Annual Students' Night

Fairleigh Dickinson Gymnasium
1000 River Road, Teaneck, N. J.

Friday, December 11, 1964
7:30 P.M.
A High Performance 1.7 to 4.1 Gc Signal Source At A Reasonable Price

HIGH OUTPUT POWER: Guaranteed to provide at least 50mw above 2.1 Gc; typically provides much more (see curve).

OUTPUT CALIBRATION: Output attenuator calibrated in relative db over most of the range.

OUTPUT INDICATION: Output meter permits maximum output setting at any frequency.

MODULATION CAPABILITY: Built-in 1-kc square-wave modulator; use of repeller-modulation makes possible extremely low incidental fm on modulated output signal. Oscillator may also be fm, pulse, or square-wave modulated with external signals.

STABILITY: Highly regulated supply voltage provides excellent short-term stability of amplitude and frequency under both cw and modulated conditions. After warm-up, average frequency observed in a one-second interval is stable within approximately 5ppm over a ten-minute period.

NARROW-BAND SWEEPING: May be internally swept through 1- to 3-Mc bands at line-frequency or 1-kc rate. Sync pulses are also provided in this mode.

ADAPTABILITY: Output is provided at a Type 874 Recessed Locking Connector which quickly and easily converts to any other popular coaxial output with the addition of a low VSWR Locking Adaptor.

PRICE: The Type 1360-B Microwave Oscillator is priced at $1175.00 in U.S.A.

GENERAL RADIO COMPANY
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Editorial Notes

This has been an enjoyable year for your Editor. We want to thank the members of the Executive Committee, the Groups and their Chairmen, and the members of the staff of "The Newsletter."

While all have worked and been helpful in producing "The Newsletter," special thanks are due to: Howard L. Cook, who has constructively advised and collected information for us; the Program Chairmen: Roger McSweeny (63-64), and Joseph O'Grady (64-65) who provided material on time: Group Coordinator Raymond Kudisch who also helped to get the Group Material in on time; Dr. Irving F. Stacy who has proof-read copy every month; Mike Perugini, former Editor, now Business Manager, who broke me in, and his associate A. J. LaRouche, who obtained the advertisements and organized the production and mailing of the publication so that you could receive it before the first of the month; and last, but not least, a recent member of the staff, Marcel Kozuch, who is going to attempt to expand his horizons by undertaking the editorship of "The Newsletter." For the present, he will only "get his pen wet," before he commits himself.

So it is with ambivalent feelings that we move from the position of Editor, and become a back-seat driver as Publications Chairman.

CALENDAR

Tuesday, December 8
Joint: Communications Technology & Computers
8:00 P.M. — "Defense Communications Agency Simulation Program"
Garden State Plaza Auditorium
Paramus, N. J.
6:00 P.M. — Pre-meeting Dinner
Cambridge Inn
Garden State Plaza
Paramus, N. J.
Make Reservations: See Page 8

Thursday, December 10
Aerospace & Navigational Electronics
8:00 P.M. — "Panorama of Flight Instrumentation"
Willkie Memorial
20 West 40th St., N. Y.
6:00 P.M. — Pre-meeting Dinner
Old Seidelberg Restaurant
626 3rd Ave., N. Y.

Thursday, December 10
Engineering Writing & Speech
8:00 P.M. — "Company Libraries & Modern Engineering Needs"
ITT Communications
South 60 Rte. 17
Paramus, N. J.
6:00 P.M. — Pre-meeting Dinner
Cambridge Inn
Garden State Plaza
Paramus, N. J.

Friday, December 11
North Jersey Section
Annual Student Night
7:30 P.M. — Fairleigh Dickinson Gymnasium
1000 River Rd.
Teaneck, N. J.

Tuesday, December 15
Electromagnetic Compatibility
8:00 P.M. — "McDonnell Phantom II A Comprehensive Program for EMC"
Fairchild Camera
300 Robbins Lane
Syosset, L. I.

Sunday, December 19
North Jersey Section
Annual Convention
2:00 P.M. — North Jersey Section (A)
Fairchild Camera
330 Robbins Lane
Syosset, N. Y.

