EDITOR'S PROFILE of this issue

from a historical perspective …

with Paul Wesling, SF Bay Area Council GRID editor (2004-2014)

March, 1967:

Cover: Shown is a logo of the International Microwave Power Institute' Symposium, being held this year in Palo Alto.

Page 4: Prof. Marvin Chodorow, of Stanford's Microwave Laboratory, opens the IMPI Symposium. He was involved in development of the klystron at Stanford, and was instrumental in increasing its power from watts up to megawatts. These improved klystrons were used for the 2-mile-long linear accelerator. Much of the physics department was built on klystron royalties. He was elected an IEEE Fellow.

Archive of available SF Bay Area GRID Magazines is at this location:
https://ethw.org/IEEE_San_Francisco_Bay_Area_Council_History

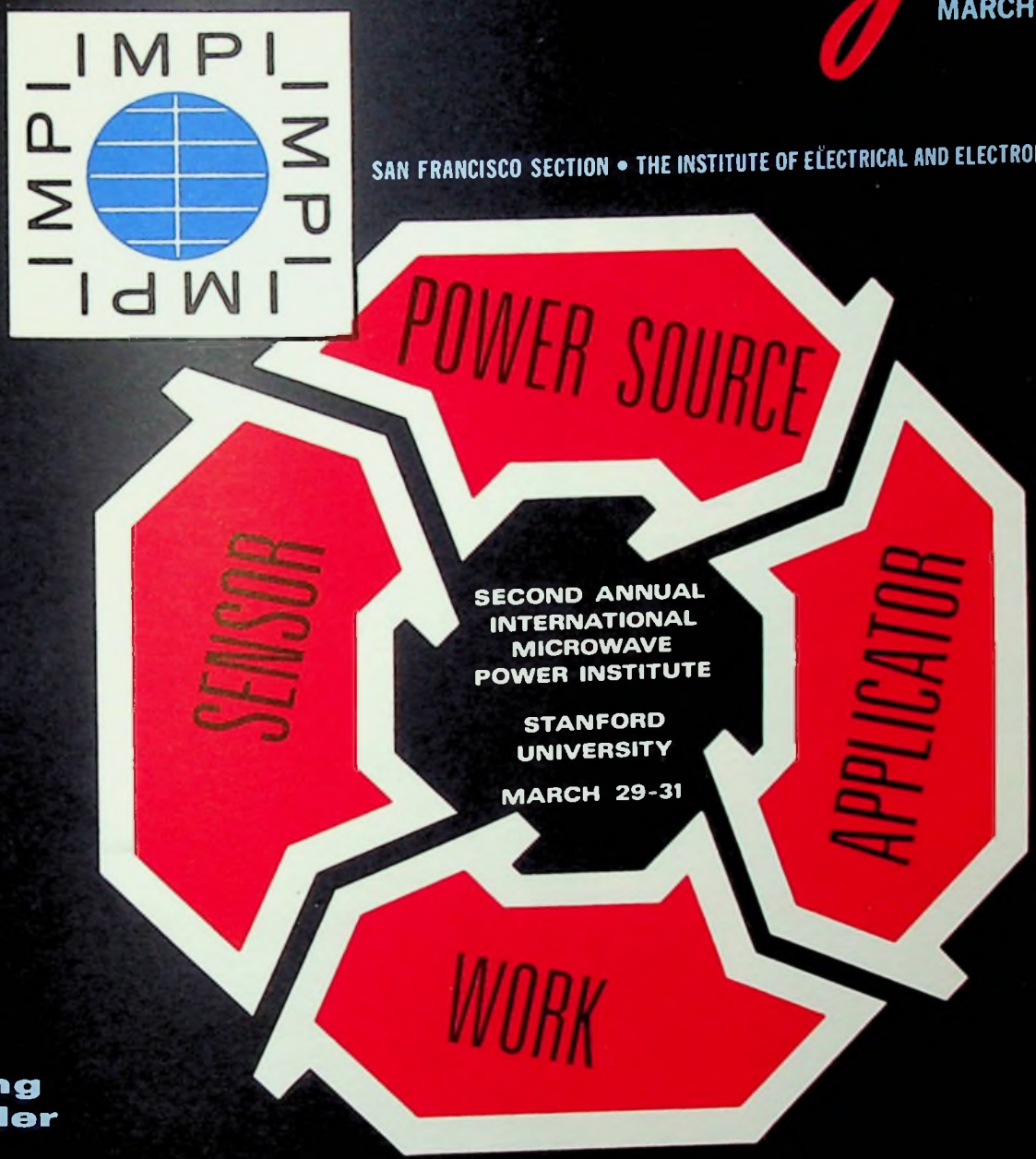
At time of scanning, the bound volumes are held by Paul Wesling. July, 2021 Contact p.wesling@ieee.org

SPECIAL ISSUE

IEEE Grid

MARCH 1967

SAN FRANCISCO SECTION • THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

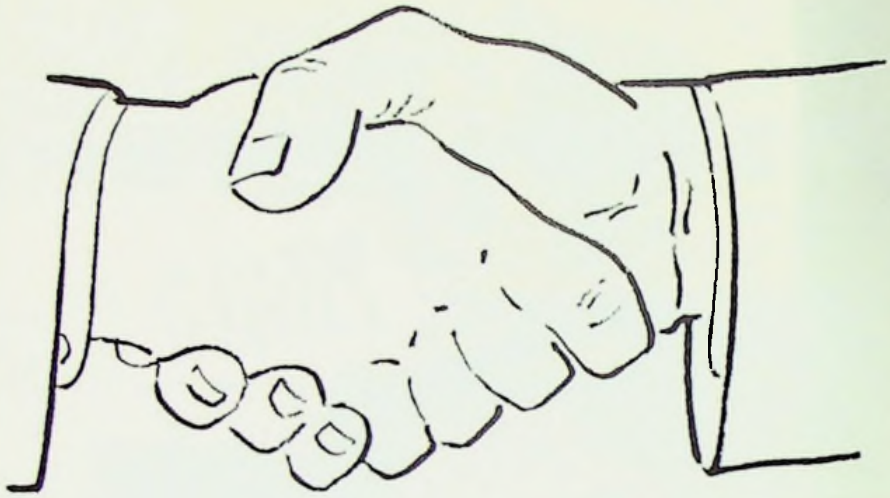


meeting reminder

erospace & Electronic Systems, Wednesday, March 22
ntennas & Propagation, Tuesday, March 21; Tuesday, April 18; Tuesday, May 16
udio & Electroacoustics, Saturday, March 18
utomatic Control, Tuesday, March 21
omputer, Tuesday, March 28
ommunication Technology/EMB/SFS, Wednesday, March 15
ast Bay Subsection, Monday, March 27
lectron Devices, Wednesday, March 29
ngineering in Medicine & Biology/ComTech/SFS, Wednesday, March 15
nformation Theory, Thursday, March 23
agnetics, Tuesday, March 14
icrowave Theory & Techniques, Wednesday, March 8
uclear Science, Monday, March 20
ower, Tuesday, March 14
eliability, Monday, March 13
an Francisco Section/ComTech/EMB, Wednesday, March 15; SFS/SCVSS, Friday, April 7
anta Clara Valley Subsection, Wednesday, March 15; SCVSS/SFS, Friday, April 7

Postmaster: SECOND CLASS MAIL. Please dispatch within 24 hrs. of receipt per 333.321, Postal Manual. Return requested: Suite 2210, 701 Welch Rd., Palo Alto, California 94304.

WE'D LIKE TO



SHAKE YOUR HAND

Technical Management — To lead and direct a staff involved in the development of solid state amplifiers, oscillators, mixers and frequency multipliers from UHF and up. BSEE plus 5 years' experience required; MSEE preferred.

Systems Engineer, Microwave — Challenging and interesting programs in I.F. and R.F. systems management and design work. Should have previous contact and job estimating experience on a high technical level.

