

EDITOR'S PROFILE of this issue

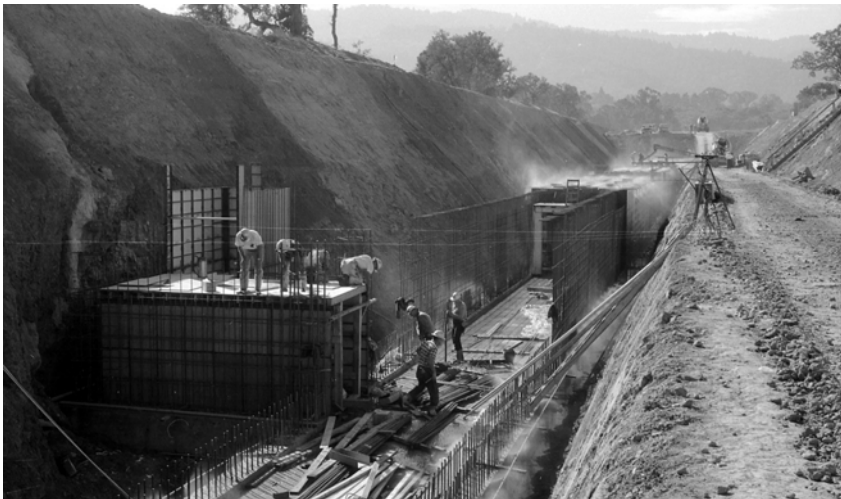
from a historical perspective ...

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

April, 1963 (mid-month):

Cover: The challenges of working two miles below the surface of the ocean are tackled by the Deepstar vessel, developed by Westinghouse with design input from Jacques-Yves Cousteau. More on page 8.

Page 6: Construction of the 2-mile-long electron linear accelerator behind the Stanford campus is about to get underway. Doug Dupen describes aspects of the 4-inch-diameter copper pipe and its resonator cavities, the 24 MW S-band klystrons, the high vacuum, the pulse phasing, and the beam control system. A diagram shows a future Fwy 280 passing overhead. When I was a student, I'd sometimes ride my bike out in the spring to the hillside overlooking the new construction, to study there in the sunshine.



1964 film on SLAC construction: <https://www.youtube.com/watch?v=9I4GxICAcBs>

Archive of available SF Bay Area GRID Magazines is at this location:

https://ethw.org/IEEE_San_Francisco_Bay_Area_Council_History

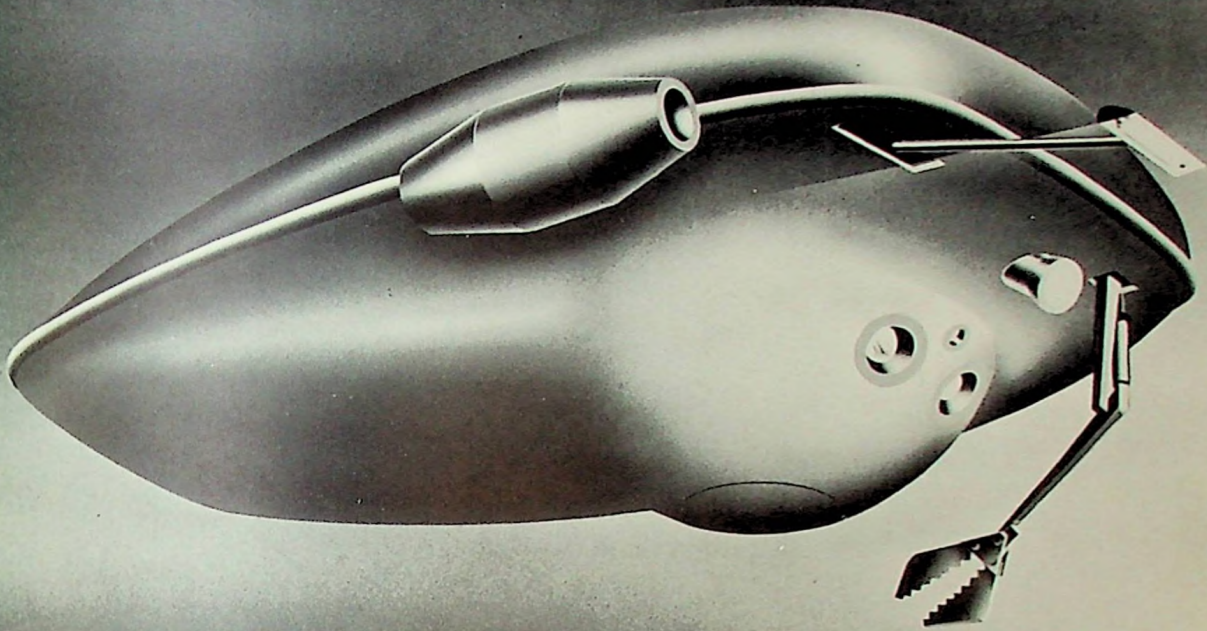
At time of scanning, the bound volumes are held by Paul Wesling. July, 2021 Contact p.wesling@ieee.org