The IEEE Newsletter
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Volume 11 December, 1964 No. 4

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ABOUT ADDRESS CHANGES
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.

REPORT ALL ADDRESS CHANGES TO:
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Executive Committee Meetings
at Verona Public Library
December 2
January 6, 1965
February 3
March 3
IEEE Convention March 22-25
April 7
May 5
June 2
Ballantine Sensitive DC/Volt/Ammeter

Model 365
Price: $650

Measures 1 $\mu$V to 1,000 V dc
0.001 $\mu$A to 1 A dc

Now you can measure with unmatched accuracy dc voltages with an extremely wide range of 1 $\mu$V to 1 kV and currents from 0.001 $\mu$A to 1 A.

Ballantine's Model 365 Sensitive DC Volt/Ammeter, an analog indicator with a single logarithmic scale and range selector, measures voltages above 1 mV with a constant accuracy of 1% of indication. It measures currents above 0.1 $\mu$A with an accuracy of 2% of indication.

The Model 365's accuracy is supported by a high order of stability gained by ac and dc feedback techniques and conservative operation of all components. If you need further assurance of accuracy, a reliable internal calibration standard is available to check its calibration, which can be switched on in a second.

Signal-ground isolation of the Model 365 allows floating measurements to 500 volts above panel ground, and ac rejection is provided to reduce the effects of common-mode signals.

**PARTIAL SPECIFICATIONS**

<table>
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<tr>
<th>Voltage</th>
<th>1 $\mu$V — 1 kV</th>
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<td>Accuracy</td>
<td>1% of indication above 1 mV</td>
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<td>Impedance</td>
<td>$1 \text{ M\Omega}$ above 1 $\mu$V; $5 \text{ M\Omega}$ above 0.1 mV; $10 \text{ M\Omega}$ above 0.1 V</td>
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<th>Current</th>
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<td>Accuracy</td>
<td>2% of indication above 0.1 $\mu$A</td>
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<td>Impedance</td>
<td>$&lt; 10 \text{ k\Omega}$ above 1 nA; $&lt; 100 \text{ \Omega}$ above 10 nA</td>
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**Impedance Between Signal and Panel Grounds:** $R > 100 \text{ M\Omega}$, $C = 0.1 \text{ mF}$, 500 V Peak Max Usable as DC Amplifier: 100 db max gain, 0.1 to 1 V output for each decade input range

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**North Jersey Section**

J ointly Sponsored Chapters as of October 1964

- The Group on Vehicular Communications (G-6)
- Joint with New York and Long Island
  - John D. Meehan, Chairman
  - 338 North Forrest Ave.
  - Rockville Center, N. Y.
  - The Group on Reliability (G-7)
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  - 3941 Maywood Drive
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  - The Group on Aerospace and Navigational Electronics (G-11)
  - Joint with New York and Long Island
  - Gus Stavis, Chairman
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  - 190 Mineola Blvd.
  - Mineola, N. Y.
  - The Group on Electromagnetic Compatibility (G-27)
  - Joint with New York and Long Island
  - Milton Kant, Chairman
  - 389 Virginia Ave.
  - North Massapequa, N. Y.

**ISA Honors Columbia Professor**

Warren P. Mason, adjunct professor of Columbia University's School of Engineering and Applied Science, received the 1964 Arnold O. Beckman award from the Instrument Society of America in ceremonies held recently during the Annual ISA Conference and Exhibit.

Professor Mason, who is associated with the Institute for the Study of Fatigue and Reliability of the Department of Civil Engineering and Engineering Mechanics at Columbia, was nominated for the award for his research in acoustical and ultrasonic wave propagation, electrical networks, and solid-state physics — and more specifically for his work on the highly sensitive, semiconductor Strain Gages resulting from those studies.

The Newsletter, December 1964
Early Ballantine Instruments Donated to Smithsonian Institution

A Ballantine Model 300 vacuum tube voltmeter, the first commercial type instrument of its kind, has become a part of the Smithsonian Institution's collection of national and international treasures which document the development of science and technology, it has been learned.