Project Engineer — Design and development of microwave components including UHF lumped element ferrite circulators and filters, latching switches, etc. BSEE or BS Physics with 3–5 years' experience.

Staff Engineer — Number 2 position in our Solid State Development Department; total responsibility for specific key jobs within the organization. Intermediate level position.

Product Development Engineer — To assist more senior engineers in product engineering of active solid state devices in UHF region; also be concerned with passive devices such as filters. BSEE and 1–2 years' experience.

Design Engineer, Senior — Design of solid state circuitry, digital and analog circuitry; design of amplifiers and power supplies.

These listings are only a representative need of our current opportunities. Excellent opportunities exist on all levels from the entry level positions to senior technical management positions.

Write the Professional Employment Manager, Warren Enos, 1045 DiGiulio, Santa Clara, California.

This might lead to a chat about your career objectives... which will certainly lead to our telling you what makes Western Microwave such a desirable place to work. Western Microwave's phenomenal growth in just 4 years has resulted in the anticipated opening this year of brand new facilities. There's a great deal here for you, your career and your family — and many rewarding careers began here with just a shake of the hand.

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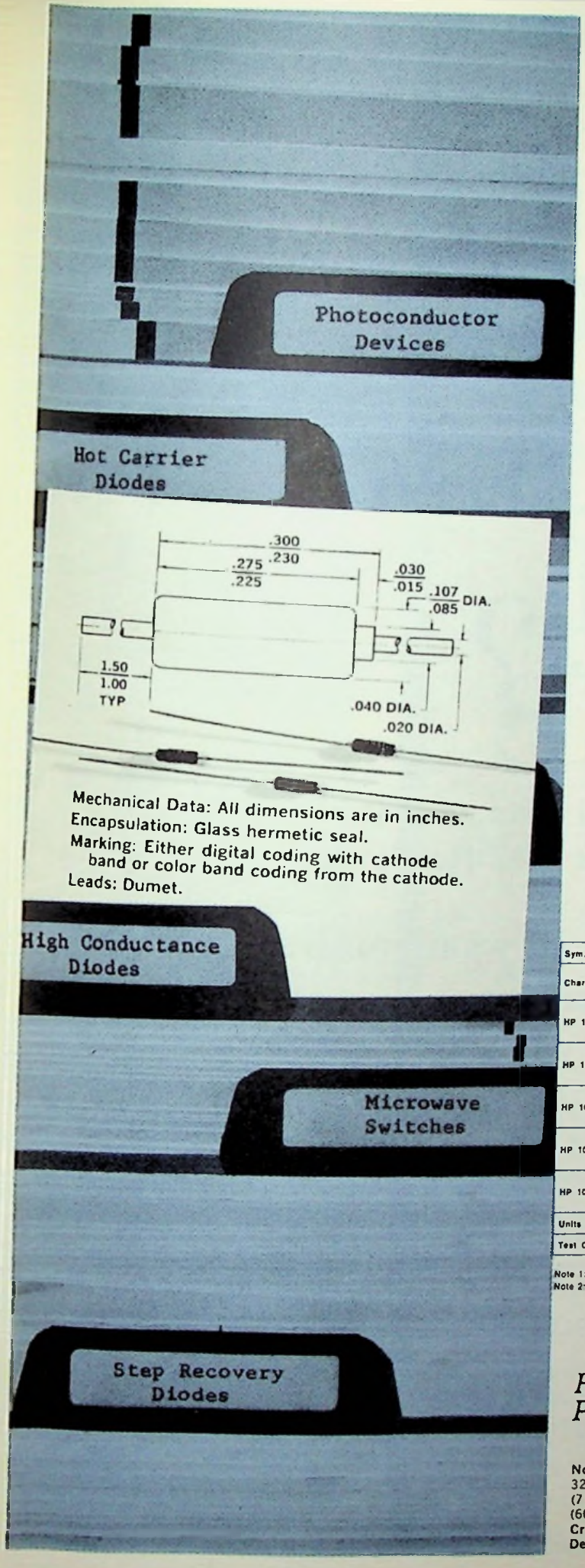
Western Microwave is an equal opportunity employer



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Electrical characteristics at 25°C

Sym.		I_F	BV_R	I_R	C_O	t_{rr}	t_{on}
Characteristic		Forward Current	Breakdown Voltage	Reverse Current	Capacitance	Reverse Recovery Time	Turn-on Time
HP 1001	Min.	500	35	—	—	—	—
	Max.	—	—	200	1.5	1.5	2.5
HP 1002	Min.	800	35	—	—	—	—
	Max.	—	—	200	3.0	2.0	2.5
HP 1003	Min.	300	25	—	—	—	—
	Max.	—	—	200	2.0	1.5	2.0
HP 1004	Min.	600	25	—	—	—	—
	Max.	—	—	200	4.0	2.0	2.0
HP 1006	Min.	500	50	—	—	—	—
	Max.	—	—	200	1.1	1.5	—
Units		mA	V	nA	pF	ns	ns
Test Conditions		V_F=1.4 V (Note 1)	I_R=10 μA	(Note 2)	V_R=0 V, f=1.0 MHz	—	—

Note 1: Measured at a repetition rate not to exceed the power dissipation.
Note 2: V_R=35 V for 1006; V_R=30 V for 1001, 1002; V_R=20 V for 1003, 1004.

2458

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IEEE Grid

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contents

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advertising

PRELIMINARY PROGRAM
SECOND ANNUAL IMPI SYMPOSIUM ON MICROWAVE POWER, STANFORD MARCH 29-31, 1967

TUESDAY, MARCH 28
6:00 to 9:00 P.M.
Advance Registration
Cabana Hotel
Palo Alto

symposium news

IMPI BACKGROUND

The International Microwave Power Institute was organized at the 1966 Symposium on Microwave Power held at the University of Alberta, Edmonton, Canada March 24-25, 1966. It was formally established as a non-profit association with its principal office in Vancouver, Canada during the summer of 1966. The official publication of the institute is the Journal of Microwave Power. Volume 1 of this journal was issued in three numbers during 1966 and contained the proceedings of the 1966 symposium. Volume 2 will appear quarterly during 1967 and will include both the proceedings of the 1967 symposium and other contributions.

Papers on the subject of microwave power and its applications are solicited by the journal and manuscripts should be sent to:

W. A. Geoffrey Voss, Editor
Journal of Microwave Power
University of Alberta
Edmonton, Alberta, Canada

The following excerpt from the constitution states the purpose of the institute: "The purpose of this institute is the furtherance of the use and understanding of microwave energy for non-information, non-communication applications:

- by bringing together scientists, engineers and interested individuals for conference and discussion
- by educating all interested individuals to a better understanding of the technology and applications of microwave energy
- by publishing technical and scientific information through the Journal of Microwave Power and such other publications as are found appropriate
- by encouraging industrial and university research and development into microwave energy applications."

Anyone whose interests include the
(Continued on page 6)

WEDNESDAY MORNING AT 9:30
INTRODUCTORY SESSION

Session A

WELCOME: MARVIN CHODOROW
Director, Microwave Laboratory
Head, Applied Physics Division
Stanford University

Session Chairman: John E. Gerling
Watkins-Johnson Co. and
President, IMPI

A1. Microwave Power Systems—A General Introduction
DONALD A. DUNN, Stanford University

A2. Microwave Heating Technique in Europe
HERBERT PUSCHNER

A3. Economic Advantages of Microwave Energy in the Paper Indus.
DAVID J. GOERZ, JR., Bechtel Corp. and
JAMES A. JOLLY, Eimac Division, Varian Associates

WEDNESDAY AFTERNOON AT 2:00
Case Studies of
Industrial Processing Systems

Session B

Session Chairman: ROBERT W. OLIN
Potlatch Forests

B1. Microwave Curing and Drying of Plywood Coatings
LEO M. FORMAN, Evans Products Co.