IEEE *Grid*

APRIL 15, 1963

SAN FRANCISCO SECTION

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS



reminder

April 15 (Monday) FSS

April 17 (Wednesday) PTGMIL

April 18 (Thursday) PTGCS, TDC

April 23 (Tuesday) PTGEC, TDP

April 24 (Wednesday) PTGIM

April 24 (Wednesday) SCVSS

... oceanography's engineering challenge

May 9 (Thursday) PTGAC

May 25 (Saturday) PTGEM

May 29 (Wednesday) PTGIM



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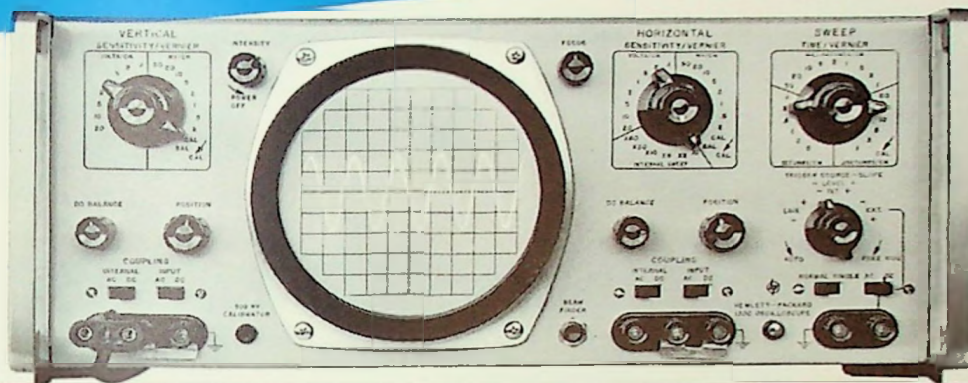
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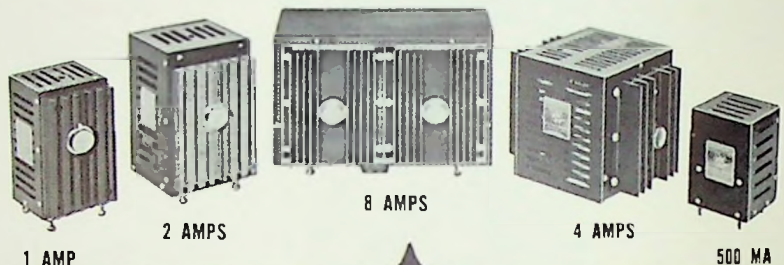
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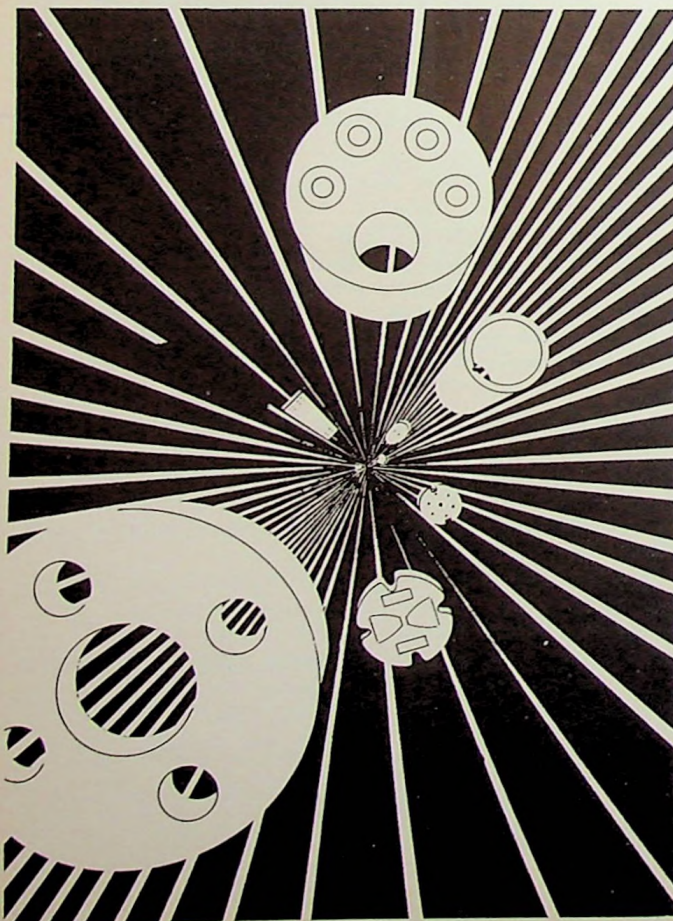
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volume 9, number 16

