Electric and Gas Company. He joined the company in 1948 and has held various positions in the Electrical Division of the Laboratory until 1964 when he was appointed to his present position. He is a graduate of the College of Engineering of New York University where he received a B.E.E. Degree in 1954; he is also a former member of the instructing staff of the Special Courses Division of the Newark College of Engineering.

He has been a member of the Section Executive Committee for several years, having been Chairman of both the Section Program Committee and the Publicity Committee. In 1965, he was elected Section Secretary and he is presently serving as Section Treasurer.

Mr. O'Grady is a senior member of both the Institute of Electrical and Electronics Engineers and the Instrument Society of America, and he also represents his company as a sustaining member to the National Association of Corrosion Engineers.

He resides at 11 Bowling Drive, Livingston, New Jersey, with his wife, Muriel, and their three sons — John, Brian and Peter.

North Jersey Automatic Controls Automatic Control of Hydrofoil Craft

Speaker: Mr. Hugh C. Wynd

Date: Monday, 10 April 1967

Time: 8:00 P.M.

Place: General Precision, Inc.

Plant #10 Auditorium

(North on Riverview Drive from Rte. 46, then right on Totowa Road)
Wayne, N. J.

Dinner: Burns Country Inn

One block south of the Rte. 46 and 3 intersection on Valley Road, Clifton, N. J.
6:00 P.M.

Two commercial and one military hydrofoil crafts, of the type that are completely dependent upon an automatic flight control system for stabilization in the foilborne condition to provide control of height, heel, trim, and heading, exist in the western world today. The control system for one of these commercial, U. S. Coast Guard certified craft will be discussed. This system is "fly-by-wire" in three of the four functions. The presentation will include discussion of the dynamics of the control problem, block diagrams, hardware description, and problems encountered during installation and sea trials.

Mr. Wynd is a graduate of Antioch College and has taken post graduate courses at MIT. He has also taken courses in Principles of Servo-Mechanisms and in Aircraft Stability and Control. Mr. Wynd is Project Engineer with the General Electric Co.

Secretary Herbert E. Blaicher, Jr.



was graduated from the Pennsylvania State University in 1949 with a degree of B.S. in Electrical Engineering. Following graduation he entered the cadet engineer training course of Jersey Central Power & Light Company. Since then he has worked in various assignments in system planning and distribution engineering. He is presently in the System Planning group where he is in charge of engineering computer applications.

Mr. Blaicher served on active duty with the U. S. Armed Forces from 1943 to 1946.

Mr. Blaicher is a senior member in IEEE and has served as chairman of the Education Committee during the 1961-62 season, and as an IEEE representative on the New Jersey Engineer's Committee for student guidance. He is presently Member-at-Large of the North Jersey Section.

Member-at-Large Robert G. Sokalski



is at present Development Engineer on Electronic Test and Measurement Equipment for the Hewlett-Packard Co., at Rockaway, New Jersey.

His present activity in the North Jersey Section is Coordinator of the Group Activities. Previously, he was Secretary, Vice-Chairman, and Chairman of the North Jersey Automatic Control Group, in successive years.

Mr. Sokalski received his B.S. from Stevens Institute of Technology in 1962, and is hopeful of an M.S. from Newark College of Engineering in June of 1967.

Member-at-Large Carl C. Torell



is Manager of the Utility Sales Division of the Newark District of the Federal Pacific Electric Company. His experience has been primarily in the field of Sales Engineering.

Previously, he was with the Pacific Electric and Manufacturing Co., a forerunner of Federal Pacific and with the Westinghouse Electric and Manufacturing Co.

Mr. Torell graduated from the University of Michigan in 1931 with a B.S. in Mechanical Engineering. He elected to Tau Beta Pi.

He is a Senior Member of IEEE. He served as Vice-Chairman and Chairman of the Power Chapter and is at present Program Chairman of the North Jersey Section. Prior to the merger, he was active in the AIEE. He served on the Educational Committee and was Vice-Chairman of the Related Activities Committee of the New York Section. Also, he was past Chairman of the Related Activities Committee of the New Jersey Division of the New York Section.

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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: A. R. D'heedene
School Affairs Editor: Gene R. O'Brien
Associate Editor: David Wiener
Associate Editor: Fred T. Gramp
Advertising Manager: M. M. Perugini

Executive Committee Meeting

at Verona Public Library
Wednesday, May 3 — 7:30 P.M.

North Jersey Section IEEE Executive Committee 1966 - 1967

Section Officers

Chairman Stephen A. Mallard
Vice Chairman Bernard Meyer
Secretary Merle M. Irvine
Treasurer Joseph O'Grady
Member-at-Large Herbert Blaicher
Member-at-Large Barry Mindes
Past Chairman Walter L. Glomb

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Group Coordinator Robert G. Sokolski
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Nominating John K. Redmon
Publications Sam Petrokofsky
Publicity M. H. Nuechterlein
Program Carl Torell
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CALENDAR

See
Page

Monday, April 10

NORTH JERSEY — AUTOMATIC CONTROLS

8:00 P.M. — "Automatic Control of Hydrofoil Craft" by Hugh C. Wynd of General Electric Company at General Precision, Inc., Wayne.

Tuesday, April 11

NEW YORK — COMTECH

6:30 P.M. — First of six lectures on Switching Systems at Little Theatre of N. Y. Telephone Co. Building, 140 West Street, New York.

Thursday, April 13

JOINT METROPOLITAN — ELECTRON DEVICES

2:00 P.M. — Tour of RCA Laboratories at Princeton.

NORTH JERSEY — RELIABILITY

5:00 P.M. — "Computer Aides to Electronic Circuit Reliability Analysis" by H. M. Wall of IBM at Newark College of Engineering.

JOINT METROPOLITAN — ENGINEERING MANAGEMENT

7:30 P.M. — "Does Theory Enable Us to Manage More Effectively" by Dr. R. R. Ritti of Columbia University in Little Theatre of New York Telephone Co. Building, 140 West Street, New York.

Tuesday, April 18

NEW YORK — COMTECH

1:00 P.M. — Inspection Trip to Weather Bureau Installation at 90 Rockefeller Plaza, New York.

JOINT METROPOLITAN — GEMB

8:00 P.M. — "Biomedical Applications of Neutron Activation Analysis" by Dr. Vincent P. Guinn, General Atomic Division of General Dynamics Corp. at the Rockefeller University, New York.

NORTH JERSEY — POWER

8:00 P.M. — "The Electric Automobile" in the Punch Bowl Room of the Jersey Central-New Jersey Power and Light Company, Punch Bowl Road, Morristown.

Wednesday, April 19

NORTH JERSEY — MTT

6:30 P.M. Dinner — 8:15 P.M. — "High Resolution Radio Astronomy" by Dr. J. W. Findlay, Director of National Radio Astronomy Observatory, at Bell Telephone Laboratories, Murray Hill, New Jersey.

Thursday, April 27

NORTH JERSEY — COMPUTER

8:00 P.M. — "National Information Utilities" by Mr. Sergio Wernikoff of Western Union at ITT Federal Laboratories, Nutley.

Wednesday, May 10

JOINT METROPOLITAN — INFORMATION THEORY

2:30 P.M. — "Preliminary Design of an Intelligent Automaton" by Dr. Nils Nilsson of Stanford Research Institute at Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

May 9-11

PACKAGING COMMITTEE SUBCOMMITTEE

Three-day conference at the Holiday Inn, New York.

Wednesday, May 17

PRINCETON — MAGNETICS

8:00 P.M. — "Permanent Magnets" by Dr. R. K. Tenzer of Indiana General at Murray Hall, Rutgers University.

Wednesday, June 14

NORTH JERSEY SECTION ANNUAL DINNER

at Robin Hood Inn, Clifton.

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Chairman's Corner Membership Drive

With 5,458 members as of the end of 1966, the North Jersey section is the sixth largest section of the IEEE. However, in spite of the increase in population and movement of industry to the North Jersey area, the level of membership remained fairly static over the past few years. In an effort to ease the manner by which an applicant can join the IEEE, headquarters has eliminated the need for three references at the Associate grade level and substituted a written endorsement by one IEEE individual at the grade of member or higher. This new procedure should make it a relatively simple matter for IEEE members to both encourage and recruit new members for the Institute. New members can offer a significant potential in exposing the present membership to developments in fields of recent vintage in addition to providing an expanded base upon which the section activities can be conducted.

Many of us would be more likely to attend section meetings of special interest if one or more of our coworkers was also interested in attending. Since non members are just as welcome as members it is suggested that consideration be given, when forming a group to attend a meeting, to the inclusion of fellow workers who are not currently IEEE members. Not only will this expose the individual to his fellow professionals but it may also provide an incentive for your coworkers to join the IEEE.

The growth of section membership and interest in such section activities as meetings and field trips is intimately related. Our executive committee is interested in hearing your thoughts on how section activities can be made more interesting to all section members thereby providing a more attractive image by which our number of new members may be increased. A return to a coffee and doughnuts session after the technical meeting, is but one of the ideas under discussion. Do you have more and better ones? If so, send them on to me or any of the executive committee members.

William Heiser
Membership Committee

North Jersey MTT HIGH RESOLUTION RADIO ASTRONOMY

Date: Wednesday, April 19, 1967
Time: 6:30 P.M. — Dinner,
Wally's, Watchung, New Jersey
8:15 P.M. — Meeting
Place: Arnold Auditorium
Bell Telephone Laboratories, Incorporated
Murray Hill, New Jersey
Speaker: DR. J. W. FINDLAY
Director of National
Radio Astronomy Observatory,
Charlottesville, Virginia

Several methods have recently been developed by which telescope resolving powers can be as good at radio as they are at optical wavelengths. Although some of these techniques do not give results which are equivalent to the optical astronomer's photograph, they nevertheless have revealed small details of only a few seconds of arc in the structure of many radio sources.