B2. Curing Epoxy Resin Impregnated Pipe at 2450 MHz
NORMAN H. WILLIAMS, Eimac Division, Varian Associates

B3. Drying of Incense Cedar Pencil Slats by Microwave Power
HELMUTH RESCH, University of California, Berkeley

B4. Practical Aspects of Microwave Veneer Redrying
GERALD GRUBER, Boise Cascade Corp.

B5. Snack Food Processing
ORA SMITH, Cornell University

B6. The Application of Microwaves for the Processing of Poultry
RANDALL MADDUX, Ocoma Foods Co., and
CARL M. OLSEN, Atherton Division, Litton Industries

B7. A Production Man's View of Microwave Processing of Potatoe Chips
NOLAN WHITE, Seyfert Foods

WEDNESDAY, MARCH 29
8:30 to 9:30 A.M.
Registration at
Dinkelspiel Auditorium
Stanford University

WEDNESDAY EVENING AT 6:30
Cocktail Party at Cabana Hotel
Palo Alto

THURSDAY, MARCH 30

THURSDAY MORNING AT 9:00
Advanced Microwave Power Systems

Session C

Session Chairman: OSCAR BUNEMAN
Stanford University

C1. Microwave Powered Helicopter System
WILLIAM C. BROWN and J. R. MIMS, The Raytheon Corp.

C2. Radiomechanical Energy Conversion in Microwave and Optical Frequencies
T. KORYU ISHII, THOMAS A. NICOUD, STANLDY V. JASKOLSKI, CHARLES KRONENWETTER, and ALFRED P. SZEWS, Marquette University

C3. The Efficient Conversion of Microwave Energy to Direct Current Energy by Means of Semiconductor Rectifiers
PAUL H. SMITH, Motorola, Inc.

C4. Microwave Power for Tube Vehicle Propulsion
KEN E. MORTENSEN, DEAN N. ARDEN, and J. A. BRADSHAW, Renssalaer Polytechnic Institute

C5. The Canadian Intense Neutron Generator
P. R. TUNNICLIFFE, Atomic Energy of Canada, Ltd.

C6. Microwave Power for Separation of High Energy Particles
H. HAHN and H. J. HALAMA, Brookhaven National Laboratory

THURSDAY AFTERNOON AT 2:00
Biological Effects of Microwaves

Session D

Session Chairman: CARL M. OLSEN
Atherton Division, Litton Industries

D1. The Use of Microwave Energy to Destroy Soil Micro-organisms
KENNETH F. BAKER, University of California, Berkeley

Tektronix is building spectrum analyzers

it's the new Type 491 10 MHz - to - 40 GHz

You can judge its performance by these features . . . internal phase lock for stable displays even at 1 kHz/div dispersion . . . resolution range of 1 kHz to 100 kHz coupled to calibrated dispersion for operational simplicity . . . dispersion range of 10 kHz (1 kHz/div) to 100 MHz (10 MHz/div) for direct readings of relative frequency from the display . . . CW sensitivity of —110 to —70 dBm depending on frequency . . . and display flatness of ±1.5 dB over 100 MHz dispersion.

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The Type 491 is only 7" high by 12" wide and 22" deep, weighs less than 40 pounds and requires only 55 watts. Yet it has the broad frequency range and high performance you need for most applications. And setup is easy even at waveguide frequencies—just mount one of the external waveguide mixers to your source and couple it to the Type 491 with a flexible cable.

As shown, the carrying handle adjusts for various tilt positions and provides a sturdy support stand. The front panel cover serves as a storage case for the included accessories such as adapters, cables, waveguide mixers and coax attenuators. And the rugged construction of the Type 491 lets you carry laboratory performance to the job.

Type 491 (with accessories) . . $4200

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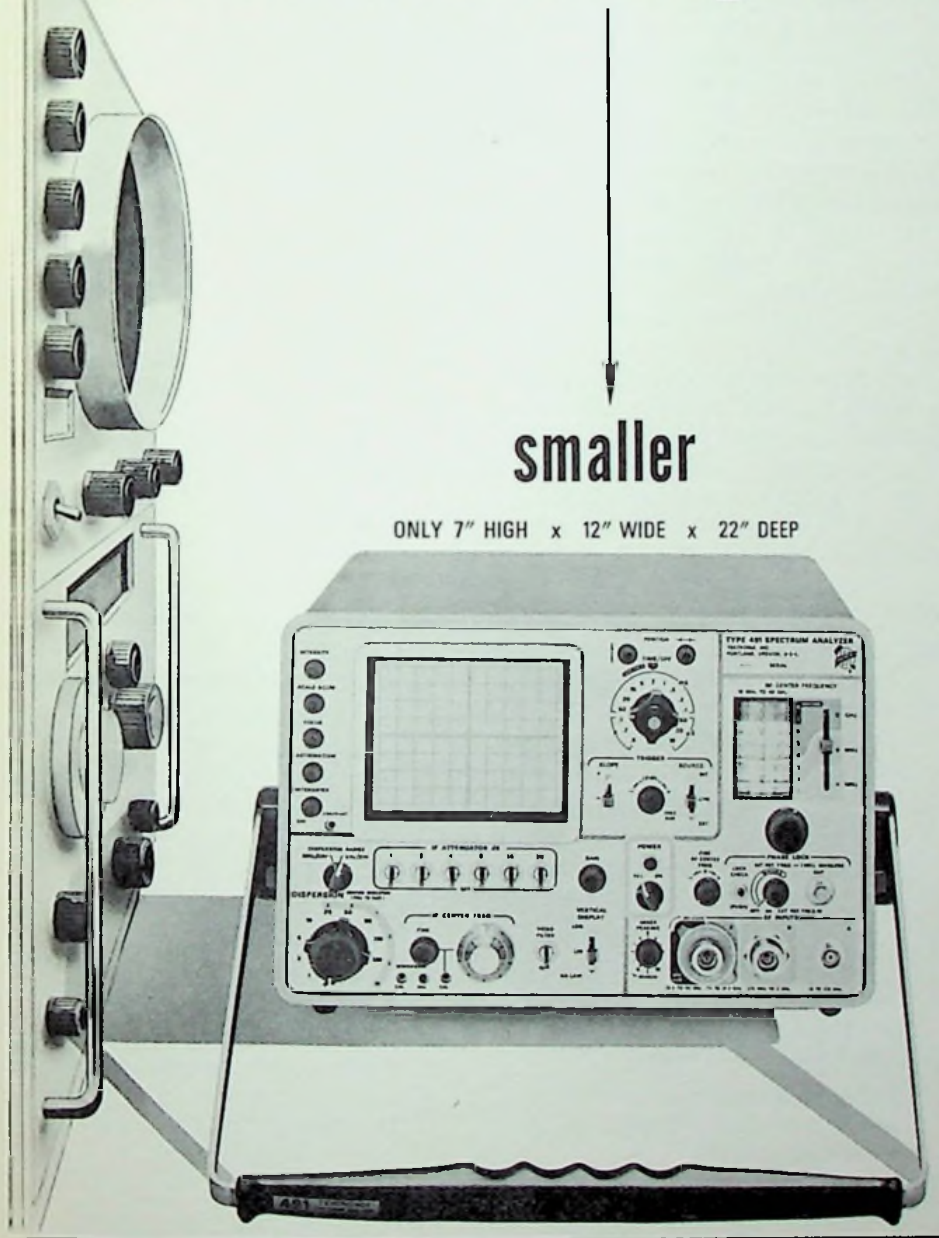
ONLY 7" HIGH x 12" WIDE x 22" DEEP



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ARRANGEMENTS

STANFORD UNIVERSITY is located at Stanford, Calif., immediately adjacent to the City of Palo Alto, and 24 miles southeast of the San Francisco airport (see map). There is regular limousine service at $1.85 from the airport direct to the Cabana, the headquarters motor hotel at 4290 El Camino Real, Palo Alto. The trip take approximately 45 minutes, longer during peak traffic periods. On Wednesday morning, a special bus, leaving at 8:30 a.m., will provide transportation from the Cabana to the central campus, a distance of somewhat under three miles. Taxicabs will be available as well. For those with cars, parking should be available in the parking lot just south of Tresidder Union.