APRIL 15, 1963

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cover

Instruments, devices, survey systems, and machinery to enable man to work in ocean depths not now possible are all engineering needs in oceanography today. Deepstar, developed by Westinghouse in coopera-

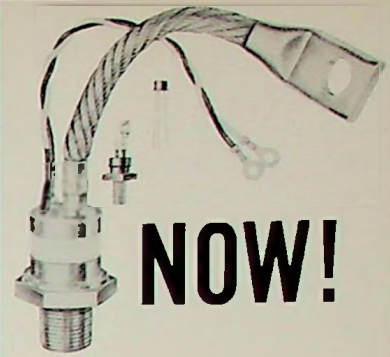
tion with Capt. Jacques-Yves Cousteau and his organization, will operate to 12,000 feet and be highly maneuverable. For more on Deepstar and oceanography's challenge to engineering, see page 8.

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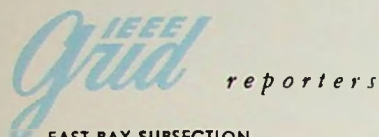


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FRESNO SUBSECTION

8:00 P.M. • Monday, April 15

"Communications for North American Air Defense Command"

Speaker: Joseph G. Perry, USAF, retired, professor of electrical engineering,
Fresno State College

Place: P.G. & E. Bldg., 1401 Fulton St., Fresno

Reservations: Dinner only, J. M. Swall, 264-9651, Ext. 215

SANTA CLARA VALLEY SUBSECTION

8:00 P.M. • Wednesday, April 24

"Oceanography—A Field of Expanding Technical Horizons"

Speaker: John H. Clotworthy, general mgr., ordnance division, Westinghouse
Electric Corporation, Defense Center, Baltimore, Md.

Place: Lockheed Missiles & Space Company Auditorium, Bldg. 202, 3251 Han-
over St. (Stanford Industrial Park), Palo Alto

TECHNICAL DIVISIONS

Power

7:30 P.M. • Tuesday, April 23

"European Power Systems—Is There a 'Common Market' for European Energy
Flow?"