Upon receiving a request from the national museum for an early type electronic voltmeter, officials of the company, located at Boonton, N. J., contacted the Naval Research Laboratory in Washington, D.C., where it was discovered that one of Ballantine's first Model 300 units produced, serial number 14, had been in use since August, 1938. The Naval Research Laboratory presented the instrument to the museum in August of this year after attaching to it a special plate commemorating its length of service.

The Smithsonian Institution also expressed its interest in obtaining samples of Ballantine's "Artificial Ear," a throat microphone used by the Air Force during World War II, an electronic stethoscope, and a variable-mu tube developed by Ballantine. These products were also sent to the museum and are now a part of its scientific and technological collection.

To present day designers of electronic equipment, a brief description of these pioneering instruments may prove interesting in their contrast to modern day advances. Ballantine's "Artificial Ear," for example, was used to check the audio fidelity of items such as recording headphones. The electronic stethoscope combined an amplifier and selective filter which checked the signal from a magnetic pickup stethoscope, amplified it, passed it through one or more filters, and measured the voltage output. Built-in filters allowed the operator to concentrate on certain portions of the audio frequency spectrum. The instrument was also entirely self-contained and battery-operated. Its bulky size, of course, was a handicap — in comparison to the small and compact transistor-type units possible today.

Ballantine's variable-mu tube was developed and sold to RCA, and was a great aid in the days when it was necessary to have an amplifier with variable gain and minimum distortion.

Ballantine's throat microphone was entirely new at the time it was introduced. It consisted of two magnetic pickups at the throat delivering a signal to an amplifier designed to amplify the higher frequency signals far greater than the lower frequency to make up for loss of high frequency responses from the throat. It made possible the use of a microphone in an airplane in which the pilot did not have to hold it up to his mouth. The idea of a throat microphone is quite old, it has been pointed out, but the practical approach including the highly compensated amplifier was what made the Ballantine unit so different and successful.

Annual North Jersey Section Student Night

Fairleigh Dickinson University will once again act as host for the Annual IEEE-North Jersey Section Student Night that is to be held this year on Friday, December 11, 1964, at 7:30 P.M., in the FDU Gymnasium, 1000 River Road, Teaneck, New Jersey.

The Student Affairs Committee of the Section, under the leadership of Mr. James Earle, Chairman, Professor W. Clements, Newark College of Engineering, Professor H. W. Phair, Stevens Institute, and Mr. T. Haffy and Professor J. E. Lawlor of Fairleigh Dickinson University.

NOTE TO ALL MEMBERS

North Jersey Section, IEEE

The membership is invited to attend this Student Night meeting; as a matter of fact, you are encouraged to do so. You can make no better contribution to these young men than coming to this meeting, mingling and talking with them, thereby indicating your interest in their future. So come on out!

NOTE TO EVERYONE

Refreshments will be served

STUDENT OFFICERS

Newark College of Engineering
Teaneck, N. J.

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Carmen W. Faucera
150 Gordon Avenue
Fords, N. J.
VA 6-3208

Vice-Chairman:
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70 Palisade Avenue
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385-0237

The Newsletter, December 1964
Executive Committee Report

WHAT IS IEEE?

To properly operate within an organization, the analytical individual must identify that organization, its structure and its purpose. For the member engineer or scientist, the IEEE is defined as an organization whose purpose is "the advancement of the theory and practice of electrical engineering, electronics, radio, allied branches of engineering, and the related arts and sciences". The instruments of this policy are the publications, the meetings, and the sections of the IEEE.

However, without introducing the relationship between members, this definition is as sterile as an organization chart without names. It is people who write the papers, run the meetings, and administer the sections so that other people, presumably the total membership, can benefit from the resultant advancement in theory and practice; and yet if a random sample of engineers were polled, one might find that, for the vast majority, their contact with the Institute is quite impersonal. The Proceedings and Transactions arrive automatically (apparently the result of a mysterious process devoid of human intervention), and are scanned and systematically filed. Perhaps one article in each issue stimulates interest or curiosity, and perhaps generates the germ of a helpful or controversial comment. However, the author is not present, and the thought dies. Most likely the only articles read are those specifically related to the reader's current technical assignment.