ROOM RESERVATIONS should be made directly with the Cabana. Single occupancy rate is $17.00, double occupancy $11.00 per person. Several motels are located nearby and the Cabana has arranged for any overflow. Space in motels is available at approximately $12.00 for single and $8.00 per person double occupancy. The Palo Alto March weather is quite mild, with only a minor chance of rain.

REGISTRATION Tuesday 6:00-9:00 p.m. in the lobby of the Cabana. Starting at 8:30 a.m. on Wednesday morning and thereafter during the meeting, a registration and information desk will be operated in Dinkelspiel Auditorium, just outside the meeting rooms. A message board will be located there as well. The registration fee of $50.00 includes 1967 membership dues in IMPI and a 1967 subscription to the Journal of Microwave Power which will include the 1967 Symposium Proceedings. The fee also covers the costs of luncheons for three days, cocktail party tickets, coffee during the symposium and bus transportation.

FOOD is available all day and evening in the cafeteria on the ground floor of Tresidder Union, starting at 7:00 a.m. Information on other nearby restaurants will be available at the time of registration. Coffee will be available during the mornings and afternoons outside the meeting room.

SMALL CONFERENCE rooms near Dinkelspiel in Tresidder Union, Tresidder 270 and 271, will be available on an informal basis. Also room 269 will be available as a press room and have a phone, (415) 321-2300, X-4322, with an attendant to receive messages and to help with travel reservation problems.


Gerling


Voss


Supplee


Dunn


Jol

MORE BACKGROUND

use of microwave energy may become a member of the institute upon application and acceptance by the institute. For 1967 the dues have been set at $15.00 (U.S.) including a year's subscription to the Journal of Microwave Power.

The institute is managed by a seven man board of governors. The members of the board are presently as follows:

John E. Gerling, Watkins Johnson Co., president; W. A. Geoffrey Voss, University of Alberta, editor, Journal of Microwave Power and executive vice-president; William C. Brown, Raytheon; Donald A. Dunn, Stanford University; James A. Jolly, Eimac Division, Varian Associates; Alan E. Supplee, Cryodry Corp.; Lewis C. Bancroft, Dupont Co.

The chairman of the 1967 symposium is Donald A. Dunn. The technical program was arranged by John E. Gerling, William C. Brown, Donald A. Dunn, Alan E. Supplee, Lewis C. Bancroft, and Carl M. Olsen. The local arrangements were made by Alan E. Supplee.

MORE PROGRAM

D2. Comparative Effects of Microwave and Laser Light Energy on Microorganisms
GEORGE K. YORK, University of California, Davis

D3. The Action of Microwave Radiation on the Eye
RUSSELL L. CARPENTER, Tufts University, Medford, Mass.

D4. Some Considerations in the Processing of Potato Chips by Microwaves
S. A. GOLDBLITH, Massachusetts Institute of Technology

D5. Some Effects of Microwave Cooking Power Upon Certain Basic Food Components
HELEN J. VAN ZANTE, Iowa State University, Ames, Iowa

D6. Ultraviolet Spectra of Heated and Microwave Irradiated Protein Solutions
MARSHALL W. CRONYN and RUTH KAVENOFF, Reed College

THURSDAY AFTERNOON AT 2:00
Buses Leave for Field Trip to
Eimac Division, Varian Associates
San Carlos, and to
Cryodry Corp., San Ramon

Those wishing to visit these plants prior to or after the conference are also invited to do so by these companies. Arrangements for such visits should be made directly with the companies.

FRIDAY, MARCH 31

FRIDAY MORNING AT 9:00
Microwave Properties of Materials and Chemical Processing

Session E

Session Chairman: L. C. BANCROFT
Dupont

E1. Physics of Microwave Heating
JEROME R. WHITE, Eimac Division, Varian Associates

E2. A Materials Evaluation Technique for Microwave Power Processing
W. A. GEOFFREY VOSS and WAYNE R. TINGA, University of Alberta

E3. High Temperature Chemical Processing Via Microwave Absorption
J. D. FORD and D. C. T. PEI, University of Waterloo, Canada

E4. Chemical Processing in a Microwave Discharge
PETER H. DUNDAS, Massachusetts Institute of Technology

E5. Microwave Hydrogen Plasma in Gas-Solid Systems
EUGENE J. MEZEY and JOSEPH H. OXLEY

FRIDAY AFTERNOON AT 2:00
Business Meeting of IMPI
Including Announcements
Regarding 1968 Symposium and
Election of President for 1967-68.
The Nominating Committee
has nominated
JAMES A. JOLLY for this office

FRIDAY AFTERNOON AT 2:30
Panel Discussion

Session F

Session Chairman: THOMAS D. SEGE
Eimac Division, Varian Associates

Participants to be announced.

Meeting Calendar

MARCH 8, WEDNESDAY, 8:00 PM — Microwave Theory & Techniques
Microwave filters and diplexers
Dr. Leo Young, head, microwave techniques program, Stanford Research Institute
Place: Hewlett-Packard conference room 5M, 1501 Page Mill Rd., Palo Alto
No dinner

MARCH 13, MONDAY, 8:00 PM — Reliability
The Mariner Mars parts screening program
Warren H. Lockyear, JPL, Pasadena
Place: Physics Lecture Hall room 101, Stanford University
Cocktails: 6:00 PM
Dinner: 7:00 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto
Reservations: Ken Sladky, 591-1414, ext. 345; W. W. DeVille, 326-4350, ext. 6133

MARCH 14, TUESDAY, 8:00 PM — Magnetics
Magnetoopic detection of high density recording
Dr. David Treves, Ampex Corp., Redwood City
Place: Ampex Cafeteria, 401 Broadway, Redwood City (north of fountain)
No dinner

MARCH 14, TUESDAY, 7:30 PM — Power
The zinc-air battery for vehicular propulsion
A. C. Eulberg, staff member, General Atomic Division of General Dynamics Corp., San Diego
Place: Engineers' Club of San Francisco, Hong Kong Bank Bldg., Pine & Sansome Sts.
Cocktails: 5:30 PM
Dinner: 6:30 PM
Reservations: Engineers' Club; GA 1-3184 by noon March 14

MARCH 15, WEDNESDAY, 8:00 PM — Communication Technology/ Engineering in Medicine and Biology/San Francisco Section
A look at the nervous system as a communications channel
Dr. William Pancoe, physiologist, department of zoology, University of Wyoming
Place: Lockheed auditorium, Bldg. 202, 3251 Hanover St., Palo Alto
Cocktails: 5:45 PM Chez Yvonne, 1854 El Camino Real, Mountain View
Dinner: 6:15 PM Menu choice: Brochette of tenderloin tips $5.00; Veal patillate $4.25, both full dinners incl. tax & tip
Reservations: Robert Howland (408) 291-4039; George Griffith (415) 591-8461 ext. 515; Ed Combs (415) 397-1471 by March 15, noon

MARCH 15, WEDNESDAY, 8:30 PM — Santa Clara Valley Subsection
The photomicrography of the liquid crystal state
Marcel J. Vogel, advisor chemist, IBM ASDD, Los Gatos
Place: Room 134, McCullough Bldg., Stanford University
Dinner: 6:30 PM (no host) Rickey's Hyatt House, 4219 El Camino Real, Palo Alto
Reservations: Carl Hollstein, 736-0310, Don McCauley, 326-4350 ext. 4757 by March 13

MARCH 18, SATURDAY, 6:00 PM — Audio & Electroacoustics/ Acoustical Society/Audio Engineering Society
Synesthesia (?) Ladies invited
Dr. William Baldridge and Leo Kulka
Place: Tiger Room, Hilton Inn, San Francisco Airport
Dinner: 8:30 same place, by reservation only
Reservations and further information: Mrs. Westburg, 961-5100 by March 15

MARCH 20, MONDAY, 8:15 PM — Nuclear Science
Nuclear weapons diagnostic instrumentation
Robert B. Patten, senior scientific specialist, EGG, Las Vegas
Place: Villa San Ramon, Crow Canyon Rd. & Hwy 21
Cocktails: 6:30
Dinner: 7:30—choice of chicken breast or veal scallopini $4.00 incl. tax & tip
Reservations: Mrs. Arlene Lenzi, 837-5311, ext. 301 by Mar. 16

CALL FOR PARTICIPATION

A "call for participation" in the technical program of the 1967 Western Electronic Show and Convention has been issued by the program chairman, Dr. Donald R. Scheuch, Stanford Research Institute.