Interferometers have led to the development of synthetic antennas capable of making very good maps of limited areas of sky. Some sources which have been occulted by the moon have been shown to have small sizes or fine structure. The scintillations of radio sources due to the solar plasma can lead to angular size estimates. The latest step will be the use of very long base line interferometers with highly stable, yet independent, phase references at their ends. Since the recently discovered quasi-stellar objects are both small and distant, all these techniques have a strong and immediate astronomical interest.

John Wilson Findlay was graduated with first class honors in physics from Cambridge University, England, in 1937, and received the Ph.D. degree from that University in 1950.

From 1954 to 1956, he was a senior principal scientific officer in the Ministry of Supply in London working on basic electronics research and on development of ground radar for the R.A.F. and Army. Since 1956 he has been employed by Associated Universities, Inc., at the National Radio Astronomy Observatory.

He is a member of the Order of the British Empire, a Fellow of the London Physical Society and Institute of Physics, a Senior Member of the IEEE, a member of the American Astronomical Society, and a member of the Space Science Board of the National Academy of Sciences.

Joint Metropolitan Management

On Thursday, April 13, 1967 at 7:30 P.M., the Metropolitan Chapter, Engineering Management group of the IEEE will hold its regular monthly chapter meeting in the Little Theatre of the New York Telephone Company at 140 West Street, New York.

A prominent personnel researcher, Dr. R. R. Ritti, will review the latest studies of organizational behavior and what they contribute to the practice of engineering management.

Dr. Ritti received his Ph.D. from Cornell in 1960. He has a Bachelors degree in Mechanical Engineering from Stevens Institute of Technology in 1951, and had worked in industry as an engineer for several years prior to his graduate study.



DR. J. W. FINDLAY

North Jersey Computer National Information Utilities

Date: Thursday, April 27, 1967
Time: 8:00 P.M.
Place:
Auditorium, ITT Federal Laboratories
500 Washington Avenue
Nutley, New Jersey

Speaker:
Mr. Sergio Wernikoff—Western Union
The concepts of national information utilities will be described, after which the presentation will deal with Western Union's presently operational Information Services Computer Center and its planned expansion to a nation-wide system by the end of 1967. It will be centered around the services to be provided and the hardware and system approach to be taken and their implementation.

Mr. Sergio Wernikoff is Director of Systems Design and Integration for the Information Services Computer System.

Mr. Wernikoff received a BS in EE from Case Institute of Technology in 1957. He is a member of ACM.

The meeting is being co-sponsored by the North Jersey Chapter of the Association for Computing Machinery.

Pre-Meeting Dinner: 6:30 P.M.
Copper Hood Restaurant
1 Park Avenue, Lyndhurst, New Jersey
(Off Route 3)

Directions to ITTFL: Exit from Route 3 at Main Avenue, Clifton, and proceed south and east to ITT tower).

In The News

Gene R. O'Brien, School Affairs Editor of the North Jersey NEWSLETTER, recently attained a noteworthy honor at the national convention of the National Society of Professional Engineers held in Puerto Rico in January. Gene, who is an Engineer in Training in the Professional Engineers Society, was the first E.I.T. to be Chairman of a major committee in the history of the N.S.P.E. and to make a report at the national meeting. He gave an outstanding report on the Young Engineering Committee, including the Y.E.S. Program (Young Engineers' Seminar).

North Jersey Power THE ELECTRIC AUTOMOBILE

The Power Group will hold its final Spring meeting on April 18, 1967 at the Punch Bowl Room in Morristown. A short business meeting will be held for the purpose of electing next years power group officers. The nominating committee has proposed the following individuals who will be voted on at the business meeting.

Chairman — Wally Hopkins
Westinghouse Electric Corporation
Vice-Chairman — Paul Watson
Jersey Central Power & Light Company
Program Secretary — Ray Black
Allis Chalmers Manufacturing Company
Correspondence Secretary — Rudy Stys
Public Service Electric and Gas Company
Financial Officer — John Coyle
Okonite Co.

This years nominating committee consisted of Chairman Mel Nuechterlein, assisted by Carl Torell and John K. Redmon.

The April 18, 1967 meeting of the Power Group should prove to be the most interesting meeting of the year. An excellent program has been arranged by Ray Black and Paul Watson. The details are as follows:

Date: April 18, 1967

Time: 8:00 P.M.

Place: Punch Bowl Room

Jersey Central - New Jersey

Power and Light Company Bldg.

Madison Avenue at Punch Bowl Road
Morristown, New Jersey

A round table discussion is planned to discuss the engineering and practical aspects of this very timely and interesting subject. A utility company representative will discuss the impact that the electric auto will have on the utility business; a representative of a battery manufacturer will discuss the power plant; and an automobile manufacturer will cover the motor drive and control system.

This meeting is not limited to Power Group members, all are welcome. Refreshments will be served following the program.

Joint Metropolitan Group on Engineering in Medicine and Biology

BIOMEDICAL APPLICATIONS OF NEUTRON ACTIVATION ANALYSIS

Date: Tuesday, April 18, 1967

Time: 8:00 P.M.

Place:

South Laboratory Building
The Rockefeller University
66th Street and York Avenue
New York, New York

Speaker:

DR. VINCENT P. GUINN
Technical Director
Activation Analysis Program
General Atomic Division of
General Dynamics Corp.

Joint Metropolitan ELECTRON DEVICES

Thursday, April 13, 1967 — 2 P.M. - 4 P.M.

Tour of RCA Laboratories, Princeton, N. J.
Highlighting Major Activities and Facilities.
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The selected voltage is indicated digitally to four significant figures on each of six decade ranges. The voltage indicated may be dc, or it may be ac at 400 Hz or 1000 Hz, RMS or Peak-to-Peak.

Note, for example, the settings in the photo — 42.35 volts RMS at 1000 Hz output. And with an accuracy that you can be sure is better than 0.15%. The receptacle on the lower right of the instrument is for high voltage outputs from 100 volts to 1110 volts at 400 Hz, RMS or Peak-to-Peak.

The new instrument also features a connection for an optional Model 2421 Error Computer that enables you to read calibration errors directly in percentages, speeding up your calibrations considerably.

In addition to its greater voltage range on ac, the Model 421A has a lower source impedance on ac than the Model 421 it replaces. Line voltage effects on the instrument are negligible. A $\pm 10\%$ line voltage change, for instance, causes less than a 0.05% change in output voltage.



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We plan to relocate within the next 2 years from our Newark location to Tarrytown, N. Y. (suburban Westchester County). Our liberal company benefits include full tuition refund program for evening graduate study. For appointment or further information, send your resume in confidence to Mr. D. S. Vawter.



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Switching Systems and Their Applications

The six part Spring series of lectures beginning on April 11, 1967 will cover the design applications of "Wide Band Switching Systems." They will be conducted on Tuesday evenings, at 6:30 P.M., in the Little Theatre, New York Telephone Company, 140 West Street.

On April 11, Mr. J. P. Rooney will discuss "Wire Center Studies." Mr. Rooney is on the Engineering Staff of the New York Telephone Company.

The April 18 lecture on "Broad Band Switching" will be given by Mr. Milton Poulos of the Western Union Company.

"Satellite Switching" will be subject of the lecture on April 25, by Mr. E. L. Taylor. Mr. Taylor is "Satellite Projects Engineer" at Long Lines, A.T. & T. Company.

Mr. J. H. Branch, manager of Computer Planning and Applications for RCA Communications Corp., will lecture May 2, 1967 on "Computer Switching."

The May 9, lecture on International Systems will be given by Mr. Oscar Myers, Director of Switching System Planning for ITT.

The final lecture "World Wide Dialing" will be given by Mr. C. Clos of the A. T. and T. Co. on May 16, 1967.

A few vacancies may exist for this series, for additional information please call: Mr. J. C. Sieglinger — 212-394-6721.

Weather Bureau Tour

The Communications Technology Group is sponsoring a field trip to the Weather Bureau installation at 90 Rockefeller Plaza,

New York City. Owing to lack of space only ten persons per tour can be accommodated. Moreover, only two tours have been arranged. The inspection trips are scheduled on the 18th and 20th of April and will be conducted between 1:00 and 3:00 P.M. The tours will assemble in Room 9 at 90 Rockefeller Plaza. Tickets are available on a first come, first serve basis. Reservations may be made by forwarding the attached coupon to Mr. C. D. Hansell at the address shown.

Mr. C. D. Hansell
G. T. & E. Service Corporation
730 3rd Avenue
New York, New York 10017

Please register me for the Weather Bureau

Tour:

Name

Address

Phone

Date Preferred: Tues., April 18th

Thurs., April 20th

Princeton Magnetics

On Wednesday, January 18, 1967 Dr. F. E. Hagedorn gave a talk to the Magnetics Chapter of the Princeton Section on "The Low Temperature Effects of Oxide Surface Layers on Thin Magnetic Films."

The next meeting of the Magnetics Chapter will be on Wednesday, May 17, 1967. At that time Dr. R. K. Tenzer of Indiana General will discuss permanent magnets. The meeting will be at 8:00 P.M. at Murray Hall, Room 120, Rutgers University. Further information may be obtained by writing to:

Dr. Edward Della Torre — EE Dept.
Rutgers — The State University
New Brunswick, New Jersey
Telephone: 201-247-1766 — Ext. 6407

North Jersey Reliability

Computer Aided Electronic Circuit Reliability Analysis

Speaker: Herbert M. Wall — IBM
Waltham, Massachusetts

When: Thursday, April 13, 1967

Where: Newark College of Engineering
Alumni Center, Seminar Room

Time: 5:00 P.M. to 6:30 P.M.

Cafeteria facilities will be available following the meeting.

Speaker:

For the past three years, Herb Wall has been a Project Leader of a team that designed, developed, programmed and documented International Business Machine's Electronic Circuit Analysis Program, more commonly referred to as ECAP. He received a Bachelor's degree in Electrical Engineering from the City College of New York and a Master's degree in Business Administration from Northeastern University.

Subject:

Mr. Wall will discuss the use of computers to perform reliability analyses of electronic circuits. The use of these techniques to study circuit margins and to establish the stresses to which the individual component parts are subjected will be included.