This hypothetical member is operating as a very narrow-band amplifier without feedback. This technical introversion is dangerous, both for the organization and the individual, for like the amplifier, he can accept only a very narrow band of inputs and deliver a specific output. If the output requirement changes either in spectrum or amplitude, he does not feed this information back to the profession for appraisal and revision of theory and practice. Neither is his spectrum broad enough to draw upon the neighboring art to accommodate the problem.

Yet the opportunity for all of this exists. Within a half hour's drive on a dozen or more evenings of the month, there is an opportunity for direct contact with the authors of many papers and talks. After-meeting discussions and social contact at the Fellows Banquet provide a communication link to the sources of much of the advancement of current technology. Furthermore, the opportunity exists for modifying, if necessary, the scope of these functions either by suggestions to the various section committees or by direct participation in them.

Despite these opportunities, the total participation of section membership in meetings, committees, and other functions of the section remains small. This year, as in the past, the section and its affiliated groups have planned an excellent program. Let us collectively benefit from it by participating. Remember, it's your profession; help it and yourself grow!

WALTER GLOMB
Vice-Chairman

NY Communications & Electronics Division

Engineering Applications of Computer Programming
January 19, 1965—February 23, 1965

Part II: DESIGN APPLICATIONS

Within a manufacturing business, computers have been successfully applied to a wide variety of functional work: accounting (payroll, receivables, billing), manufacturing (production scheduling, inventory control, material ordering), and marketing (forecasting, order processing, distribution). Engineering, where the computer gained its initial recognition and acceptance, has not been overlooked, but broad-scale applications are relatively few and far between and are concentrated mainly in peripheral or highly specialized areas.

Recent announcements are opening up the area. During this series of lectures several of these new developments will be used to highlight the ever-increasing use of computers for various types of engineering design. This is a three-phase program including prototype, non-prototype, and the analysis of electronic currents.

Section 1

Non-prototype design, sometimes referred to as design, application, or production engineering, is an important function in business where (1) the product encompasses a broad range of expected requirements and (2) modifications are introduced to customize the product to specific customer requirements. The use of computers in these cases will be discussed in terms of Automated Design Engineering, a new computer application in which customer design and functional requirements for a product are converted automatically into parts lists, assembly instructions, and other information for manufacturing of a product. A case example of an Automated Design Engineering System employed in transformer design will be used to illustrate the computer's utility in non-prototype design.

Aerospace & Navigational Electronics

Panorama of Flight Instrumentation

Meeting Notice

The December 1964 meeting of the New York Metropolitan Chapter of the Group on Aerospace and Navigational Electronics (GANE) will be held as follows:

Date: Thursday, December 10, 1964
Time: 8:00 P.M.
Place: Willkie Memorial Auditorium
20 West 40th Street
New York City
Subject: Panorama of Flight Instrumentation
Speaker: Mr. Kenneth S. Lester
Aircraft Radio Corporation
Boonton, New Jersey

Pre-meeting Dinner: 6:00 P.M.
Old Seidelberg Restaurant
626 Third Avenue
New York City

Mr. Lester received his A.B. degree from Drew University. He joined Aircraft Radio Corporation in 1961 as Eastern Regional Representative for dealers in airframe manufacture and is presently Airborne Sales Manager of the Corporation.

Section 2

Prototype design, particularly when it involves large, complex systems, is continually being subjected to more complex technologies, more minute and detailed packaging requirements, and an accelerated rate of technological change. These factors have highlighted the need for better communication and dissemination of information at all levels of design from before-the-fact research to after-the-fact production reporting. IBM's Design Automation System which is used in the design, manufacturing, testing, and servicing of IBM products will be discussed as a case study of the use of computers for prototype design. During the lecture six major areas will be discussed:

1. Packaging Standards
2. Engineering Sketches and Transcription
3. Logic Diagram Printing and Checking
4. Back Panel Wiring
5. Impact on Manufacturing
6. Output Documentation of Engineering Records

Section 3

Electronic circuit performance requirements vary between industries and products. In some instances the design objective is extremely high reliability; in others, it is a balance between cost and reliability, and consumer acceptability. The design effort includes determining the tolerance required of each individual component in order to obtain an overall circuit performance within tolerance. Since the relationship between component tolerance and circuit tolerance is not a direct one, the analysis of the possible combinations of components is a time-consuming task.