Speaker: C. F. Hochgesang, executive engineer, Power and Industrial Division,
Bechtel Corporation

Place: Engineers' Club, 206 Sansome St., San Francisco

PROFESSIONAL TECHNICAL GROUPS

Automatic Control

8:15 P.M. • Thursday, May 9

"Optimal Re-entry Flight Paths"

Speaker: Dr. Arthur E. Bryson, Jr., professor of mechanical engineering, Harvard
University, visiting professor, aeronautics and astronautics, Stanford University

Place: 126 Electrical Engineering, Stanford University

Dinner: 6:15 P.M.—To be announced

Reservations and information: Mrs. Pauline Eckman, DA 1-3300, Ext. 286, by
noon, Wednesday, May 8, 1963

Communications Systems

8:00 P.M. • Thursday, April 18

(Joint with Communications Division)

"The Duobinary Technique for Digital Communications"

Speaker: Adam Lender, senior staff engineer, Lenkurt Electric Co., Inc.

Place: Lenkurt Electric Co., Inc., engineering bldg., Brittan Ave. and Industrial
Way, San Carlos

Dinner: The Gold Platter, 1000 El Camino Real, San Carlos

Reservations: Sue Manzi, LY 1-8461, Ext. 430

Electronic Computers

8:00 P.M. • Tuesday, April 23

"Operating Modes of Thin Magnetic Film Memory Devices"

Speaker: Wolfgang Kayser, principal engineer, Magnetic Film Memory Devices,
General Electric Computer Dept.

Place: Lockheed Auditorium, 3251 Hanover St., Palo Alto

Dinner: 6:00 P.M., The Red Shack, 4085 El Camino Way, Palo Alto

Engineering Management

9:00 A.M. • Saturday, May 25

Program: Management Decision-Making Game (special PTGEM meeting)

Place: IBM, San Jose

Details: See "meeting ahead" notice, April 1 issue of GRID

Reservations: W. D. Bolton, 227-7100, Ext. 2711

Instrumentation & Measurement

8:15 P.M. • Wednesday, April 24

Lecture No. 4: "Detection of Planetary Life"

Speaker: Dr. Elliott Levinthal, program director, instrumentation research laboratory, Stanford School of Medicine

Place: Physics Lecture Hall, Room 100, Stanford University

Dinner: 6:15 P.M., L'Omelette Restaurant, 4170 El Camino Real, Palo Alto

For additional information call Mrs. Renda Blackler, 948-8233

Military Electronics

8:00 P.M. • Wednesday, April 17

"The Stanford Two-Mile Linear Accelerator"

Speaker: Douglas Wm. Dupen, public information officer, Stanford Linear Accelerator Center, Stanford

Place: Lockheed Auditorium, 3251 Hanover St., Palo Alto

Dinner: 6:30 P.M., Red Shack, 4085 El Camino Way, Palo Alto

Reservations: Vic Conrad's office, DA 6-4000, Ext. 2212

section affairs

OFFICERS NOMINATED

A slate of officers having been nominated by a joint IRE/AIEE committee after much study and deliberation, additional nominations are hereby invited as provided in the by-laws. All voting members within the section will receive their ballots early in May, provision being made for write-in candidates. Ballots should be marked and returned promptly to permit the tellers to complete their work in time for the annual meeting on June 15.



William A. Edson



John C. Beckett



Jack L. Melchor



Gerard K. Lewis

consolidation notes

WRAP-UP OF SECTION MERGER

With boundaries and subsections (East Bay, Santa Clara Valley, and Fresno) set, by-laws drafted, a new Wescon agreement signed, and officers for 1963-64 nominated, the groundwork for establishing the San Francisco Section of IEEE is virtually completed.

Although merger of the AIEE and IRE sections will not be official until July 1, four technical groups are discussing immediate consolidation prior to their election of new officers. They are Communications Division with PTGCS, the two having held joint meetings for some time, and Instrumentation & Controls Division with PTGIM.

At the same time, the activation of at least one more PTG chapter—Vehicular Communications—is being planned to further serve specialized interests within the section. The Grid will continue to document changes within the organizational structure, many of which are expected.

Nominated for Chairman:

William A. Edson, president and director of research, Electromagnetic Technology Corp., of which he was one of the founders in 1961. B.S. and M.S. in electrical engineering, University of Kansas; Doctor of Science, Harvard University; a registered professional engineer, state of California; Bell Telephone Laboratories, New York City; General Electric Microwave Laboratory, Stanford; governmental consultant; has taught at Illinois Institute of Technology, Georgia Institute of Technology, Stanford University; fellow of IEEE.