MEETINGS ARE OPEN TO ALL



HERBERT M. WALL

Did You Miss February Section Meeting?

The Section Meeting for February consisted of a series of lectures on reliability, organized by the Reliability Group, the Power Group, and the Student Branch. The meeting was held at the Newark College of Engineering and the attendants were treated to talks by P. H. Eisenberg, Robert L. Trent, and Stuart Voorhis. The speakers were interesting and prompted a lively audience participation in the form of a question and answer period at the end of the meeting. Everyone joined at dinner in the cafeteria.

150 MHz, 2.4 ns

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The Tektronix Type 454 is an advanced new portable oscilloscope with DC-to-150 MHz bandwidth and 2.4-ns risetime performance where you use it—at the probe tip. It is designed to let you make convenient measurements of fast-rise pulses and high-frequency signals previously outside the range of conventional oscilloscopes.

The Type 454 is a complete instrument package with dual-trace vertical, high-performance triggering, 5-ns/div delayed sweep and solid-state design, all in a rugged 31-lb. instrument. You also can make 1 mV/div single-trace measurements and 5 mV/div X-Y measurements with the Type 454.

The 2.4-ns risetime and DC-to-150 MHz bandwidth are specified at the tip of the new miniature P6047 10X Attenuator Probe. The dual-trace amplifiers provide the following capabilities with or without probes:

Deflection Factor*	Risetime	Bandwidth
20 mV to 10 V/div	2.4 ns	DC to 150 MHz
10 mV/div	3.5 ns	DC to 100 MHz
5 mV/div	5.9 ns	DC to 60 MHz

*Front panel reading. Deflection factor with P6047 is 10X panel reading.

The Type 454 features a new CRT with distributed vertical deflection plates and a 14-kV accelerating potential. It has

a 6 by 10 div (0.8 cm/div) viewing area, a bright P-31 phosphor and an illuminated, no-parallax, internal graticule. The Type C-30 and the New Type C-40 (high writing speed) cameras mount directly on the oscilloscope.

The instrument can trigger to above 150 MHz internally, and provides 5-ns/div sweep speeds in either normal or delayed sweep operation. The calibrated sweep range is from 50 ns/div to 5 s/div, extending to 5 ns/div with the X10 magnifier. Calibrated delay range is from 1 μ s to 50 seconds.

The Type 454 is designed to be carried and has the rugged environmental characteristics required of a portable instrument. A rackmount, the 7-inch-high Type R454 oscilloscope, is available with the same high performance features. Also available is the new Type 200-1 Scope-Mobile® Cart.

For further information about the Type 454, or about the new Tektronix DC-to-100 MHz *plug-in* oscilloscope, the Type 647A, contact your nearby Tektronix field engineer, or write: Tektronix, Inc., P. O. Box 500, Beaverton, Oregon 97005.

Type 454 (complete with 2 P6047 Probes and accessories)	\$2550
Type R454 (complete with 2 P6047 Probes and accessories)	\$2635
C-30 Camera	\$ 390
C-40 Camera	\$ 540
Type 200-1 Scope-Mobile® Cart	\$ 60

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Key benefits of the new Hewlett-Packard Network Analyzer are derived from the unique Model 8411A Frequency Converter. It is a two-channel RF converter, conveniently small in size so it may easily be located near the device under test. From the converter, the IF signals are fed through a cable to the Model 8410A Network Analyzer main-frame. There are two plug-ins

available for the Analyzer; one readout plug-in is the Model 8413A Phase-Gain Indicator, which presents phase and amplitude readings by meter; it also provides analog outputs which can be displayed on a conventional oscilloscope or XY Recorder to yield calibrated, swept presentations of amplitude and phase vs. frequency over a 60 dB dynamic range. The other is the Model 8414A Display Unit with its own CRT for swept polar displays of phase and amplitude. Smith chart overlays are provided for direct impedance or admittance readout.

The Model 8740A Transmission Test Unit implements transmission measurements across the whole 0.11 to 12.4 GHz range. Its function is to divide the RF output power of the sweeper or other signal source into the required two channels, one for reference, and one for test.

Reflectometer tests may be made across the 110 MHz to 12.4 GHz band



MODELS 8740A 8741A 8742A

with only two test units. One of these, Model 8741A, spans 110 MHz to 2 GHz; the other, Model 8742A, covers 2 to 12.4 GHz. Incident and reflected signals from either unit are fed to the analyzer's frequency converter. Amplitude and phase are analyzed and displayed as desired—as complex impedance (or admittance), as reflection coefficient and angle, or as return loss and angle. A new reflectometer calculator is yours for the asking—while they last. Call or write one of the sales offices listed below.

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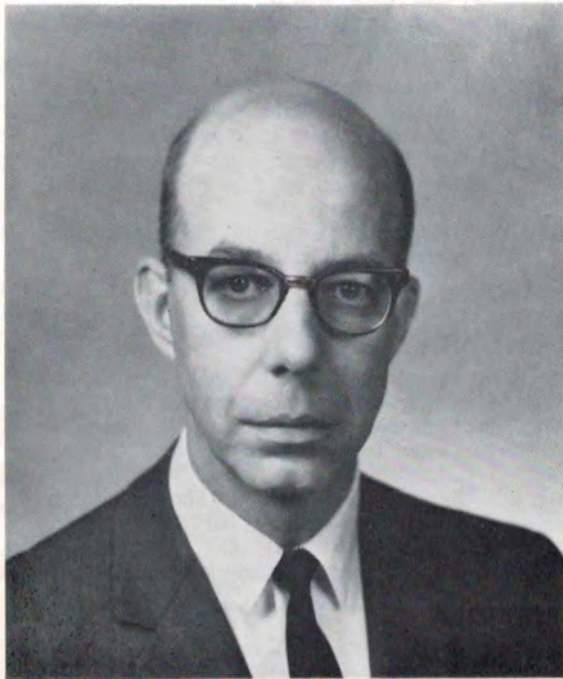
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Section Meeting Reliability Group



HARRY W. HOLLAND

Solid Tantalum Capacitors

Failure Mechanisms

Thursday, May 18, 5 P.M.
Newark College of Engineering

see page 8

Also, Election of Officers



The IEEE

Newsletter

The Magazine of the North Jersey Section

NORTH JERSEY SECTION – ANNUAL DINNER
Wednesday, June 14 – Cocktail Hour 5:30 P.M.

see page 4

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NORTH JERSEY — MTT Microwave Integrated Circuits

Date:

Wednesday, May 17, 1967

Time:

6:30 P.M. — Dinner, Wally's.

Watching, New Jersey

8:15 P.M. — Meeting

Place:

Arnold Auditorium

Bell Telephone Laboratories, Incorporated

Murray Hill, New Jersey

Speaker:

H. Oswald, Member of Technical Staff
Bell Telephone Laboratories, Incorporated
Whippany, New Jersey

A survey discussion of several types of active and passive microwave components; in development and in production; which utilize thin-film techniques. The components will be examined from the standpoint of the different technologies employed with a discussion of their advantages and disadvantages. A "blue sky" glance into the future will conclude the discussion.

Henry Oswald

Born in Brooklyn, New York on February 3, 1931.

BSS Manhattan College 1953—Also attended Union College, Northeastern University and NYU.

1954-1956 — Ordnance Corps. Frankford Arsenal, Philadelphia, Pennsylvania.

1956 - present—Bell Telephone Laboratories, Incorporated.

Worked on Receiver design for the NIKE-ZEUS Acquisition Radar and on the Beam-forming and Steering Systems for the MAR RADAR of NIKE-X.

Presently a Member of the MAR Receiver Systems and Amplifier Group of the NIKE-X Laboratory.

The election of officers for the North Jersey Chapter of the Group on Microwave Theory and Techniques will be held at this meeting. The nominating committee has selected the following slate of officers:

Chairman R. G. Pecina
Vice Chairman D. S. Lerner

Secretary R. J. Gutmann

Additional nominations may be made from the floor at the time of the meeting.

Polkinghorne Back

Our March issue carried the news that our veteran Frank Polkinghorne had left North Jersey for California. When Frank read this account he hastened to inform us that "it ain't so." He has decided not to work longer, and will return to North Jersey during the summer.

SECOND ANNUAL INTERDISCIPLINARY SYMPOSIUM

Uses of the Computer for Basic Research in the Humanities and in the Behavioral Sciences

Date:

Friday, May 5th, 1967

Time:

9:30 A.M. - 5:00 P.M.

Place:

Stevens Institute of Technology
Hoboken, N. J.

Five papers, each followed by a panel Discussion and audience participation on the use of computers in linguistics, experimental method, music, game playing and philosophy.

On the panels will be prominent representatives from the fields of science, business, music, social science, philosophy, and computer technology.

As before, the emphasis is not on specific accomplishment in any given area but rather on the general interplay between the researcher and the computer. Sponsored by Stevens Institute and IEEE Basic Sciences.

- Introduction and Moderation by Dr. Ivan Flores

- "Modelling the human brain as a device for learning and using languages" — Sydney Lamb, Professor of Linguistics, Yale University.
- "Computer analysis of experimental data during experimentation" — Ray Edwards, IBM Corp.
- "Musical composition by computer" — Lajaren A. Hiller, Professor of Music, University of Illinois.
- "Playing games with the computer" — Oliver Selfridge, Lincoln Labs, MIT.
- "The effect of computers on philosophy" — Bert Dreyfuss, Professor of Philosophy, Massachusetts Institute of Technology.