(Continued on Page 7)
Electromagnetic Compatibility

**PHANTOM II COMPATIBILITY**

The New York Metropolitan Area Group on Electromagnetic Compatibility will hold the second meeting of the 1964-1965 series on December 15.

The meeting is tentatively scheduled to be held at Fairchild Camera and Instrument Corporation, 300 Robbins Lane, Syosset, Long Island, New York and will begin at 8 P.M. Guest speaker will be Mr. W. D. McKerchar of McDonnell Aircraft Corporation, St. Louis, Missouri. Mr. McKerchar will discuss the "McDonnell Phantom II - a Comprehensive Program for Electromagnetic Compatibility." He will also present two movies, "The McDonnell Compact Wire Harness," which describes the development of an improved shielded harness, and "The Free World's Phantom," which reviews the development of the RF-4C Phantom Aircraft.

The Electromagnetic Compatibility (EMC) program, implemented as part of the basic design of the RF-4C being produced by McDonnell Aircraft Corporation for the United States Air Force, provides a wide variety of interference problems for the Electromagnetic Compatibility Manager. The RF-4C aircraft involves a high density installation of electronic, electrical, and electro-optical subsystems, integrated to perform tactical reconnaissance missions.

**The Speaker:**

Mr. McKerchar, presently with the Aircraft Systems Engineering Division of McDonnell Aircraft Corporation is the Supervisor of the Electromagnetic Compatibility Control Group. In this capacity he is responsible for electromagnetic compatibility programs on aircraft, advanced design, and interference research studies.

He is a member of the IEEE Groups on Electromagnetic Compatibility, Military Electronics, Engineering Management, and Aerospace and Navigational Electronics. Mr. McKerchar is Secretary of the Electromagnetic Compatibility Committee (AE-4) of SAE, and a member of the AIAE EMC panel.

**Registrations:**

To assure adequate meeting facilities, it is requested that members planning to attend phone A. L. Albin at 516—WE 1-4500, X 323 (Syosset, L.I., N. Y.) or O. P. Schreiber, 201—BR 2-5500 (Crainford, N. J.). Registrations for the pre-meeting dinner can also be made at that time.

(Continued from Page 6)

This section will discuss how computers are now being applied to this area of engineering and analysis. Specific examples of how computer programs can be used to complete DC, AC, and transient analysis of electrical networks will be discussed during the lectures. Live computer demonstrations will also be used in conjunction with the lectures.

R. A. Bragg
Program Administrator
Engineering Application Development IBM Data Processing Div.
425 Park Avenue
New York, New York 10022

**Lectures on Language:**

**Written and Spoken-Electronic Identification and Conversion**

**To Start January 11 in N. Y.**

A Winter Lecture Series on "Language: Written and Spoken-Electronic Identification and Conversion" will be held in January and February by the New York Section, IEEE and its Communications and Electronics Division.

The course will be given at the Western Union Auditorium, 160 West Broadway, Manhattan, on six consecutive Mondays commencing January 11, 1965, from 7 to 9 P.M. Adequate street parking is available after 6 P.M. The building is easily reached by IRT Seventh Avenue Subway (Franklin Street Station).

Facets of the work presently being pursued, such as character and speaker identification, writing and language conversion, including present and future trends, will be discussed. The chosen speakers are specialists in the field and are actively engaged in the work in industrial and educational institutions.

This is one of the first occasions where such a group has been brought together to present a unified and comprehensive discussion of this most interesting topic.

Lectures and lecturers are as follows:

1. January 11
   "Introduction — What has been and what is being done," Dr. Vincent Guillian, Arthur D. Little Associates.