Nominated for Vice Chairman:

John C. Beckett, general manager, Paeco Division, Hewlett-Packard Co. A.B. in electrical engineering, Stanford University (magna cum laude); Electrical Engineer, Stanford University; registered in electrical engineering in California, Oregon, Nevada; Westinghouse Electric Mfg. Co.; U.S. Navy; S.F. Bay Area Rapid Transit District; Wesix Electric Heater Co.; numerous offices and committees of

AIEE, including past chairman, SFS, chairman Pacific Energy Conversion Conference; fellow of IEEE.

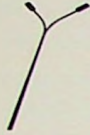
Nominated for Secretary:

Jack L. Melchor, president, -hp associates-. B.S. and M.S. in physics, University of North Carolina; Ph.D., University of Notre Dame, where he was a fellow in high polymer physics, research associate and instructor; Bendix Aviation Corp.; Sylvania Electronic Defense Laboratories; co-founder and first president of Melabs; director of Melabs, Applied Systems Corp., Astro Technology and -hp associates-. Author of many technical papers and holds a number of patents; senior member of IEEE.

Nominated for Treasurer:

Gerald K. Lewis, district manager, Allis-Chalmers Mfg. Co., San Francisco; graduate industrial engineering, University of California; has served present firm as sales representative, manager utility sales; manager Portland district office; has served on executive, program, arrangements, membership committees, SFS AIEE.

PHYSICISTS or ELECTRONIC ENGINEERS



The San Francisco Peninsula is the scene of development of the most advanced research tool in particle physics—a two-mile accelerator. As part of this development, physicists or electronic engineers are needed now for experimental work, including that developed on their own initiative, on the Mark IV 25-foot microwave linear electron accelerator. This instrument is used to develop and test accelerator components and investigate system performance. A full supporting staff of operators, technicians and machine engineers already exists.

This is a challenging career opportunity to help advance the state of the art in accelerator technology, as well as to learn advanced vacuum technology, water temperature control systems, magnetic electron beam bending systems, and radiation monitoring. The project is not under security classification.

Though advanced degrees are preferred, consideration will be given highly qualified candidates with a B.S. degree and strong foundation in electromagnetic theory, including microwave circuitry, particle-wave interaction and relativistic particle dynamics!

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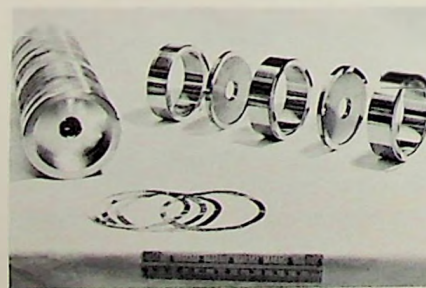
Already employing a staff of more than 500, by "on-the-air" time in 1966 the Stanford Linear Accelerator Center (SLAC) will require 730 people to operate the machine around the clock 365 days a year.