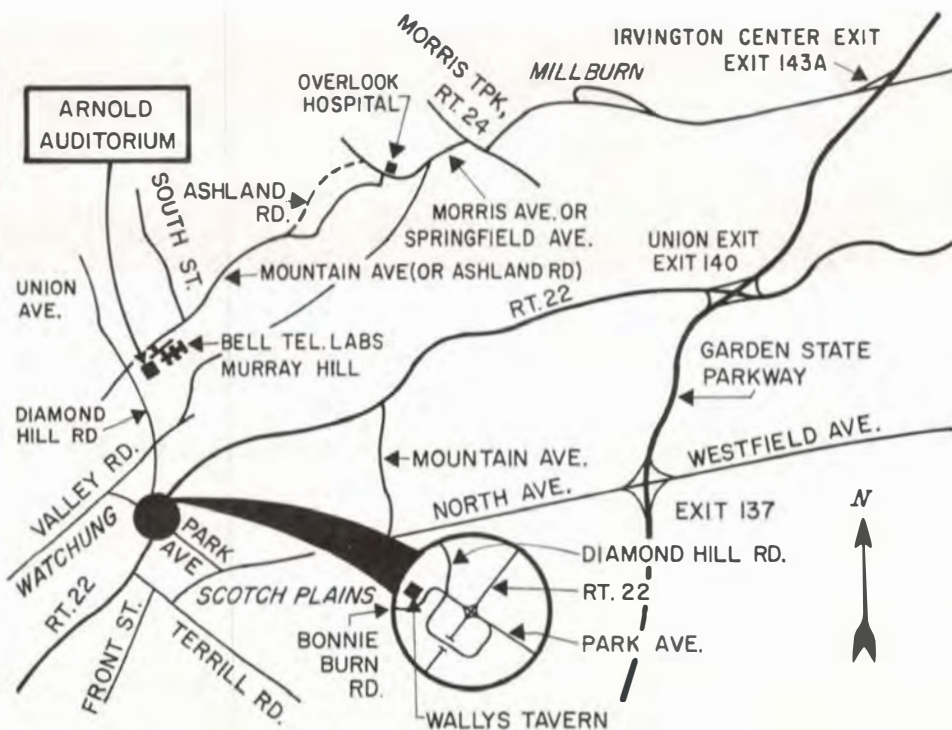
Registration Fee of \$10 includes lunch.

Make checks payable to IEEE Basic Science c/o Dr. Ivan Flores, EE Dept., Stevens Institute, Hoboken, New Jersey 07030.

Owens Illinois Tour A Success

The North Jersey Section sponsored a visit to the North Bergen Plant of the Owens Illinois Glass Facilities Wednesday, March 8th. Thirty nine members and guests were treated to a very interesting and instructional tour of the plant. Included was a view of the four continuous furnaces operating at 2700 degrees, feeding mechanisms directing molten glass to the automatic machines form-

ing bottles of various shapes and sizes, and mechanical arms transferring the bottles to belts which moved them to the ovens for annealing and gradual cooling. At the opposite end of the ovens, the bottles were inspected, boxed and carried off to the warehouse. A trip was also made to the batching tower where various materials were automatically measured and dumped into the furnaces. Arrangements for the trip were handled by Al Franco of the Program Committee.



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ABOUT ADDRESS CHANGES

REPORT ALL ADDRESS CHANGES TO:

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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: A. R. D'heedene

School Affairs Editor: Gene R. O'Brien

Associate Editor: David Wiener

Associate Editor: Fred T. Grampp

Advertising Manager: M. M. Perugini

Executive Committee Meeting

at Verona Public Library

Wednesday, June 7 — 7:30 P.M.

North Jersey Section IEEE Executive Committee 1966 - 1967

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Program Carl Torell
Student Affairs Prof. J. W. Earle

CALENDAR

See
Page

Friday, May 5

IEEE BASIC SCIENCES AND STEVENS INSTITUTE 2
9:30 A.M. to 5:00 P.M. — Second Annual Interdisciplinary Symposium — Five lectures on Uses of the Computer.

Wednesday, May 10

NEW YORK SECTION AND JOINT
METROPOLITAN INFORMATION THEORY 6
2:30 P.M. — "Preliminary Design of an Intelligent Automaton" by Dr. Nils Nilsson of Stanford Research Institute at Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

May 9 - 11

PACKAGING COMMITTEE SUBCOMMITTEE 9
Three-day conference at the Holiday Inn, New York.

Thursday, May 11

JOINT METROPOLITAN — ENGINEERING MANAGEMENT 9
7:30 P.M. "Risk Taking — A Practical Approach" by J. H. Leggett of the Bendix Corp. at the Little Theater of the New York Telephone Co. Building, 140 West Street, New York.

Wednesday, May 17

NEW YORK POWER AND INDUSTRIAL DIVISION 6
6:00 P.M. — Annual Spring Get-together.

NEW YORK SECTION AND COMTEC 8
7:00 P.M. — "Space Communications in Retrospect and Anticipation" by Harry Jackson of ITT Federal Labs. at Little Theater of the New York Telephone Co. Building.

NORTH JERSEY — POWER 4
7:30 P.M. — "Oyster Creek Nuclear Generating Station" by Ivan Finrock, Jr. of Jersey Central and Power and Light Co. at Punchbowl Road, Morristown.

NORTH JERSEY — MTT 2
6:30 P.M. dinner — 8:15 P.M. "Microwave Integrated Circuits" by H. Oswald of Bell Telephone Labs. at Arnold Auditorium, Murray Hill, New Jersey.

PRINCETON — MAGNETICS 8
8:00 P.M. — "Permanent Magnets" by Dr. R. K. Tenzer of Indiana General at Murray Hall, Rutgers University.

Thursday, May 18

NORTH JERSEY SECTION AND RELIABILITY 8
5:00 P.M. — "Solid Tantalum Capacitors Failure Mechanisms" by Harry W. Holland of Union Carbide at Newark College of Engineering Alumni Center.

JOINT METROPOLITAN — ELECTRON DEVICES 9
8:00 P.M. — "Characterization of Diodes for Microwave Multipliers and Mixers" by Dr. Arthur Uhlir, Jr. of Microwave Associates, Inc., at United Engineering Center.

Tuesday, May 23

JOINT METROPOLITAN — GEMB 10
8:00 P.M. — "Sound Spectrography Applied to the Identification of Body Sounds" by Lawrence Kersta of Voiceprint Labs. at Rockefeller University, New York City.

Wednesday, May 31

NEW YORK POWER AND INDUSTRIAL DIVISION AND
SOCIETY OF FRENCH ENGINEERS IN THE U. S. 4
6:15 P.M. — "Nuclear Energy in the World From Now Until 2000" by Robert Gibrat of Societe pour l'Industrie Atomique, SOCIA, at United Nations Association, 345 E. 46th Street, New York.

Wednesday, June 14

NORTH JERSEY SECTION ANNUAL DINNER 4
5:30 P.M. cocktail hour — 6:30 P.M. dinner — guest speaker, Morris D. Hooven, Public Service Electric and Gas Co., at Robin Hood Inn, Clifton.



NORTH JERSEY SECTION Annual Dinner

Wednesday, June 14, 1967

Guest Speaker:

Mr. Morris D. Hooven,
Consulting Engineer,
Public Service Electric and
Gas Company

Mr. Hooven will discuss the growth of the electrical engineering profession in the North Jersey area. He will add color to the background of this growth which has resulted, among other things, in the new-old North Jersey Section celebrating its fourth annual dinner meeting. He will defend (to the ladies present) the continued absence of husbands at section meetings.

For the first time of our annual dinner, we will honor our past chairmen of the Section.

The dinner will be held at the Robin Hood Inn, 1129 Valley Road, Clifton, New Jersey. A "Dutch Treat" cocktail and social hour will begin at 5:30 P.M. followed by a combination ham and chicken dinner to be served at 6:30 P.M. Dinner tickets will cost \$4.00 each. Non-members including wives are welcome.

Reservation Coupon

Mr. Carl Torell
9 Colony Court
Summit, N. J. 07901

Enclosed please find my check (or money order) made payable to the North Jersey Section IEEE in the amount of \$ (\$4.00 each) for tickets for the 1967 Annual Dinner, Wednesday, June 14th. Enclosed also is a stamped, self-addressed envelope to expedite return of the tickets to me. If reservation coupon is received after June 9th, or without self-addressed stamped envelope, tickets will be held at the door.

Name

Address
No. Street

City State Zip

NORTH JERSEY — POWER Oyster Creek Nuclear Generating Station

Date:
Wednesday, May 17, 1967

Time:
7:30 P.M.

Place:
Punchbowl Room
Jersey Central Power & Light Company
Madison Avenue (Highway 24)
at Punchbowl Road
Morristown, New Jersey

Speaker:
Ivan R. Finrock, Jr.
Nuclear Project Engineer
Jersey Central and New Jersey
Power & Light Company

The main reasons for building a nuclear plant at Oyster Creek will be discussed.

Following this, the nuclear aspects will be dealt with: how the output of the reactor is controlled; inherent safety mechanisms; the fuel assemblies; control rods, and the instrumentation necessary to measure a power level which varies from 1/2 watt at startup to 1,600,000,000 watts at rated power.

Emphasis will be placed on the numerous "engineered safeguards" included in the station to insure that the station can be operated without undue risk to the health and safety of the public.

Refreshments will be served following the program.

ATTENDANCE AT THESE MEETINGS
IS NOT LIMITED TO POWER GROUP
MEMBERS, BUT IS OPEN TO ALL
INTERESTED PARTIES.

YOU CAN HELP

If you are an employer, rely upon some students for temporary assistance in filling the "vacation gap." If you are a progressive employer, utilize the up-to-date academic training of an engineering student to update your in-house procedures. Hire a student and charge him or her with reviewing your operations — overall or in a specific area — and recommending means of increasing production, reducing costs, or creating more cohesiveness in the organization. It might cost you \$2,000 in salary to update your thinking.

If you are an employee, encourage your boss or personnel man in your firm to hire an engineering student. It could save a company money for senior recruiting if one or two juniors were given an opportunity to "show their stuff." They might prove to be so good that the company would want them back; and they, having already become familiar with the company and having no apprehension, would be anxious to return.

Employers wishing to interview college students for summer job openings can arrange such interviews with the following college placement officers:

Fairleigh Dickinson University
Mrs. Carla DeRiso
Phone: 836-6300
Newark College of Engineering
Richard Albers
Phone: 645-5202
Stevens Institute of Technology
Harold R. Fee
Phone: 792-2700—Ext. 348

NEW YORK POWER AND INDUSTRIAL DIVISION AND SOCIETY OF FRENCH ENGINEERS IN THE U. S.