WESCON, co-sponsored by the Los Angeles Council and San Francisco Section, representing IEEE Region 6, and by the Western Electronic Manufacturers Association, will be held in San Francisco August 22, 23, 24, and 25, 1967.

The WESCON "call" is for session proposals, rather than for individual papers. Dr. Scheuch indicated that the WESCON program will be made up of 20 sessions to be presented during the four-day convention, and that four of these will be special sessions organized by the technical program committee. Sixteen others will be selected from among session proposals received in response to the "call."

Ernest W. Pappenfus, Granger Associates, is vice chairman of the committee, and overall convention planning is under direction of John C. Beckett, Hewlett-Packard Co., who is 1967 WESCON convention director.

Under WESCON's "session unit" approach, the volunteer organizers submit proposals for session topics, together with suggestions of speakers who will be invited to prepare papers covering specific sub-topics under the main topic. There will be four papers in each 2½ hour session.

In the "call," proposing individuals are asked to submit a letter of intent to propose, including subject area and an outline of the session to Dr. Scheuch, c/o WESCON, 701 Welch Road, Palo Alto, California 94304 by March 15. If approved by the committee, the organizer will be requested to prepare a full session proposal by a deadline of April 15.

According to Dr. Scheuch, areas of interest to the committee will include (but not be restricted to) the following subjects:

Engineering Education: particularly programs for the continuing education of professional engineers.

Biomedical Electronics: for example, advances in medical instrumentation, electronic systems for hospitals, research into new applications.

Electrical Power Systems: power sources, power systems, electrical power transmission, electrically powered transportation systems.

Aerospace Systems: projected missions, and their requirements for ground

(Continued on page 10)

meeting ahead

FILTERS & DIPLEXERS

Dr. Leo Young, head, microwave techniques program, electromagnetic techniques laboratory, Stanford Research Institute, Menlo Park, will discuss microwave filters and diplexers at the March 8 meeting of the Microwave Theory & Techniques chapter.

Filters are at the heart of many design problems. They are used to separate or to combine different frequencies, such as frequency converters or multipliers, or multiplex communications. Filters are used to confine the radiation from high-power transmitters within assigned spectral limits. Conversely, other filters are used to protect receivers from interference outside their operating bands. Filter-like networks occur in impedance matching, such as between two transmission lines of different characteristic impedances, or between a resistive termination and a reactive load such as a diode in a parametric amplifier. There is need for filters at all frequencies, from very low through microwave to optical frequencies and beyond.

A diplexer separates power entering a common input into two frequency bands; or conversely, it combines two frequency bands arriving separately into a common output. A miltiplexer extends this principle from two to many channels. Frequently, a multiplexer is made up of a cascade of diplexers because of the mechanical problems in connecting many filters close to a single junction.

meeting ahead

LIQUID CRYSTALS

The photomicrography of the liquid crystal state will be the subject of the March 15 meeting of the Santa Clara Valley Subsection.

The photomicrographs in this exhibit show something familiar in a new way. They are the work of Marcel J. Vogel, advisory chemist for the Los Gatos Laboratory of the advanced systems development division, who was singled out as one of IBM's outstanding inventors in 1962 and again in 1963.

Many awards, including the 1963 Watson Trophy for photography in IBM, San Jose, have come to Mr. Vogel. In the 1963 competition sponsored by the Biological Photographic Association, "Methyl Succinic Anhydride," he won first place and earned the Charles S. Foster Memorial Citation for exceptional achievement in photomicrography.

Spectrum is sent to Student Members during their last six years as seniors and to graduate students.

Young

Treves

meeting ahead

MARINER SCREENING PROGRAM

Warren H. Lockyear, Jet Propulsion Laboratory, Pasadena, will discuss the Mariner Mars parts screening program at the March 13 meeting of the Reliability chapter.

Mr. Lockyear is manager of the electronic parts engineering section at the Jet Propulsion Laboratory. He received his bachelor of electrical engineering degree from the University of Denver in 1946 and a master's degree in 1947 from the same university. He joined the Jet Propulsion Laboratory in 1955 as a cognizant engineer on the Corporal missile program. His JPL experience includes the electronic parts program for the Sergeant missile, Mariner II, Mariner Mars 1964, and the Ranger Series spacecraft. His current responsibilities include the management of the electronic parts reliability activities associated with the Mariner Venus '67 and the Mariner Mars '69 projects; evaluation of electronic parts in sterilization environments and R&D efforts in screening life studies and failure mechanisms.

He has served as secretary to the NASA parts working group and is a working member of the new NASA Parts Steering Committee.

meeting ahead

SLAC COMPUTER R&D

W. F. Miller, professor of computer science at Stanford and group leader of the computation group, Stanford Linear Accelerator Center, will discuss computer research and development at the March 28 Computer group meeting.

Miller

Patten

meeting ahead

MAGNETOOPTIC DETECTION

Dr. David Treves, member of the research staff at Ampex, will discuss magnetooptic detection of high density recording at the March 14 meeting of the Magnetics chapter.

The various noise sources in a high density magnetooptic readout system will be evaluated. It will be shown that shot noise is not severe even at interrogation rates of 10^7 bit per sec when bit areas are in the 10^{-6} cm^2 range. Various techniques used to reduce the noise originating from surface imperfections will be described and their effectiveness demonstrated by experimental results.

Holding four degrees from the Technion, Israel Institute of Technology, Haifa, Dr. Treves held teaching and research positions in Israel, at Pomona College, at Bell Telephone Laboratories, and at the Weizmann Institute of Science before joining Ampex in 1965. His specialties are magnetism and magnetic materials.

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meeting ahead

NUCLEAR DIAGNOSTICS

Robert B. Patten of EG&G Inc. will present a talk titled "Twenty Years of Nuclear Weapons Diagnostic Instrumentation" to the Nuclear Science chapter on March 20.

The talk will trace the story of diagnostic instrumentation from the very first atomic explosion TRINITY to the present day underground events. A color movie and slides will graphically display the various types of nuclear tests, such as tower, airdrop, balloon, water, and underground. Advances in nuclear radiation detectors, fast pulse circuits, coaxial cable, travelling wave oscilloscopes, and logarithmic devices due to the particular nature of nuclear testing will be reviewed. Finally, the special requirements placed upon instrumentation for underground testing, permitted by the atmospheric test ban, will be briefly detailed.

The speaker has been active for over twenty years in the design, development, and operation of diagnostic instrumentation for nuclear weapons tests, beginning with the first atomic test. He has supervised nuclear diagnostic experiments, and has been responsible for maintaining liaison with the scientific personnel of both the Los Alamos and Lawrence Radiation Laboratories in the performance of their experiments at the Nevada Test Site and the Pacific Proving Grounds.