The design and development of this accelerator is taxing the state of

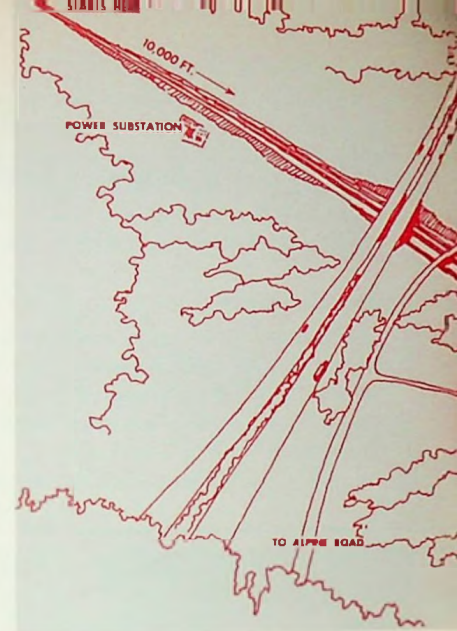


Douglas Wm. Dupen

the art in many various technologies. An alignment system must be devised to measure deviation from a straight line to a tolerance of less than one millimeter over the entire two-mile length. A vacuum system must be developed to pump a continuous vacuum of 10^{-7} mm Hg inside the entire pipe and connecting waveguide. Klystrons must be manufactured, 240 of them, each capable of delivering 24-megawatt pulses of S-band energy. To maintain the vacuum differential, waveguide windows must be designed to pass these tremendous pulses. Microwave drive and phasing systems must be developed to provide for absolute synchronization of the rf in-



A portion of the accelerator pipe itself, showing the construction of the internal resonant cavities.



put to and output from 240 klystrons in parallel. Huge magnets and beam control systems must be devised and built. Eighty million watts of electric power will be consumed by this \$114,000,000 project.

Next Wednesday, April 17, Douglas Dupen will describe this gigantic engineering effort to the regular PTGMIL meeting. He will cover such

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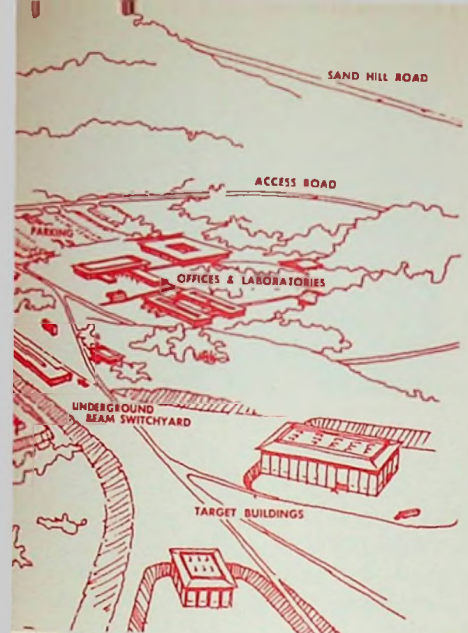
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questions as: What are the purposes and eventual uses of the accelerator? How will it be used and who will use it? What is its history? Why the one-dimensional configuration? What will be the effects of the machine on the world of science, the countryside, the neighborhood, and advanced technology?

Dupen, public information officer
(Continued on page 9)

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meeting ahead

ENGINEERING IN OCEANOGRAPHY

"Oceanography—a field of expanding horizons" will be the subject of John H. Clotworthy, general manager, ordnance division, Westinghouse Electric Corp. defense center, Baltimore, at the April 24 meeting of the Santa Clara Valley Subsection.

A significant change must take place in our approach to collecting and assimilating data from the sea. Oceanography offers challenging opportunities for the engineering profession to contribute to our well-being and safety as a nation, not only in the design, development, and manufacturing of instrumentation systems, but also in many other areas supporting at-sea operations. The Westinghouse Deepstar underwater vehicle is an example of new engineering approaches to oceanography exploration.

Mr. Clotworthy will discuss present techniques in areas of passive sonar detection (PSD), acoustic water velocity subsystems necessary for precise underwater missile launching, mine classification sonar, and other similar systems.



John H. Clotworthy

Mr. Clotworthy graduated from the University of Virginia with a degree of B.A. in electrical engineering in 1948, and followed this with special training at Johns Hopkins University and the Harvard Business School. He joined Westinghouse as a senior engineer and held a series of design and supervisory positions in the company's electronics division. He became general manager of the ordnance division in 1960, following two years as administrative assistant to the vice president and chairman of the executive committee. Mr. Clotworthy is a member of IEEE, AOA, ASNE, and NSIA advisory committee on ASW.

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Elliott C. Levinthal

meeting ahead

LIFE ON MARS

"Detection of Planetary Life" will be the subject of Elliott C. Levinthal, program director, instrumentation research laboratory, Stanford University School of Medicine, at the fourth lecture in the PTGIM series on space instrumentation April 24.

Existing evidence of life on Mars will be reviewed. The establishment of a critique for choosing a detection system to serve in the quest for signs of this life, and present and future restrictive limitations on this choice, will be discussed.