Nuclear Energy in the World From Now Until 2000

On Wednesday, May 31st, 1967, at 6:15 P.M. there will be a joint meeting between the Metropolitan Section of the IEEE and the Society of French Engineers in the U. S. in the main auditorium of the United Nations Association of the United States, 345 East 46th Street, main floor.

The speaker will be Mr. Robert Gibrat, president of the "Societe pour l'Industrie Atomique, SOCIA" and director of the Company INDATOM, consulting engineer of Electricite de France, and the 1966 president of the Societe des Ingenieurs Civils de France in Paris. Mr. Gibrat will be on his way to Montreal, where he will deliver the closing speech of the "Week of Energy" at Expo '67.

Mr. Gibrat will talk about a subject with which he is eminently familiar, having had something to do with practically every nuclear power plant in Europe.

Following the lecture, there will be a dinner in the banquet room on the second floor of the same building. The price of the dinner is \$9 per person (\$8 for members of IEEE and ICF) including wine and gratuities. Aperitifs are to be paid when served. Ladies are, of course most cordially invited to the meeting and the dinner.

POWER GROUP

1967 Summer Meeting

The Power Group of the Institute of Electrical and Electronics Engineers has announced the completion of the tentative program for the 1967 Summer Power Meeting.

This meeting will be held in Portland, Oregon, at the Portland Hilton Hotel from July 9 through 14, 1967, and is expected to attract an attendance of as many as 1,500.

There will over 150 technical papers presented at the 35 technical sessions covering the entire range of electric power system problems — from high-voltage d-c power transmission and EHV (extra-high voltage) a-c transmission to underground residential distribution.

In addition to the technical sessions, time has been set aside for meetings of the National Committees of the IEEE Power Group.

Arrangements are also underway for a technical session on power sources for aerospace programs. Developments of this kind can turn out to be the power sources of the future.

This Power Group Meeting promises to be a comprehensive coverage of the latest technological advances in the field of electrical power systems.

A call for papers has been issued. Further details concerning the IEEE 1967 Summer Power Meeting may be obtained from W. L. Carey, Publicity Chairman, Portland General Electric Company, 621 S. W. Alder Street, Portland, Oregon 97205.

HELP WANTED!

Two volunteers are needed for the Newsletter Staff. Our current manpower is just about adequate and we enjoy publishing these news items for you on a monthly basis. But, Gene O'Brien finds that job requirements will make it necessary for him to drop out. So, we need a man to cover student activities. Also we should have one additional man for our general staff.

The job requires a few hours each month. In return, this activity provides a broad view of all the IEEE activity in the North Jersey Section and of much of the activity in the other Metropolitan Sections. One gets early warning of new technical topics and becomes acquainted with the men associated with them. The activity provides experience with the fields of publishing and printing. Finally, with a circulation of 5600 there is public recognition of your activity in IEEE. Everyone notes the names on the Newsletter masthead.

For more information, write to me — Box 253, New Vernon, N. J. 07976 or call 538-0362.

Al D'heedene, Editor

Backstage at the New Met A Tremendous Success

The Power and Industrial Division's tours of the backstage facilities at the new Metropolitan Opera House on March 18 and March 25 were tremendous successes and enthusiastically enjoyed. Each tour for the IEEE members and their wives originated in the beautiful auditorium where a talk was given on the acoustics, appointments, decor, lighting, innovations, and other matters of interest which concern the new Met.

The main group was broken up into smaller groups for better maneuverability and more personal attention. These smaller groups were taken behind the scenes into the dressing rooms, rehearsal halls, storage areas, below stage, side stages, and on stage. They were shown and/or explained the lighting controls, closed circuit TV, stage controls, bridges, cycloramas, and many other things too numerous to mention. Because there were matinees on both dates, the operation of equipment was necessarily restricted. The March 18 group was on, in, and through the set of Madame Butterfly while the March 25 group used La Traviata. (Fortunately, no one was left behind to become an unexpected added credit for either performance.)

Because the response for tour tickets was so great, the Metropolitan officials increased the number of proposed visitors from 50 on one day to 75 on each of two days. Even with this increase, there were still over 350 disappointed people.

The response for opera tickets was equally as great. The original arrangement of 20 tickets for each of two days was increased to include a third date. Still, there were over 120 others who were disappointed.

To those of you who were disappointed, our apologies and sympathies. A request for future tours has already been initiated.

The Power and Industrial Division wishes to express its sincerest thanks to the Metropolitan Opera Association, and in particular to Messrs. Krawitz, Kuntner, Hubay, and Bonheur for a most interesting and very successful tour.

Our thanks to Frank Farinella, Public Service Electric and Gas Co., for the writeup—Eds.

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The selected voltage is indicated digitally to four significant figures on each of six decade ranges. The voltage indicated may be dc, or it may be ac at 400 Hz or 1000 Hz, RMS or Peak-to-Peak.

Note, for example, the settings in the photo — 42.35 volts RMS at 1000 Hz output. And with an accuracy that you can be sure is better than 0.15%. The receptacle on the lower right of the instrument is for high voltage outputs from 100 volts to 1110 volts at 400 Hz, RMS or Peak-to-Peak.

The new instrument also features a connection for an optional Model 2421 Error Computer that enables you to read calibration errors directly in percentages, speeding up your calibrations considerably.

In addition to its greater voltage range on ac, the Model 421A has a lower source impedance on ac than the Model 421 it replaces. Line voltage effects on the instrument are negligible. A $\pm 10\%$ line voltage change, for instance, causes less than a 0.05% change in output voltage.



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Great Neck, N. Y. HUnter 2-7876
Antenna Laboratory: Smithtown, N. Y.

JOINT METROPOLITAN INFORMATION THEORY

Preliminary Design of an Intelligent Automaton

Date:

May 10, 1967

Time:

2:30 P.M.

Place:

Room 116 (Auditorium),
Polytechnic Institute of Brooklyn,
333 Jay Street, Brooklyn, New York
(Take IRT to Borough Hall station, BMT
to Borough Hall station or Lawrence Street
station, or IND to Jay Street-Borough
Hall station.)

Speaker:

Dr. Nils Nilsson,
Stanford Research Institute

The design of an intelligent automaton, or robot, will be described. In order to build useful, ambulatory automata, certain fundamental problems must be isolated and their solutions begun. These problems include: means of representing the external environment in an internal model; methods of using the model for planning of tasks involving navigation or route finding, and learning about the external world through sensory apparatus, the most important of which is visual.

These problem areas are now under study at the Stanford Research Institute. A small, computer-controlled vehicle is being constructed to allow experimental testing of various ideas. The results of early simulation experiments and future plans for experimenting with the vehicle will be discussed.

Dr. Nilsson has been on the staff of Stanford Research Institute since August 1961 where he has participated in and led research in pattern recognition, learning machines, and artificial intelligence. He has taught courses on learning machines at Stanford University and at the University of California, Berkeley. McGraw-Hill published, in March 1965, a monograph by Dr. Nilsson describing recent theoretical work in learning machines.

Dr. Nilsson received an M.S. degree in Electrical Engineering in 1956 and a Ph.D. degree in 1958, both from Stanford University. While a graduate student at Stanford, he held a National Science Foundation Fellowship. His field of graduate study was the application of statistical techniques to radar and communication problems.

Before coming to SRI, he completed a three-year term of active duty in the U. S. Air Force. He was stationed at the Rome Air Development Center, Griffiss Air Force Base, New York. His duties entailed research in advanced radar techniques, signal analysis, and the application of statistical techniques to radar problems. He has written several papers on various aspects of radar signal

North Jersey Section Budget

At the April 5 Exec. Comm. Meeting, the North Jersey Section adopted the budget detailed below for the 1967-68 fiscal year. It will be noted that the greatest section expense is the Newsletter. Also, income from Newsletter advertising is in a downtrend. This is offset, in part, by additional income from lecture series, which are becoming increasingly popular. An increase is projected for supporting the group chapter meetings.

Proposed Section Budget

	7/1/67 to 6/30/68	Budget 7/1/66-6/30/67
Receipts		
IEEE Membership Rebates	6,325.00	\$ 5,300.00
Newsletter Income — Curr. Yr.	7,800.00	9,100.00
Newsletter Income — Prev. Yr.	350.00	350.00
Education Committee	4,500.00	3,675.00
Program Committee	200.00	200.00
Section Banquet	1,600.00	1,450.00
Other Income	800.00	150.00
Receipts Total —	\$21,575.00	\$20,225.00
Disbursements		
Section Meetings — Genl.	\$ 900.00	\$ 900.00
Chapter Meetings		
Automatic Control	250.00	200.00
Comm. Technology	250.00	200.00
Computer	250.00	200.00
Engr. Writing and Speech	250.00	200.00
Microwave Theory	250.00	200.00
Power	250.00	200.00
Reliability	250.00	200.00
Newsletter	11,000.00	10,940.00
Education Committee	2,600.00	1,860.00
Executive Committee	300.00	300.00
Annual Audit	150.00	150.00
Standing Committees		
Awards	75.00	25.00
Membership	25.00	50.00
Program	300.00	300.00
Publications	25.00	25.00
Publicity	25.00	100.00
Nominating	25.00	25.00
Student Affairs	150.00	100.00
N. J. Engrs. Comm. for Student Guidance	150.00	150.00
Section Banquet	2,400.00	2,000.00
Student Day Activity	750.00	750.00
Section Award	—	50.00
Joint Chapter Support	450.00	600.00
Previous Years Disbursements	250.00	250.00
Miscellaneous	250.00	250.00
Disbursements Total —	\$21,575.00	\$20,225.00

J. G. O'Grady
Treasurer
North Jersey Section

processing. While stationed at the Rome Air Development Center, he held an appointment as Lecturer in the Electrical Engineering Department of Syracuse University.