2. January 18
   "Character Identification," Dr. Robert J. Potter, Thomas J. Watson Research Center, IBM.

3. January 25
   "Speaker Recognition," Dr. Lawrence G. Kerst, Bell Telephone Laboratories.

4. February 1
   "Writing Conversion," Mr. Warren Strohm and Mr. Robert V. Mazza, IBM.

5. February 8
   "Language Conversion," Dr. Suyumma Kuno, Harvard University.

6. February 15

**Registration Information**

Fee for the series is $5 for members of the IEEE; $8 for non-members; and $1 for full-time students.

Registrations must be made in advance. To register, send check payable to "Communications & Electronics Division, New York Section, IEEE" to R. E. Sanner, General Telephone & Electronics, 730 Third Ave., New York, N. Y. 10017. A stamped self-addressed envelope must be included.

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Engineering Writing
& Speech

COMPANY LIBRARIES AND
MODERN ENGINEERING NEEDS
a panel discussion sponsored by

The North Jersey Section of IEEE and the North Jersey
Chapter of the Group on Engineering Writing and Speech

The multi-fold increase in engineering information and the need for ready accessibility pose problems of increasing magnitude for libraries that support engineering effort. In this panel discussion, the approach of several companies will be presented. The librarians from several companies will outline the needs that their libraries must satisfy and the manner in which they satisfy those needs. Answers will be supplied to the questions: what is being done to obtain and categorize information, how is the information presented to the engineer, and what is expected in the future.

Representation on the panel includes:
Mr. Gordon E. Randall
Manager, IBM Research Library
Thomas J. Watson Research Center
Yorktown Heights, New York

Joint Meeting:
Communications Technology & Computers
Defense Communications Agency Simulation Program

Mr. Edward H. Cooper will be the speaker at the December joint meeting of the Communications Technology and Computer Groups. He will discuss the application of digital simulation techniques to defense communications network design and operation.

In addition to the history of the DCA simulation development program, application of the developed models to practical problems will be discussed. Emphasis will be placed on "Lessons Learned," cost, and technical support required to staff the DCA simulation program. Models have been developed to simulate between voice and teletype traffic.

The paper will conclude with a discussion of the philosophy of simulation, future plans for simulation of the DCA, and a short discussion of the role of simulation languages.

The meeting will be held at 8:00 P.M. on Tuesday, December 8 at the Garden State Plaza Auditorium. The pre-meeting dinner begins at 6:00 P.M. at the Cambridge Inn, Garden State Plaza.

MEETING NOTICE

Subject: The Defense Communications Agency Simulation Program
Speaker: Edward H. Cooper
Place: Garden State Plaza Auditorium
Date: Tuesday, December 8, 1964
Time: 8:00 P.M.
Pre-meeting Dinner: Cambridge Inn, Garden State Plaza, 6:00 P.M.

Meeting Notice
Date: 10 December 1964
Pre-meeting Dinner: 6:00 P.M.
The Cambridge Inn
Garden State Plaza
Paramus, New Jersey

Meeting: 8:00 P.M.
ITT Communications Systems, Inc.
South 60, Route 17
Paramus, New Jersey
(across Route 17 from the Garden State Plaza)

Mr. Morton W. Wasserman
Head, Library/Information Center
ITT Communication Systems, Inc.
Paramus, New Jersey

Miss Fern Cloak
Librarian, David Sarnoff Research Center
RCA Laboratories
Princeton, New Jersey

The panel moderator will be LaVern G. Lee, Chairman, North Jersey Chapter of IEEE Group on Engineering Writing and Speech.
Letters

Gentlemen:

Re: October 1964 Newsletter

The drawing which you used on the cover of this month’s Newsletter is not as far-fetched as it may seem. The individual shown in the wheelchair on the enclosed photographs is a totally paralyzed quadriplegic residing at Goldwater Hospital on Welfare Island. With the equipment, which was designed and built by myself, the boy attends college, signals with a light instead of raising his hand, and takes notes with a tape recorder. He performs all of these operations selectively, without the use of his arms, legs, or body. He can drive the chair forward, backward, forward-left, forward-right, backward-left, or backward-right, all by himself.