Multivator, a two-pound, surface-landing biochemical laboratory, and some of the many different biochem-

ical experiments (such as fluorometry, nephelometry, and scintillometry) which it can perform, will be described.

Dr. Levinthal, a graduate of Columbia College, MIT, and Stanford, where he received the Ph.D. in 1949, is a former research director of Varian Associates, chief engineer of Century Electronics, and president of Levinthal Electronic Products. Medical electronics is one of his many special fields.

MORE PTGIMIL

for SLAC, received a Bachelor's degree in physics from the University of California. He also graduated from Humboldt State College and Sacramento College and attended the University of the Pacific. He is presently doing graduate work at Stanford University. Prior to joining SLAC last year, Dupen was an engineering writer for Sylvania's Electronic Defense Laboratories and for Associated Techdata, Inc., in Palo Alto, with which latter firm he remains as a consultant. During the early 'fifties he was electronics officer to the staff of the Commander of the First Fleet. He is a member of IEEE.



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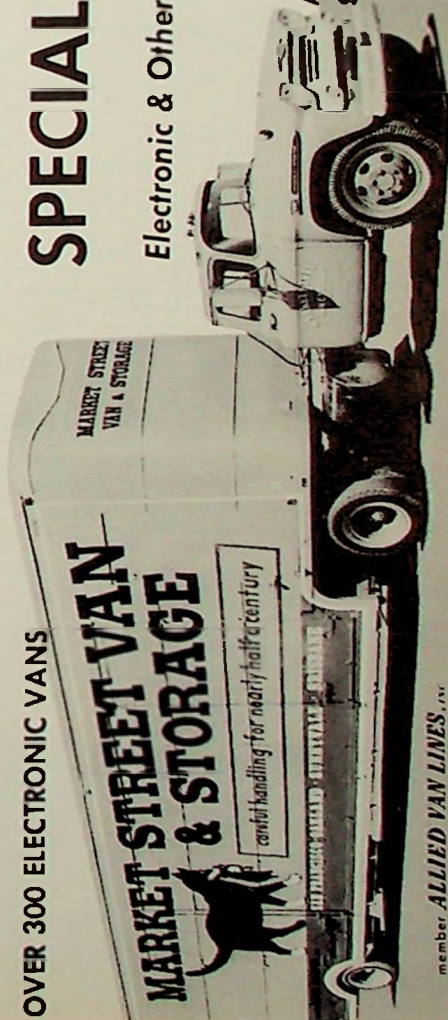
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Joseph G. Perry

meeting ahead

NAADC COMMUNICATIONS

Communications for the North American Air Defense Command will be discussed by Joseph G. Perry, professor of electrical engineering, Fresno State College, at the April 15 meeting of the Fresno Subsection.

Professor Perry, who retired as a colonel from the USAF, spent twenty-three years in service communications and electronics, military management, operations, and personnel. The last 12 years of his tour of duty were spent in the field of communications and electronics, primarily in R&D activities.

He received the B.S. in engineering from the U.S. Military Academy and the M.S. in electrical engineering from the University of Michigan.

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student affairs

STUDENT PAPER CONTEST

Section members are urged by R. C. Honey and E. H. Hulse, co-chairmen of the Student Relations Committee, to attend the San Francisco Section Student Papers Contest to be held at the University of Santa Clara on Tuesday, April 23. One paper from each student chapter will be allowed, with fifteen minutes for presentation and five minutes for discussion. Reservations for the meeting, which will begin with dinner at 6:00 p.m., may be made by calling Mrs. Gould in the Section office, DA 1-1332.

grid errata

CORRECTION

Peter Lacy, Section Chairman (IRE), was given the wrong corporate title in the March 1 issue. Dr. Lacy is vice president and director of engineering of the Wiltron Co. William E. Jarvis is president and sales manager.