Dr. Nilsson is a member of Sigma Xi, Tau Beta Pi, the Institute of Electrical and Electronics Engineers, and the Association for Computing Machinery.

Election for officers for the Metropolitan New York Chapter of the Information Theory Group will be held prior to the meeting.

Persons interested in having lunch with the speaker prior to the meeting should contact one of the following:

Long Island —

Ira Langenthal, (516) 921-9540;

New Jersey —

Aaron Wyner, (201) 582-3370;

New York —

Jack Wolf, (212) 643-3843.

The meeting is co-sponsored by the New York section of the IEEE.

NEW YORK POWER AND INDUSTRIAL DIVISION

Annual Spring Get-together Theme — Bavarian

Date:

Wednesday, May 17, 1967

Place:

165th Regiment Armory
Lexington Ave. between 25th and 26th St.
Manhattan, N. Y.

Cocktails start at 6:00 P.M. Entertainment to follow dinner.

Seats reserved on a first come, first served basis at \$5.75 each. Request tickets from — No later than May 1.

Mr. R. Martinsen

Long Island Lighting Co.

175 East Old Country Road

Hicksville, N. Y. 11801

Make checks payable to Power and Industrial Division of IEEE, New York Section. Include stamped self-addressed envelope.

THE RISING STAR IN THE NORTHEAST



QUESTION:

What does AEL offer to the engineer and scientist to satisfy his career requirements?

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NORTH JERSEY SECTION MEETING RELIABILITY GROUP

Solid Tantalum Capacitors Failure Mechanisms and Determination of Failure Rates

Speaker:

Harry W. Holland
Union Carbide Corporation
Greenville, South Carolina

When:

Thursday, May 18, 1967

Where:

Newark College of Engineering
Alumni Center, Seminar Room,
323 High Street, Newark New Jersey

Time: 5:00 P.M.

Following the speaker's presentation at approximately 6:15 P.M., a "Dutch Treat" dinner will be available in the NCE Cafeteria.

At 7:30 P.M., the meeting will reconvene for a short business meeting to elect officers for the coming year for both the North Jersey Section and the Reliability Group.

Following the business meeting, further questions on reliability will be welcome.

Mr. Holland has agreed to discuss your tantalum capacitor reliability problems, so bring them to the meeting. Discussions of new failure modes and mechanisms and new failure analysis techniques will be welcomed.

Harry W. Holland received the B.S. degree in Chemical Engineering from Virginia Polytechnic Institute in 1948. Subsequent experience with Union Carbide Corporation began with Development Laboratory work on radio and hearing aid B batteries. This work later extended to other electrochemical systems, including both primary and sealed secondary cells. After a brief period of fuel cell development, he joined the division producing solid tantalum capacitors. He has been associated with these devices for the past six years in Development and Quality Control capacities. He is presently Manager of Quality Assurance for the Components Department of Union Carbide Electronics. The Components Department, in addition to being a major manufacturer of solid tantalum capacitors and vacuum tube getters, produces a new plastic film dielectric capacitor.

ABSTRACT

A brief description of the product design and the manufacturing process is given as an introduction. The common modes of failure are discussed and the physical mechanism of the primary mode is examined in some detail. The postulated mechanism is seen to be consistent with observed life test behavior. The characteristic decreasing failure rate of this device is shown to allow quantitative screening of individual production lots to meet established failure rate goals. Accelerated life testing and establishment of correlative factors are discussed, and this principle is extended to de-rating in applications. Finally, failure analysis techniques are discussed.

MEETINGS ARE OPEN TO ALL

Princeton Magnetics

The next meeting of the Magnetics Chapter will be on Wednesday, May 17, 1967. At that time Dr. R. K. Tenzer of Indiana General will discuss permanent magnets. The meeting will be at 8:00 P.M. at Murray Hall, Room 120, Rutgers University. Further information may be obtained by writing to:

Dr. Edward Della Torre — EE Dept.

Rutgers — The State University

New Brunswick, New Jersey

Telephone: 201-247-1766 — Ext. 6407

NEW YORK SECTION N. Y. COMTEC

Space Communications in Retrospect and Anticipation

Date:

May 17, 1967

Time:

7:00 P.M.

Place:

140 West Street,
New York Telephone Company
Little Theater

Speaker:

Mr. Harry Jackson of IT&T

Federal Laboratories

Mr. Harry Jackson of IT&T has first hand knowledge of the art of communicating with satellites. He was on the scene providing TV coverage of the Gemini missions. Hence, he brings fresh and timely impressions of this newest communications frontier. This same past experience enables him to look forward realistically toward new challenges.

Mr. Jackson plans to illustrate his remarks with his own personal films of Gemini recovery operations. In addition, he will use another film to illustrate future plans for space communications.

Both the New York Section and the Communications Technology Group plan to elect officers at this meeting, so please plan to attend.

Mr. Jackson is project manager of the design and fabrication of a 42 foot transportable earth station. Earlier he was station manager of the ITT transportable ground station aboard the USS Wasp, USS Boxer and USS Guadalcanal, providing TV coverage of the Gemini recovery missions. During 1964-65 he was responsible for providing technical advice and assistance to the military personnel operating and maintaining the ITT Federal Laboratories designed and built AN/MSC-45 terminal at Helemano, Hawaii. Previously, Mr. Jackson served as station manager of the ITT Federal Laboratories Space Communications Research Station at Nutley, N. J. and as station manager of project Trade Post's Terminal No. 2 at Nutley and Lakehurst. In both roles he was directly responsible for operations, maintenance and training at the stations which included activities in projects Telstar, Relay and Syncom. Prior to joining ITT Federal Laboratories, Mr. Jackson completed 21 years of service with the U. S. Army and the U. S. Air Force. His later assignments there included: chief: transmission engineering division, Headquarters, AFCS; engineering officer: project Pole Vault, tropospheric scatter communications systems; instructor: advanced communications course, Scott Air Force Base, Illinois; supervisor: HF transmitter site.

**JOINT METROPOLITAN
ENGINEERING MANAGEMENT**

**Risk Taking
A Practical Approach**

Date:

May 11, 1967

Time:

7:30 P.M.

Place:

Little Theater of the
New York Telephone Co.
140 West Street, New York, N. Y.

In today's highly competitive industrial environment, one element is universal: the taking of risks. J. H. Leggett, Director of Engineering, The Bendix Corporation, will present several techniques which have been employed, in concrete instances, to meet this challenge.

Let us assume that your company is in a position of technological leadership in a field, but it turns out that you need to question for a given development project (1) its **ECONOMIC** feasibility, (2) whether an eventual **SOLUTION** may be guaranteed or (3) whether a prescribed **TIME SCHEDULE** can be met! How we may rationally take risks in the face of these typical problems, systematically deal with them, and still maintain a competitive industrial advantage, will be the subject of Mr. Leggett's discussion. In this endeavor, the speaker will draw on his wealth of actual experience and describe the managerial approaches which have met with some success. He will also allude to certain Operations Research techniques, where they have been found relevant in dealing with risk taking in new projects.

Joseph Leggett, in his capacity as Director of Engineering, is personally responsible for a professional and technical staff of over 2200 people engaged in the research and development of aircraft and space instrumentation and automatic controls. He has been with the Navigation and Control Division (Teterboro, New Jersey) since 1950. He has been active in both R & D and the establishment of Standards in the industry. Mr. Leggett has devoted over 25 years to the field of aviation and began his career in design, development, installation and testing activities. He has also been awarded several patents in his field.

**IEEE Packaging Conference
Set for May 9-11**

"A New World of Packaging Line Controls" will be opened up for attendees at the Seventh Annual Packaging Industry Technical Conference to be held next May. Sponsored by the Packaging Industry Subcommittee of the Institute of Electrical and Electronics Engineers, this year's meeting will run for three days, May 9-11, at the Holiday Inn, New York City.

The first technical session will get underway on Tuesday afternoon, May 9, after welcoming addresses by E. B. Gardner, Subcommittee Chairman, and other key personnel. Topics covered in this session will include "The New J.I.C." and "Trouble Shooting with the Integrated Maintenance Chart." On Wednesday morning, May 10, "Printed Motors in Packaging Machinery" and "The Marriage Between Fluidics and Electrical Control Can be a Happy One" are

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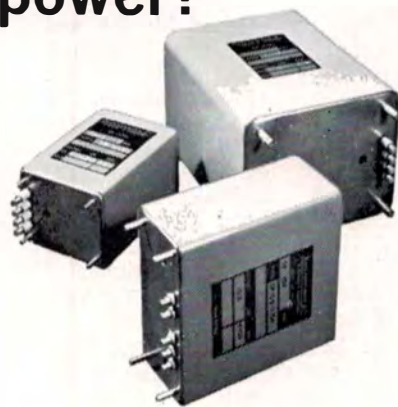


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two papers that will highlight the second technical session.

After a luncheon, and a talk by Francis Carpenter, Senior Advisor, Public Affairs, U.S. Mission to the United Nations, the third technical session will get underway. Integrated circuits will be the dominant theme of three papers, presented by experts from Westinghouse, Motorola and Texas Instruments. "Improved Color Sensing and Control Methods" is another of the advanced subjects scheduled for this part of the program. "Static Controls — a Practical Industrial Control Technique" is the initial talk on Thursday morning's technical agenda, which features several papers on solid state control technology and winds up with a luncheon and then a talk by Munro Leaf, famous author and illustrator.

A trip to the Western Electric Co., Kearny, N. J. is on the tour list for Tuesday morning, May 9, and a choice of trips to either Hoffmann-LaRoche (in Nutley, N. J.) or the New York Times (NYC) is offered for Thursday afternoon. The ladies are welcome on these **TOURS**, and in addition, can see Lincoln Center, Manhattan from the water (Circle Line tour) and the United Nations.

Official programs have been mailed to hundreds of packaging men who might be interested in attending this conference. A pre-registration form is included as part of the program booklet, permitting cash savings and a chance to make early reservations for tours and luncheons. Additional programs and information, including the pre-registration form, are available from: E. J. Wheeler, Registration Chairman, P.O. Box 93, Milford, Conn. 06460.