The wheelchair control system is operated by sensors built into the hat. It is capable of yielding up to 16 selective outputs—all under voluntary control. At the present time, I am refining the design so that the equipment can be made even smaller and lighter in weight, and so that it can be used for operating limb orthoses and other prosthetic devices. As you can see, there are no microswitches or other gadgets in the hat and the device is not mechanical. The only alterations visible on the headpiece is the cable which exits at the rear, and the indicator light on the front which lights when the boy wishes to raise his hand in class—a feat which he cannot actually perform. All equipment is potted within the headpiece and is virtually indestructible. The hat has an adjustable headband and can be used by anybody, once it is adjusted to fit the user’s head.

I thought this information would be of interest to you. I much prefer to apply the technological skills which I possess to the betterment of humanity than to its destruction 1984 style.

Yours very truly,

Donald Selwyn

---

NY Basic
Sciences Division

1965 Integrated Circuits Seminar
Thursday, January 28, 1965
Stevens Institute of Technology
Hoboken, New Jersey

Schedule of Invited Papers:
Morning Session — 9:30 A.M.
“State of the Art of Monolithic and Thin Film Integrated Circuits”
Jay Lathrop, Texas Instruments, Dallas, Texas

“Fabrication and Design of Integrated Circuits Utilizing the EPIC Process”
Mike Callahan and George Averkiou, Motorola, Phoenix, Arizona

“Techniques for Frequency Discrimination in Micrcircuits”

Moderator: Dr. R. W. Wyndrum, Jr., Bell Labs., Whippany, N. J.

Lunch — included in Registration Fee

Afternoon Session — 1:30 P.M.
“Considerations in High Speed Integrated Logic”

“Integrated Memory Considerations”
Tudor Finch, Bell Labs., Murray Hill, N. J.

“Micropower Microelectronic Systems”
Dr. Wolfgang Gartner, CBS Labs., Stamford, Conn.

Moderator: Dr. R. C. Levine, Bell Labs., Whippany, N. J.

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Fris, Ferguson, Busignies to Receive IEEE Awards During National Electronics Conference

The Institute of Electrical and Electronics Engineers (IEEE) gave field awards to three top engineers during a special luncheon in their honor on Wednesday, October 21. The luncheon was held in conjunction with the National Electronics Conference (Oct. 19-21) — a three-day meeting held each year in Chicago and sponsored by IEEE. Clarence Linder (IEEE President and retired GE Vice-President) was on hand to present the awards as follows:

Mervin J. Kelly Award (in the field of telecommunication) to:
Harald Trap Friis (Consultant, Hewlett-Packard Co.)

"For his many contributions to the development of radio systems from high frequency to microwaves, particularly in the fields of radio measurements and antennas."

Morris E. Leeds Award (in the field of electrical measurement) to:
John Gilbert Ferguson (Engineering Consultant, Lockheed Electronics Co.)

"For his contribution in expanding the knowledge of the measurement of fundamental electrical units."

David Sarnoff Award (in the field of electronics) to:
Henri Busignies (Vice-President and General Technical Director, International Telephone and Telegraph Co.)

"For outstanding contributions to electronic systems, especially in the fields of direction finding and air navigation."

Harald Trap Friis was born in Nuestved, Denmark, February 22, 1893. He attended the Royal Technical College, Copenhagen, where he received the degree of Electrical Engineer in 1916 and Doctor of Science in 1938. He began his engineering career in Denmark in 1916 as assistant to Professor P. O. Pedersen. Moving to the United States in 1919, he then joined the Western Electric Company's research department which was later to become Bell Laboratories. During his career with the Bell System, Harald Friis contributed substantially to almost every aspect of the radio art. In the early twenties he built the first field measuring set for the 300 to 400 meter range. Work in the field of propagation and antennas culminated in the design of the multiple unit antenna (MUSA). Entering the field of microwaves in 1938, Friis established accurate measurement techniques which proved invaluable both in the Bell Laboratories' wartime microwave work and in the work of the Radiation Laboratory at MIT. In the field of antennas, his invention of the simple rocking-horse scanning antenna is noteworthy, as is the "hill-board" antenna which was installed in large numbers in the Arctic for the White Alice tropospheric scatter system. The antennas used in the "Telstar" experiment are direct descendants of the horn-reflector antenna which was invented by Friis and Beck.