MARCH 21, TUESDAY, 8:00 PM — Antennas & Propagation

Tutorial series on tropospheric propagation

Lecture no. 2: *March 21, Robert F. White and Richard U. Laine, staff engineers, Lenkurt Electric. Subject: Tropospheric effects on line-of-sight propagation.*

Lecture no. 3: *April 18, Dr. A. T. Waterman, Jr., professor at Stanford University and Don Cox, research assistant, Stanford University. Subject: Transhorizon propagation effects.*

Lecture no. 4: *May 16, Dr. Glenn Keitel, head, EE Dept., San Jose State College, Subject: Tropospheric earth-space effects.*

Place: Lockheed auditorium, Bldg. 202, 3251 Hanover St., Palo Alto

Dinner: 6 PM., Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto

Reservations: W. K. Chang, 591-1414, ext. 223

MARCH 21, TUESDAY, 8:00 PM — Automatic Control

Design of nonlinear hydraulic servo with time delay

Henry S. Baeck, senior electrical engineer, ordnance engineering div., FMC Corp., San Jose

Place: FMC Corp., 1105 Coleman Ave. (corner of Newhall St.), San Jose. (Take Coleman off-ramp from Hwy. 17)

Dinner: 6:30 PM, Rare Steer, 1240 Coleman Ave., San Jose

No reservations required

MARCH 22, WEDNESDAY, 8:00 PM — Aerospace & Electronic Systems

Radio frequency interference

R. O. Lange, senior research engineer, Lockheed M&S Co., Sunnyvale

Place: Lockheed auditorium, Bldg. 202, 3251 Hanover St., Palo Alto

No dinner

MARCH 23, THURSDAY, 8:30 PM — Information Theory

Cascade product codes

Prof. Norman Abramson, EE Dept., University of Hawaii

Place: Stanford Research Institute, 333 Ravenswood Ave., Menlo Park, Bldg. 1, Conf. Room B

Dinner: 6:30 PM, L'Auberge, 2826 El Camino, Redwood City

Reservations: Mrs. Deane Saltzman, 326-4350, ext. 4101 by Mar. 22

MARCH 27, MONDAY, 7:30 PM — East Bay Subsection

The Apollo mission and program status

Dr. William A. Lee, assistant manager, Apollo spacecraft program, Houston, Texas

Place: PG&E Oakland Service Center, 4801 Oakport St., Oakland

Dinner: Speaker & officers will have dinner at Edgewater Inn. (Anyone also desiring dinner should make arrangements for their own group.)

Reservations (for meeting only): Valerie Gomes (Livermore) 447-1100 ext. 8031; Layne Winkle (San Jose) 291-4567; Mrs. Emerson (Oakland) 835-8500

MARCH 28, TUESDAY, 5:30 PM — Computer

Computer R & D at SLAC

Tour of SLAC at 5:30; talk at 8:00

Prof. W. F. Miller, group leader of computation at SLAC and Prof. of Computer Science at Stanford

Place: Auditorium, SLAC, 2575 Sand Hill Rd., Menlo Park

Dinner: 6:45 PM, SLAC cafeteria

Reservations: (dinner reservations essential) Mrs. Chris Jensen, 324-3311 ext. 45034, $2.10 per person, by Mar. 24

MARCH 29, WEDNESDAY, 8:00 PM — Electron Devices

Microwave oscillations in GaAs

Dr. Daniel Dow, manager of microwave semiconductors, Varian Associates

Place: Physics Lecture Room 100, Stanford University

Dinner: 6:30 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto

Reservations: Mrs. Biggs, 326-4000, ext. 3021 by Mar. 28

APRIL 7, FRIDAY, 7:30 PM — San Francisco Section/Santa Clara Valley Subsection

Annual Pioneers' Night: IEEE members, families and friends

Highlights of Section anniversaries, the Perham Foundation and Foothill Electronic Museum, followed by open house tours and planetarium show.

Place: Foothill College, 12345 S. El Monte Ave., Los Altos Hills

Dinner: 6:30 PM, Main dining room of Foothill Student Center

Reservations: Mrs. Helmke (Section office) 327-6622 or in San Francisco: 433-4567 ext. 3351

8:30 Planetarium show limited to 120 persons who make reservations when their dinner tickets are purchased

Baeck

Lee

meeting ahead

AUTOMATIC CONTROL

Henry S. Baeck, senior electrical engineer at the ordnance engineering division, FMC Corporation, San Jose will present a talk on design of nonlinear hydraulic servo with time delay at the March 21 Automatic Control chapter meeting. This talk will describe the problems encountered in stabilizing a rudder control. The application of describing functions and the phase plane is used in determining the maximum permissible gain of the system and the best accuracies that can be achieved. The design approach is applicable to many types of position servos. After the completion of the talk a working model of the steering system will be demonstrated in the FMC plant.

Mr. Baeck is involved in the design of automatic control systems and solid state circuits. Previously he was engaged in testing and designing aircraft instrumentation for the 727 airplane. Presently Baeck is writing a textbook on practical servo mechanism design which will be published by McGraw-Hill in the near future.

meeting ahead

RADIO INTERFERENCE

R. O. Lange, senior research engineer, LMSC, will discuss radio frequency interference at the March 22 meeting of the Aerospace and Electronic Systems chapter.

Mr. Lange specializes in radio interference and associated phenomena. He has published many papers on the subject. His education includes degrees from Columbia University, the University of Texas, and the State University of Texas.

The IEEE Executive Committee has acted to encourage Student Associate membership in regionally-accredited junior colleges which have significant programs in engineering and physical sciences. Associate Student Branches can be established in institutions "other than schools of recognized standing" if approved by the Regional Director and the IEEE Executive Committee.

meeting ahead

APOLLO PROGRAM STATUS

Dr. William A. Lee, assistant manager, Apollo spacecraft program office, NASA, Manned Spacecraft Center, Houston, will discuss the Apollo mission and program status at the March 27 meeting of the East Bay Subsection.

Dr. Lee plans to give a brief history of the program and a general description of the lunar mission with the coverage on the development plans and current program status. His talk will include slides and a sound film.

Dr. Lee has been serving as assistant manager of the Apollo spacecraft program office, Manned Spacecraft Center, since October, 1965. His primary area of responsibility is the overall management of the lunar module design and development effort.

MORE WESCON

and spaceborne electronic systems.

New Materials and Techniques: superconducting materials, new adhesives, plastics, shielding materials.

Solid State Devices and Circuits: trends in microelectronics, new microwave devices, high-power semiconductors.

Computers and Applications: design of computers, computers as engineering tools, computers as components of a system, computer applications in other industries, trends in information retrieval.

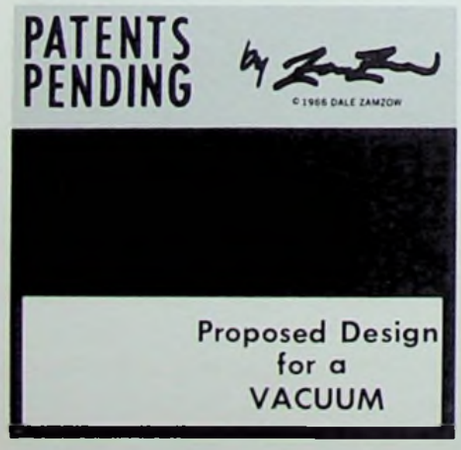
Management: engineering management techniques with regard to development of new equipment from invention to application.

Adaptive Processes and Automatic Control: for example design of control systems to operate in a changing environment.

Advances in Communications: design of equipment using advanced noise-suppression and modulation techniques.

Instrumentation: new test techniques, new applications of electronic instruments in industry.

Lasers: new applications, advances in the state-of-the-art.



Experimental prototype of zinc-air battery. Photo courtesy of General Atomic.

meeting ahead

ZINC-AIR BATTERY

A. C. Eulberg, staff member, General Atomic division of General Dynamics, will discuss the zinc-air battery for vehicular propulsion at the March 14 meeting of the Power chapter.