JOINT METROPOLITAN ELECTRON DEVICES

Characterization of Diodes for Microwave Multipliers and Mixers

Speaker:

Dr. Arthur Uhler, Jr.
Vice-President and Manager of
Semiconductor Division
Microwave Associates, Inc.
Burlington, Massachusetts

Date:

Thursday, May 18, 1967 at 8:00 P.M.

Place:

United Engineering Center
345 East 47th Street
New York, N. Y.

Pre-meeting Dinner:

Copain Restaurant (6:00 P.M.)
1st Avenue at 50th Street
New York, N. Y.

ABSTRACT

Objectives of characterization vary and include: data for circuit design, establishment of circuit and diode tolerances, process control, physical description of diode, and understanding physics of diode action. Cutoff frequency, transition time, and lifetime measurements are often carried out under conditions far removed from those of use; relationship to multiplier tests will be discussed. Power handling and noise considerations will also be covered.

ELECTION OF CHAPTER OFFICERS

The annual election of officers for the coming year will take place immediately preceding Dr. Uhler's talk.

NEW INSTRUMENTS



QUALITY 11" x 17" X-Y RECORDER AT BUDGET PRICE

The new hp Model 7005A X-Y Recorder, for plotting one variable as a function of another on 11" X 17" paper, is intended for general purpose applications where the highest available dynamic performance is not required (maximum slewing speed is 15 inches/second.) Its accuracy and linearity, prime indicators of X-Y recorder performance, are at the same level as more expensive instruments, i.e., plots are accurate within $\pm 10.2\%$ and instrument linearity is $\pm 10.1\%$.

The input on each axis is guarded, resulting in common-mode rejection on the 1-mV/inch range of 130 dB at dc and 95 dB for ac. It has five calibrated ranges on each axis, from 1-mV/inch to 10-V/inch in decade steps.

Standard equipment includes electric pen lift, with local or remote control, wing brackets for easy convertibility to rack-mounting, and the hp Moseley-developed silent Autogrip paper hold-down, which has no moving parts and requires no maintenance other than routine cleaning.

Price of the hp Model 7005A Recorder is \$1195. And for more information on equipment, contact your local hp Engineer.



NEW LOW-COST SOLID STATE PLUG-IN HF/VHF SWEEP OSCILLATOR

Hewlett-Packard's 100 kHz—110 MHz sweep oscillator, Model 3211A, has two plug-in positions. One determines the range of sweep frequencies; the other accepts as many as eight plug-in marker cards, each with its own frequency-determining crystal.

The marker functions of the 3211A are different from other sweepers in that, a birdie bypass marker system is used in which the beat notes are transformed into video pulses. The video pulses can be applied either to the detected response of the test circuit to obtain positive or negative vertical markers or to the Z axis input of an oscilloscope which yields intensity-modulated dots.

Six frequency plug-ins are available. The 3212A is a heterodyne unit covering from 100 kHz to 30 MHz. The other five plug-ins sweep octaves. The ranges are 6 - 18 MHz (Model 3213A), 12 - 28 MHz (Model 3214A), 20 - 45 MHz (Model 3215A), 30 - 70 MHz (Model 3216A), and 50 - 110 MHz (Model 3217A).

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FOURTH ANNUAL SECTION DINNER - MEETING



Morris D. Hooven,

Past President of IEEE

will speak on

*Growth of
Electrical
Engineering
in North Jersey*



The IEEE

Newsletter

The Magazine of the North Jersey Section

Meeting will honor Past Chairmen

Wednesday, June 14

Robin Hood Inn, Clifton

Cocktail Hour 5:30 P.M.

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- Thin Film Techniques
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NEW YORK COMPUTER Second Annual Computer Survey

The second annual survey of recent achievements in computer technology will be the featured event at the June 15 meeting of the NY Chapter of the IEEE Computer Group.

At the meeting, two government computer specialists, Marlin H. Wagner and Leonard W. Cotten, of the Department of Defense, will describe highlights of the past year in computer technology and computer-aided design and will discuss the quality of progress.

The meeting will be held in the auditorium of Burroughs Corp., 605 Third Avenue, NYC (40th Street) at 7:45, and will be preceded by a no-reservations-needed dinner at Gatti's restaurant, 246 East 40th Street (near Second Avenue) beginning at 6:00 P.M.

As the last of the 1965-66 season, the meeting will be the occasion of the election of chapter officers for the 1967-68 year. Nominated for a second one-year term as chairman is the present chairman, Alan Corneretto, of Wathen/Walsh Associates, 605 Third Avenue, NYC. Dr. Herbert Freeman, professor of electrical engineering at New York University, University Heights, Bronx, N. Y., has been nominated as vice-chairman.

Chapter members are cordially invited to attend this last dinner and meeting of the season and meet the speakers, the prospective new officers and other members of the Computer Group. Anyone interested in serving as a Chapter committeeman is especially urged to attend and contact Alan Corneretto or Prof. Freeman. See you there.

Planetary Billiards System May Propel Spacecraft of 1970's

Spacecraft tours of the 1970's may use an interplanetary billiards system — ricocheting via gravitational drag from one planet to another. The unmanned spacecraft would be redirected at each planetary approach. The gravitational forces would enable the craft to pick up added energy as it changed course.

The new possibilities for solar system exploration are outlined in the December issue of the *Astronautics and Aeronautics Journal* by Dr. H. J. Stewart of the California Institute of Technology's Jet Propulsion Laboratory. According to Dr. Stewart, two propulsion developments now emerging from engineering research may open Jupiter and the outer planets, Mercury, regions outside the solar system, and even the sun to close-up inspection during the next decade. These developments are the use of planetary gravitational drag and solar-electric propulsion. Under study are systems using small ion engines and large solar panels for sustained low-thrust power.

Astronomers have long recognized the three-body effect — that a moving planetary gravitational field can change the heliocentric trajectory of another body. Mariner IV proved the theory in its flight by Mars in July 1965. Larger effects could be achieved in fly-bys of other planets with greater masses or, as in the case of Venus, higher orbital speed. Jupiter, with a mass 317 times that of the earth, has such a strong gravitational field that large deflections and changes in speed are possible.

Computations show that the spacecraft, launchable with present-day boosters, would have greatest chance for a successful grand tour to Neptune and beyond if launched in October 1978. It is estimated that such a tour, bouncing from Jupiter to Saturn to Uranus to Neptune, would require 8.9 years. Without the billiard-type acceleration, a direct flight from the earth to Neptune could take up to 30.7 years, depending on the launching vehicle used.

Puzzle Corner

For fear that our wits may tarnish in the summer sun, your editors have selected some diabolical teasers. We dare you to solve them.

1. I recently went into a hardware store to make a purchase. The proprietor quoted the following prices:

- one will cost 10 cents
- eight will cost 10 cents
- thirteen will cost 20 cents
- eighty-five will cost 20 cents

One hundred thirty one will cost 30 cents
What was I buying?

2. That was easy. In the following sequence of numbers there is a number missing between the 24 and the 100. What is that number.

10, 11, 12, 13, 14, 15, 16, 17, 20, 22, 24—
100, 121, 10000.

Answers will be published in the September issue. If you have a favorite puzzle send it in.

To get an idea of how many people solved the second problem please send answers to:

D. T. Wiener
104 Falcon Road
Livingston, N. J. 07039

North Jersey Section ANNUAL DINNER

For the first time, the North Jersey Section of the IEEE will honor Past Chairmen of the Section at its Annual Dinner to be held Wednesday, June 14, 1967, at the Robin Hood Inn, 1129 Valley Road, Clifton, N. J. A "Dutch Treat" cocktail and social hour will begin at 5:30 P.M. followed by a combination ham and chicken dinner to be served at 6:30 P.M.

Dinner tickets will cost \$4.00 each. Non-members are welcomed.

After four years of growth and activity as the North Jersey Section of the IEEE, it is timely that one of our programs be devoted to looking back over the happenings of the two organizations which joined to form our present North Jersey Section. We are most fortunate in having as our guest speaker one who has seen activity in both the IRE and AIEE and who is presently a member of IEEE's standing committee on History and also IEEE's appointed member to the Board of Directors of the Electrical Historical Foundation.

He served as Historian of the New York Section and at present in our own Section's Chairman of the History and Procedures Committee. His avocation for many years has lain in the field of history of the engineering profession. He will attempt to give color to the background of the growth of the profession in this area which has resulted, among other things, in the new-old North Jersey Section celebrating its fourth annual dinner meeting. He will defend, to the ladies present, the continued absence of husbands at section meetings.

Mr. Hooven's present major concern is consulting engineering, administrative and coordinative tasks in connection with the Kittatinny Mountain Pumped Storage Project as performed jointly with Public Service Electric and Gas Company and Jersey Central Power and Light Company personnel. Other points of interest concerning our speaker are as follows:

Education

Attended Carnegie Institute of Technology
Graduated Sc.B. Magna Cum Laude, Bucknell University
Received Doctor of Science, Bucknell University
D.Sc., Newark College of Engineering
Received Distinguished Lecture Medallion, U. of Louisville
Elected to Eta Kappa Nu, Phi Kappa Psi, & Tau Beta Pi

Prior Positions

Chemist, Carnegie Steel Corp.
Engineer, Westinghouse Electric Corp.
Radio Engineer, Robbins Electric Company
Public Service Electric and Gas Company as
Transmission Engineer, Asst. Transmission
and Substation Engineer and Chief Electrical Engineer

Other Activities

Member, American Institute of Electrical Engineers, President 1955-56
Engineers Council Professional Development, President 1956-58
Engineers Joint Council, Director 1953-58
Montclair Society of Engineers, President 1942-43, Honorary Member 1964
Electrical Historical Foundation, Director 1961
Member, Institute of Radio Engineers
American Society of Mechanical Engineers
National Society of Professional Engineers
American Society of Engineering Education
MR. CARL C. TORELL
9 Colony Court
Summit, New Jersey 07901

Enclosed please find my check (or money order) made payable to the North Jersey Section IEEE in the amount of \$ (\$4.00 ea.) for tickets for the 1967 Annual Dinner, Wednesday, June 14, 1967. Enclosed also is a stamped, self-addressed envelope to expedite return of the tickets to me. If reservation coupon is received after June 9th, or without envelope, tickets will be held at the door.