Fris was made Director of Research at Bell Laboratories in 1942 and in 1945 became Director of Research in High Frequency and Electronics. His many honors include the Valdemar Poulsen Gold Medal, presented by the Danish Academy of Technical Sciences in 1954, and the IRE Medal of Honor for 1955.

A Fellow of the IEEE, Friis is also a member of the American Association for the Advancement of Science, the Danish Engineering Society, the American Section of the International Scientific Radio Union, and the Danish Academy of Technical Sciences.

John Gilbert Ferguson was born on June 5, 1892 in Brevard, Australia. He received the Bachelor of Science degree in Electrical Engineering from the University of California in 1915, and after spending the following year there as Research Assistant, received the Master of Science degree in Physics in 1916. He immediately joined the engineering department of the Western Electric Company, later incorporated as Bell Telephone Laboratories. In 1922 he was appointed supervisor of electrical measurements and advanced to the position of Transmission Measurement Engineer in 1948. Upon his retirement from the Laboratories in 1957, he joined Lockheed Electronics Company and served as engineering consultant until 1963.

Mr. Ferguson pioneered in the development of precise measurement of frequency, capacitance, inductance, attenuation, and phase as required for developing new communication systems that included coaxial cable, microwave relay, and ocean telephone cable projects. In 1923, he devised a method of tuning fork control which made it possible to gain two orders of accuracy over conventional tuning fork standards. At the same time he introduced the use of the cathode ray tube for making precise frequency comparisons. His further work in frequency measurements led to the completion of the new Bell System Primary Standard of Frequency in 1951 with one part in a billion accuracy. The world's most accurate public clock was controlled by this standard.

During World War II, he contributed inventions in the Magnetic Gradientometer used for exploring the earth's magnetic field. Later he directed and guided development of "sweep" and "rapid comparison" methods of measuring attenuation, phase, and delay at frequencies up to 20 megacycles.

Mr. Ferguson's contributions to the field of electrical measurement are documented in many published articles which include his classic papers on shielding and classification of bridge methods of measuring impedance. He is a Fellow of IEEE, and a member of Sigma Xi and the American Association for the Advancement of Science.

Henri Busignies was born on December 29, 1905, in Paris, France. He received the Electrical Engineering degree in 1926 from the Institut Normal Electrotechnique, Paris, France, and an honor of Doctor of Engineering of Science was conferred upon him in 1958 by the Newark College of Engineering, Newark, New Jersey. He joined the International Telephone and Telegraph Corporation in 1928 as an engineer with its Paris Laboratories, and for the next twelve years carried out research and development in direction finders, instrument landing systems, and early radar devices. His automatic direction finder, first tested in a dramatic flight from Paris to the Isle of Reunion off Madagascar, was successfully demonstrated in the United States in 1937.

Since 1941, when he participated in the founding of IIT Laboratories, Nutley, New Jersey, Mr. Busignies played a major role in the growth of the corporation's activities in the United States. He became a technical director of the Laboratories in 1949, vice-president and member of the management advisory board in 1953, executive vice-president in 1954, and president in 1956. Currently Mr. Busignies is vice-president and general technical director of the worldwide International Telephone and Telegraph System.

Inventor, scientist, and a leading authority on radio navigation and direction finders, Mr. Busignies holds approximately 130 patents in the air navigation, radar, and communication fields.

He is known as the inventor of the world's first automatic direction finder for aircraft, the Aeronautical and Navigational Electro for which he received the Pioneer Award of Electronics Group of the Institute of Radio Engineers in 1959. His contributions to the Allied World War II effort include the development of a direction finding system known as "huff-dull", which proved a vital factor in the war on enemy submarines. In recognition of these contributions, he was awarded the U. S. Navy Certificate of Commendation for "oustanding service" to the Navy, and the Presidential Certificate of Merit for his activities with the National Defense Research Council.

Mr. Busignies is a Fellow of the IEEE.
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