General Atomic has been engaged in the development of a zinc-air battery for motive applications since 1960. From 1964, the Edison Electric Institute has jointly sponsored the battery on a research "seeding" basis to stimulate the development of advanced electrical energy storage systems. This development and other activities concerning electric power sources and vehicle developments and urban transportation considerations will be discussed.

The zinc-air battery concept will be described, in terms of the background of the development, and the characteristics of the basic cell and the battery system. Typical power and energy requirements for current industrial, commercial and private vehicles will be interpreted for electric energy storage systems. The potential of batteries to meet these requirements and also to be economically competitive, will conclude the presentation.

Mr. Eulberg received his B.S. in civil engineering at San Diego State College in 1952. He joined General Dynamics Convair in 1952 as a structures engineer. In 1958 he moved to preliminary design, and in 1960 to the advanced systems project office, working on launch and entry vehicle concepts and systems analysis. In 1965 he transferred to General Atomic division where he presently directs systems and application analysis efforts on the zinc-air battery program.

More than 3300 student member applications were received at Headquarters from 280 Student Branches during the seven weeks following September 1, 1966.

N.Y. CONVENTION PROGRAM

The 1967 IEEE International Convention technical program has been formulated by the convention program committee and announced by Donald G. Fink, general chairman of the Convention. The program includes a number of innovations in organizing the technical sessions.

The 1967 Convention will be held Monday through Thursday, March 20th through 23rd, at the New York Hilton Hotel and the Coliseum.

As initiated last year, the times for scheduling sessions, and the concentration of all technical sessions at the New York Hilton Hotel will be continued. All exhibits will be at the Coliseum.

The technical program continues to emphasize new technologies, new applications of existing technologies, and areas of great current interest to the IEEE membership. It runs the gamut from sessions on computer-aided learning, to system interfaces for Global communications, to integrated circuits, to new horizons in science and engineering, to speech processing.

The highlight session, a major feature of the program, will be "Exploitation of the World's Oceans—Electronics' Role".

meeting ahead

CASCADE PRODUCT CODES

Prof. Norman Abramson of the University of Hawaii will speak at the March 23 meeting of the Information Theory chapter.

Dr. Abramson will describe a subclass of product codes, called cascade product codes. Encoders for cascade product codes can be synthesized in the form of a cascade of two simpler encoders, corresponding to the encoders for the row and column codes of the cascade product code. A decoding algorithm, called diffuse decoding can be provided for use with these codes and one can show how to synthesize diffuse decoders in the form of two simpler decoders.

Cascade codes can be used for correction (and detection) of random errors and bursts of errors. In addition, because of the novel nature of the decoding algorithm, the correction ability of cascade product codes may be extended far beyond the usual Elias bounds for product codes.

Prof. Abramson received the AB in physics from Harvard College in 1953, the MA in physics from UCLA in 1955, and the Ph.D. in electrical engineering from Stanford University in 1958.

Abramson

Dow

section news

NEW YORK GROUP FLIGHTS

After several years of discussion with Headquarters regarding permission to arrange group or charter flights for the convenience and savings of section members attending the annual convention and other institute events, the San Francisco Section this year arranged TWA group flights representing a savings to members of $60.90.
savings to members of $60.90.

Although, following a mailing to the section membership, reservations were closed on February 13, it is possible that cancellations have occurred. To determine if vacancies exist among the 50 seats reserved for IEEE members and their spouses on each of the flights, call Mrs. Helmke in the section office. All flights have early San Francisco departure times. Members must travel

(Continued on page 14)

meeting ahead

GALLIUM OSCILLATIONS

Dr. Daniel G. Dow, manager of a task force on microwave semiconductors in the central research laboratory of Varian Associates, will discuss microwave oscillations in gallium arsenide at the March 29 meeting of the Electron Devices chapter.

The past few years has seen the emergence of active microwave effects based on the apparent differential negative mobility of gallium arsenide. This talk will summarize the discovery of these effects, and their engineering utilization, with emphasis on recent developments.

The Gunn effect, originally discovered in 1963, was the first of these. Since that, this effect has been studied, and during the studies, other forms of active effects have been discovered. Gallium arsenide diodes can operate in the Gunn effect mode, as one-port negative resistances, as impact avalanche oscillators, and in the recently discovered LSA (Limited Space-charge Accumulation) mode. The latter mode shows promise of utility up to extremely high powers and frequencies on a pulsed basis.

Emphasis in this talk will be on performance, applications, and a general discussion of the engineering future.

meeting ahead

PIONEER'S NIGHT

Traditionally the Santa Clara Valley Subsection annually sponsors a Pioneer's Night during the spring. This year the subsection and section through the section's historical committee have arranged to hold this event at Foothill College. IEEE members, their families and friends are cordially invited by Foothill College and the Perham Foundation to attend a no-host dinner meeting and open house beginning at 6:30 PM, April 7th, in the main dining room of the student center on the Foothill College Campus.

Since this year (1966-67) marks the 50th anniversary of the former San Francisco Section of IRE, the 62nd anniversary of the former San Francisco Section of AIEE and the 3rd anniversary of the new San Francisco Section of IEEE, the program will highlight these events and present pictures of some of the old and some of the new activities of the Foothill Electronics Museum. The museum will be the central focal point of the new space science center that is developing on the campus. Included in the center complex are the existing planetarium, the new observatory and the well known OSCAR (Orbiting Satellite Carrying Amateur

(Continued on page 16)

Taylor

Dean

Sundblad

Pardue

grid swings

IT IS REPORTED:

Robert W. Taylor has been named director of communications and Gilbert Dean information services manager for Applied Technology, Palo Alto. Taylor was formerly manager of communications for Insurance Securities, Inc. and Dean was previously public relations director for the R. G. Williams advertising agency in San Francisco. Taylor will be in charge of corporate public relations, and Dean will handle advertising and internal information.

Richard W. Hansen, microwave products division manager, Western Microwave Laboratories, Inc., Santa Clara, has been elected a vice-president. Formerly manager of manufacturing, he was recently given total responsibility for the product development and production of a line of microwave devices and components.

MORE GROUP FLIGHTS

together to New York, but may return individually, providing the flight is direct from New York to San Francisco.

Because of the convenience and savings they represent to members, the Section will investigate future charter and group flights to IEEE events and greatly appreciates a change in Headquarters policy making them possible, as well as the cooperation of TWA which made feasible on short notice the New York group flights.

Lloyd R. Sundblad has been appointed industrial relations director for Philco-Ford's recently established space and re-entry systems (SRS) division in Palo Alto.

Turner E. Pardue, former manager of micro-electronics at Melpar, Inc., where he directed research and development on silicon integrated circuit processes, design, fabrication, and applications, has joined Dickson Electronics, Scottsdale, as manager, special devices, and will be responsible for all assembly, testing, and related activities.

Philip A. Gugliotta has been appointed programs manager for the western operation of Sylvania Electronic Systems, Mountain View, with over-all responsibility for several major programs.

Watkins-Johnson, Palo Alto, achieved a 46 percent increase in sales and a 64 percent increase in earnings for 1966, with a backlog of unliquidated orders standing at $8,619,000 on January 15.

Nickerson-Gray & Associates, manufacturers' reps, Palo Alto, announces the staff additions of Fred W. Dalzell, formerly owner of Engineering Associates, Wall Cantor, and Judy Gallagher.

Applied Technology, Inc., Palo Alto, announced an increase in net earnings of 600 percent for the six month period ending December 31 over the like period a year ago.

Manufacturer / Representative Index

Acoustronics, Inc. ..... Frauman Associates
Aertech ..... Jay Stone & Assoc.
Applied Dynamics, Inc. ..... J. D. Kennedy Co.
Applied Microwave Laboratories ..... Jay Stone
Associated Testing Labs ..... Dietrich-Heffner
Atec, Inc. ..... V. T. Rupp Co.