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Student's Corner

NNJ Students Earn Awards in MSC Paper Contest

The North Jersey Section was well represented when the prizes were awarded for the 1967 Metropolitan Student Council Student Prize Paper Contest. Seniors Frederick Telewski of NCE and Ernest L. Ohlhoff of FDU were among the winners at the Long Island University Graduate School in Farmingdale on April 22nd.

The judge's final decision resulted in these awards:

First Place:

\$200 — "Design of an Adaptive Signal Recognition System" — Steven Fink and Alex Gernert — Cooper Union.

Second Place:

\$100 — "Design of an Ultra-High Frequency Pre-Amplifier" — Telewski.

Third Place (Tie):

\$125 (divided) — "Automatic Synchronizing Strobe Light" — Ohlhoff.

"An Analytical Method of Biasing Junction Field Effect Transistors" — Charles F. Bieber and Harold J. Shelley — Pratt Institute.

The students are required to present an oral dissertation in addition to their written work. The subject material must be related to an area of engineering in which the IEEE is concerned.

Fourteen engineering schools belong to the MSC including the three North Jersey schools of Stevens, Fairleigh Dickinson, and Newark College of Engineering.

The papers submitted by Ohlhoff of FDU and the Pratt students were judged equivalent. Therefore the third and fourth prizes were combined and divided between the two papers' authors.

Credit should also go to Ernest Wantuch and James Earle, the FDU and NCE advisors, respectively, who gave assistance to the engineering students. Fred Telewski's second-place paper resulted from his senior project course at NCE. His work in the laboratory facilities of the college enabled him to test the theories and circuits which were depicted in his paper.

Our congratulations should go to both Fred and Ernie for their work as well as all the contestants, their advisors, and the schools which sponsored them.



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gram at NCE in December.

Publicity — The Publicity Committee was active again this year in publicizing the Section's activities as well as the honors received by members of the Section.

Newsletter — Ten issues of the Newsletter were published. The Newsletter *continues to be the vital communication link between the Section and the membership. This year the Newsletter presented a good deal of news coverage in addition to straight meeting notices.*

New Chapter — The Reliability Chapter

The Newsletter, June 1967

Danger — Lc

It is common knowledge that victims of l respiration more readily than the victims of merciful clamping of the heart, owing to the voltages. However, lest these details be misin can be drawn is that 75 volts are just as lethal

The actual resistance of the body varies c skin condition (moist or dry). Between the e than skin resistance) is only 100 ohms, while The skin resistance may vary from 1000 oh dry skin.

Banner Year

Under the vigorous and enthusiastic leadership of Leo Katz, the Joint Metropolitan Chapter of the Engineering Management Group has completed a year of outstanding activity. Seven technical meetings were well attended and there was a good turnout for the cocktail party.

Certificates of appreciation for substantial service rendered to the Chapter during the past season were awarded to thirteen members (elected officers ineligible): N. H. Biyal, R. Chalom, J. Greene, L. H. Hershenson, M. Katz, S. Kramer, K. G. Leib, J. P. Leonard, N. B. Mills, W. D. Moyers, H. N. Oppenheimer, S. J. Raiter, J. A. Vaughan.

The following men have been nominated as officers for the 1967-68 year:

Chairman:

H. F. Mullen, Northern Radio Co.

Vice-Chairman:

E. W. Van Winkle, Bendix Corp.

Secretary:

R. Colen, Hewlett-Packard Co.

Treasurer:

S. Kramer, General Inst. Co.

• **Diversified Program Presented**

The Chapter made decisive advances in (a) the variety of services offered to the membership, (b) widening the base of active participation and (c) placing the Chapter in a favorable financial position.

The Metropolitan Chapter provided an opportunity: (1) to hear top level managers of considerable first-hand experience at seven monthly technical meetings; five meetings took place in the core area (N.Y.C.) and one each in L. I. and N. J. the format including single speakers and panels; (2) to take a substantive survey course in the financial aspects of management at a six-week Spring series; (3) to participate in an all-evening workshop session to become a more effective manager.

Other projects included the establishment and conduct of three technical sessions at the IEEE International Convention, pre-season and IEEE convention socials and a comprehensive survey in the Spring of membership needs employing a detailed questionnaire.

• **Annual Membership Survey Completed**

Last year a questionnaire-type survey revealed members' meeting and subject preferences. This Spring a questionnaire probed in greater depth to obtain a profile of the membership and their views on many aspects of the program, so that their needs can be optimally met. Highlights included: 64% are in Manufacturing, 58% are in Middle and Upper Management, 84% have three or more people reporting to them, 39% earn over \$20,000 per year; in the over "20 K" group 59% travel over 30 days per year and 91% are active in other organizations, as opposed to 17% and 61%, respectively, for the under "20 K" group. The chief reason for membership cited was "increase perspective" and for attending meetings "subject matter."

Compression of Human Speech Enables Speeded-up Tape Playback With No Change in Pitch, No Deterioration, and Full Recognition

New York, N. Y., March 20 — Engineers attending the 1967 IEEE International Convention and Exhibition at the New York Hilton Hotel in New York City were given a lecture-demonstration of the technique of "speech compression." A device known as an information rate changer was described and demonstrated by Stephen F. Temmer, president of Infotronic Systems, Inc., of New York City.

The rate changer steps up the speed of a recording, on playback, to several times the rate of normal speech without any change in pitch and without accompanying deterioration in the precision and accuracy of speech formants (characteristic resonances). Simply increasing the playback speed of recordings of speech without such a device produces the well known "Donald Duck" effect of higher pitch and resulting deterioration of recognition.

The information rate changer solves the Donald Duck problem by making use of a special precision playback head. If the playback head is stationary and the 1/4" magnetic tape is driven by its capstan at normal playback speeds of either 7.5 or 15 inches per second, playback will be at a normal rate. If, however, the tape is rotated in the direction of tape travel, pitch will be decreased. Rotating the head against tape travel will have the opposite effect. To lower the pitch by 20%, for example, the head is rotated in the tape travel direction. If, at the same time, the speed of the tape is increased by 20% by speeding up the speed of rotation of the capstan, the pitch will return to its previous level but the actual playback rate will have increased by 20%.

Recent improvements in the design of the rate changer have made it possible to change speed and pitch independently and yet simultaneously so that pitch can be raised and speed lowered at the same time. The pitch change aspects are of great importance to the unscrambling of helium speech produced by deep sea divers whose voice pitch is raised by as much as an octave.

In an accompanying paper by Dr. Robert D. Gates of Philco-Ford Corporation, Fort Washington, Pa., some of the implications of speech compression were discussed. He pointed out that in animal life, articulation and the oral or sonic communication thereof often take place faster and more efficiently than in humans. Research with birds and recordings of dolphins substantially slowed down, he said, give evidence that man — comparatively speaking — is operating in low gear. Compressed speech, he stated, offers man the opportunity to operate in high gear and to possibly communicate with animal life of high intelligence and with extraterrestrial intelligence.

Space Chlorophyll is Clue to Life Form on Other Planets

Chlorophyll, the key compound of life on earth, has been found to exist in outer space. This discovery implies that life itself in forms familiar to man could exist on the other planets in both our galaxy and perhaps throughout the universe.

Physicist Fred M. Johnson of Electro-Optical Systems, Inc., recently explained to an astronomy and biodynamics colloquium at the University of California that after 13 years of research he has succeeded in identifying interstellar dust grains to be the solid molecular substance chlorophyll and not ice or graphite as had been hypothesized in the past. He noted that these dust particles have been telescopically observed for over 80 years as a sort of cloud formation in space that partially obscures light from distant stars. Since biologists have already determined that chlorophyll is essential to the basic building process of life called photosynthesis, it can be speculated that space chlorophyll could reach the surface of other planets and there undergo photosynthesis as on earth to produce at least simple plant forms.

The identification technique was similar to fingerprinting — a comparative process whereby certain optical characteristics of the dust in space were found to match closely the optical characteristics of chlorophyll in the laboratory. It was established from the light filtering or spectroscopic findings of Dr. George Herbig of Lick Observatory that whatever the molecular composition of interstellar grains, they absorb starlight in the blue to red spectral region at specific wavelengths of from 4400 to about 6600 angstroms. Since there are literally billions of molecules, the problem was to find the particular molecules that absorb light in this blue to red spectral range.

Dr. Johnson first examined in detail all existing theories that could help identify the dusts' molecular composition and was finally led to porphyrin, the skeleton structure of chlorophyll. Porphyrin, however, did not match exactly with the interstellar absorption lines but was the starting point for a search through the related family of compounds, which pointed directly to the larger, more complicated chlorophyll structure. Since that time, the absorption lines of chlorophyll have matched up with the interstellar fingerprints under repetitive laboratory tests.

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Newark College of Engineering
Richard Albers
Phone: 645-5202

Stevens Institute of Technology
Harold R. Fee
Phone: 792-2700—Ext. 348

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NEW INSTRUMENTS



MODEL 3434A TESTS ELECTRONIC DEVICES FASTER AND EASIER

A new Comparator makes fast high-go-low measurements of electrical quantities. It is especially useful for component evaluation, component sorting, or component matching; and for making circuit adjustments, testing integrated circuits, sub-module checkout or complete system checkout.

The input to the Comparator can be a dc voltage, an ac voltage, a dc current, or a resistance. The Comparator provides relay closures which may be used to operate external equipment such as sorting machinery or a printer.

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The Model 3434A Comparator (without plug-ins) is \$1575. Plug-ins range from \$40 to \$575. The companion Model 11084A Programmer is \$225.



NEWLY DEVELOPED EIGHT-CHANNEL FLUID RECORDER SYSTEM

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