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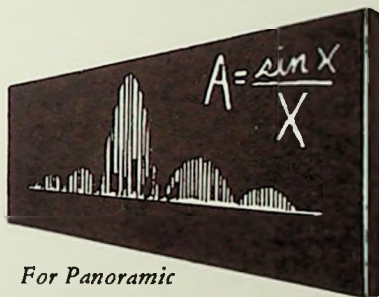


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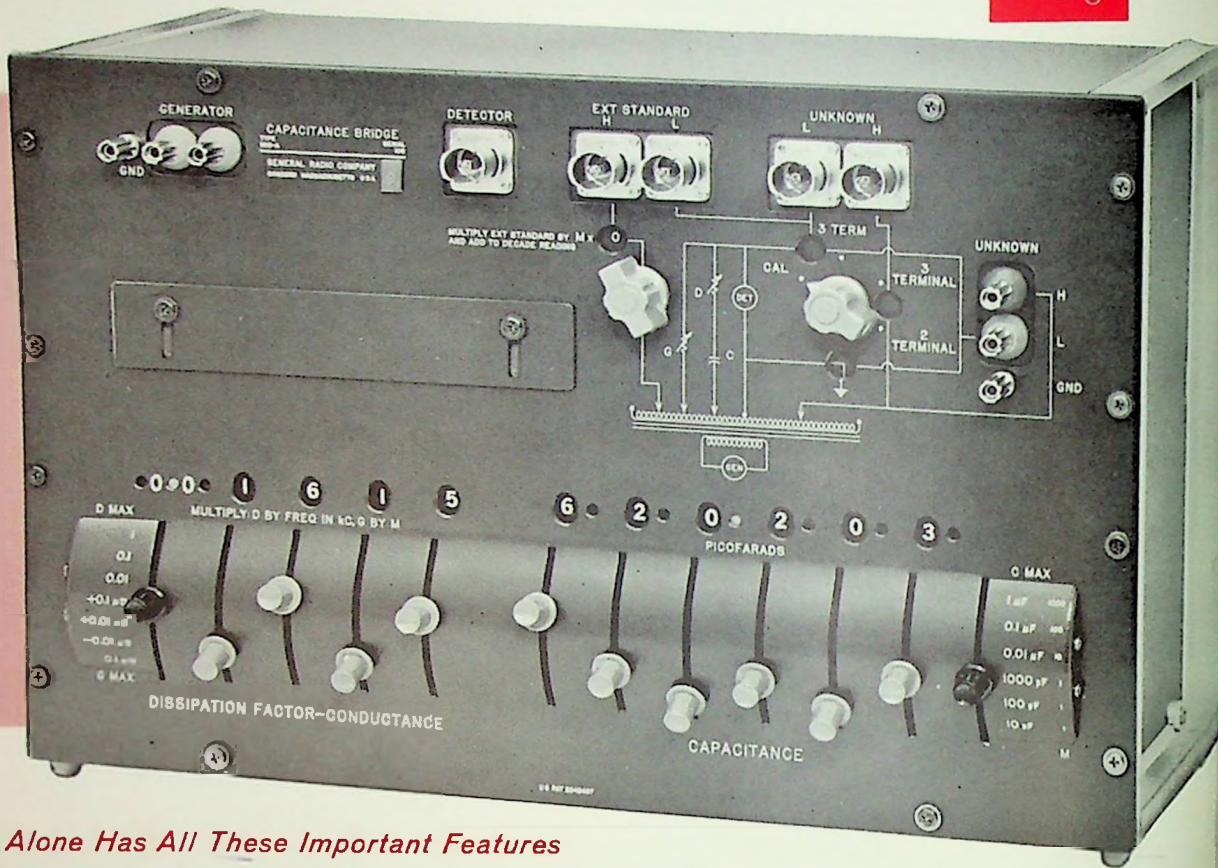
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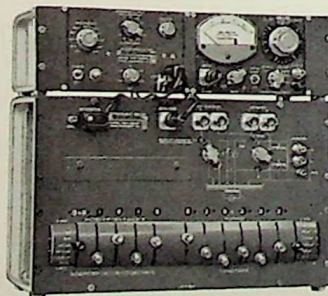
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