Beckman/Computer Operations ..... V. T. Rupp Co.
Behlman/Invar Electronics ..... T. Louis Snitzer Co.
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American Enka Corp. ..... L & M Engineering

Canoga Corporation ..... Jay Stone & Assoc.
Century Electronics
& Instruments ..... T. Louis Snitzer Co.
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Computer Test Corporation ..... King Engineering
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Datan Technology Corp. ..... T. Louis Snitzer Co.
Dielectric Products Eng. Co. ..... Jay Stone & Assoc.
Digitronics Corp. ..... Components Sales Calif.
Dynamic System Electronics Corp. ..... King Engineering

Eldorado Electronics ..... T. Louis Snitzer Co.
Electro Cube Inc. ..... Nickerson-Gray & Assoc.
Electronic Engineering Co. ..... Data Associates
Electro Optics Associates ..... O'Halloran Assoc.
Electro Products Labs, Inc. ..... King Engineering
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Kepco, Inc. ..... V. T. Rupp Co.
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McLean Engineering Labs ..... T. Louis Snitzer Co.
Micro Instrument Co. ..... Jay Stone & Assoc.
Micro-Power Inc. ..... Walter Associates
Micro-Tel Corp. ..... Walter Associates
Microlab-FXR Div. of Microlab ..... L & M Engineering
Microwave Electronics Corp. ..... Jay Stone & Assoc.
Millitest Corp. ..... Components Sales Calif.

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Dynamics Corp. of America ..... L & M Engineering
Royal Microwave Devices ..... Walter Associates
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Sierra Electronic Div., Philco ..... T. Louis Snitzer Co.
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Bill Coe & Assoc.
P. O. Box 1383
San Carlos; 593-6057

Components Sales California
Palo Alto; 326-5317

Dietrich-Heffner Associates
2555 Park Blvd.,
Palo Alto; 321-4321

Dynamic Associates
1011 Industrial Way,
Burlingame; 344-2521

Geist Co., W. K.
Box 746, Cupertino;
968-1608, 253-5433

King Engineering Co., Inc.
525 Grant Street
San Mateo; 342-9645

L & M Engineering
2620 The Alameda
Santa Clara; 243-6661

Nickerson-Gray & Assoc., Inc.
P. O. Box 11295
Palo Alto; 326-0152

O'Halloran Associates
3921 E. Bayshore,
Palo Alto; 326-1493

Rupp Co., V. T.
1182 Los Altos Avenue,
Los Altos; 948-1483

Snitzer Co., T. Louis
1020 Corporation Way,
Palo Alto; 968-8304

Stone & Assoc., Jay
140 Main Street,
Los Altos; 948-4563

Walter Associates
175 S. San Antonio Road,
Los Altos; 941-3141

Willard Nott & Co.
1485 Bayshore Blvd.
San Francisco; 587-2091

MEMBERSHIP

Following are the names of individuals who have been elected to current membership:

B. R. Baaris	J. L. McNeley
R. J. Baculo	H. Paterson, Jr.
B. C. Brummer	R. L. Powers
C. S. Buscemi	H. V. Punkari
C. V. Cawood	L. W. Rea
A. Dury	G. J. Taber

MORE PIONEERS

Radio) Project. These activities are sponsored by Foothill College and members of interested groups in the community.

The planetarium and observatory are being used as laboratories and demonstration facilities for regular college courses in astronomy and meteorology. The planetarium began its 5th continuous year of public and school programs this past fall and the observatory initiated a similar series of programs following its completion last summer. A new activity of the Project OSCAR team and the office of community services will be a lecture/seminar discussing methods of tracking and using satellites. Such activities as these will become part of the role to be played by the Foothill Electronics Museum for which the building plans are now under way with construction to start later this year. The heart of the Foothill Electronics Museum is the famous electronics collection formerly housed in the New Almaden Museum of Douglas M. Perham.

Plan to attend this interesting and exciting event. The program will begin at 7:30 PM following the dinner which is at 6:30 in the Main Dining Room of the Foothill Student Center.

7:30 — Introductions
7:40 — Highlights of Section Anniversaries
7:50 — The Perham Foundation 1959-1967
8:00 — Foothill Electronics Museum and Space Science Center
8:15 — Adjourn for open house tours and planetarium show
8:30 — Planetarium show — limited to first 120 persons who make reservations when their dinner tickets are purchased.
Observatory Tour
OSCAR Project Tour
9:45 — Adjournment

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SYSTEMS ENGINEERS

For Field Assignments. Experience or interest in electronic design, development, testing and integration of sub systems into complete operational systems. Provide consulting service and operational aid plus training assistance. Must be capable of handling a broad spectrum of electronic problems. A knowledge of military radar and microwave desirable, BS Degree required; 1-5 years systems experience desirable.

RECEIVER ENGINEERS

To design and evaluate receiver circuits such as low noise RF amplifiers and oscillators, IF and video amplifiers, parametric upconverters, and wave from generators. Work will involve network synthesis, control systems, and information theory, and will consist of receiver system design, technique investigation and equipment development. BSEE or MSEE required plus 1-6 years' applicable experience.

TRANSMISSION ENGINEERS

Designs a wide variety of transceiver circuits and equipment. Assumes responsibility for the coordination and technical direction of small projects (1 to 5 engineers). Has thorough grasp of equipment and circuit design, including RF, nonlinear, and simple digital circuits. Makes significant individual contributions to the more difficult design problems. Assist in preparation of estimates and proposals for future work. Significant design capability in most of the following areas: RF circuits, modulation theory, information theory, feedback techniques, digital circuits, voltage tuning techniques, mixer and detector design, and environmental resistance. MSEE or BSEE required; 5 to 10 years of progressively maturing circuit and equipment design experience. Proven high level technical competence in equipment design areas mentioned above.

MECHANICAL ENGINEERS

To perform physical design of electronic equipment including antenna structures, tuning and drive mechanisms and enclosures. Perform engineering analysis for stress heat transfer, aerodynamics, fluid flow dynamics and related subjects, investigate methods, techniques and materials for design and fabrication. Requires some travel and contact with suppliers. BSME plus 0-5 years' related experience; MSEE preferred.

ADVANCED SECURITY SYSTEMS DESIGN ENGINEERS

Equipment and circuit design of security devices, security systems and special purpose detection equipment. Will be a member of a small engineering group responsible for the application of various types of sensors to security and detection systems, for the design, development and worst case analysis of solid state circuitry required for system implementation and for the testing, evaluation and analysis of test data to determine system sensitivity, effectiveness and false alarm criteria. BSEE required, MSEE desired with 3-6 years of experience designing solid state circuitry for military equipment.

SIGNAL PROCESSING ENGINEER

Design and development of solid state circuits using discrete components and integrated circuits. Circuits to be associated with signal analysis, signal processing and display techniques. Supervision of technicians and support to other engineers in the design and development of complex analysis equipment using both analog and digital techniques. Prime responsibility to be in the area of circuit design, but must also be capable of documentation of work performed. BSEE required, MS desired with 0-4 years in design and development of circuits analog and digital.

SENIOR PRODUCT ENGINEER

To be responsible for converting breadboard and developmental models of electronic devices into final pre-production items of hardware. Responsibility will include test and integration of sub-systems and complete systems and development of new product engineering technology and advanced packaging techniques. Supervision of engineers and technicians. BS required, MS preferred.

DEVELOPMENT ENGINEER

Position in the laser device development which requires knowledge and experience in one or more of the following areas: (1) laser fabrication techniques; (2) laser system fabrication and design; (3) infrared optical devices; and (4) electronic control systems. The position will require technical responsibility in several research programs directed toward the development of sophisticated infrared laser devices.

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Dr. Forrest Fulton, Staff Scientist

Dr. David Leeson, Staff Scientist

Mr. Charles Zumba, Director of Systems Eng.

Mr. John Arnold, Director of Advanced Techniques Engineering

Mr. John Adkins, Director of Equipment Development Engineering

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