EDITOR'S PROFILE of this issue

from a historical perspective …

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

February, 1965:

Cover: This early LIDAR unit, developed at the Stanford Research Institute (SRI) labs, uses maser radar to study weather. More details on page 5.

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
February 1965
SAN FRANCISCO SECTION
INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS

meeting reminder

February 9 (Tuesday) Antennas and Propagation

February 16 (Tuesday) Automatic Control/Biomedical Engineering, Reliability

February 17 (Wednesday) Military Electronics

February 18 (Thursday) Audio

February 23 (Tuesday) Computer, Microwave Theory and Techniques, Product Engineering and Production, Space Electronics and Telemetry

February 24 (Wednesday) Electron Devices, Engineering Writing and Speech, Electromagnetic Compatibility, Instrumentation and Measurement, S.F. Bay Area Engineering Council

February 25 (Thursday) Santa Clara Valley Subsection, Information Theory

March 3 (Wednesday) Nuclear Science, Power

March 22 (Monday) San Francisco Section/East Bay Subsection

March 24 (Wednesday) Instrumentation and Measurements

yours

INTRODUCING AUTOMATIC DISPLAY SWITCHING in the Tektronix Type 547

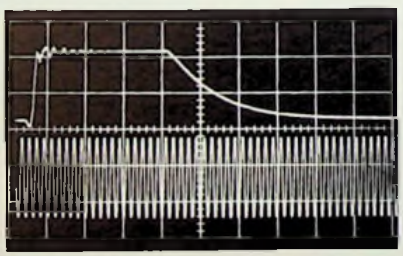
... one of three new DC-to-50 Mc Oscilloscopes

Write or call now

complete data on how Automatic Display Switching

with Tektronix Type 547 and 1A1 Plug-In Unit
gives you Dual-Beam performance • Single-Beam economy

Your local Tektronix Field Office has this complete booklet on how the Tektronix Type 547—a single-beam oscilloscope—can provide dual-beam performance for most applications. A dc-to-50 Mc oscilloscope with automatic display switching, the Type 547 features two time bases. Either time base can be used for horizontal deflection of the crt beam. Or the beam can be driven first by one time base then the other, automatically, on alternate sweeps.



The single-beam oscilloscope display shows two different signals, each at a different vertical sensitivity and sweep speed. Single-exposure photograph.

Tektronix, Inc. *SAN FRANCISCO FIELD OFFICES*

3944 FABIAN WAY • PALO ALTO, CALIF. • Phone: 326-8500
1709 MT. DIABLO BLVD. • WALNUT CREEK, CALIF. • Phone: 935-6101
From Oakland, Berkeley, Richmond, Albany and San Leandro: 254-5353

Something missing?

Call your Neely Field Engineer. He offers you the most complete line of quality instrumentation available. Furthermore, you can put his talents as an instrumentation engineer to work for you. Try him.

HEWLETT PACKARD hp *NEELY* SALES DIVISION

North Hollywood, (213) 877-1282; San Carlos, (415) 591-7661; Sacramento, (916) 482-1463; San Diego, (714) 223-8103; Scottsdale, (602) 945-7601; Tucson, (602) 623-2564; Albuquerque, (505) 255-5586; Las Cruces, (505) 526-2486; Seattle, (206) GL 4-3971

Yul Brynner in "Invitation to a Gunfighter," co-starring Janice Rule. A Stanley Kramer Production, in color by Deluxe, released through United Artists. By Inflight Motion Pictures, Inc.

United's new Jetarama Theater!
The widest choice of entertainment to New York...
wide-screen movies, plus 6 channels of stereo and monaural listening...
on many of United's Red, White & Blue jets.

Here's a unique new experience in travel entertainment: United's Jetarama Theater . . . a superb variety of entertainment from takeoff to touchdown.

You can watch a wide-screen movie. Or listen to classical music in stereo. Or a variety show in stereo. Or light classics. Or popular music. Or jazz. Even children's stories. Head phones and controls at every seat allow you to make your own selection.

Only United gives you so many choices . . . there's something for everyone. But don't worry if you're not in the mood for entertainment. You're free to ignore the whole thing . . . with United's new movie system it is not necessary to darken the cabin.

Jetarama Theater is yours to enjoy (or ignore) on selected transcontinental Red, White & Blue flights . . . the flights with three choices of service: Red Carpet First Class, Standard and Coach. Just call United or your Travel Agent.

UNITED®

THE EXTRA CARE AIRLINE

WELCOME ABOARD





IEEE Grid
volume 11
number 6
february, 1965

Published monthly except July and August by San Francisco Section, Institute of Electrical and Electronics Engineers

address all mail to
IEEE, Suite 2210, 701 Welch Road
Palo Alto, California 94304
Telephone: (415) 327-6622

Members: send address change promptly to IEEE, Box A, Lenox Hill Station, New York, N.Y. Send copy of letter to Section Office

executive editor:
JAMES D. WARNOCK

advertising director:
ERNESTO A. MONTANO

editorial & advertising assistant:
MRS. JEAN HELMKE

subscriptions:
$4.00 (members); $6.00 (others); overseas, $7.00 per annum

contents

Mailing office of publication: 363 Sixth Street, San Francisco 94103
Second class postage paid at San Francisco

san francisco section officers

advertising

from the chairs

WESCON FOR '65

WESCON, the Western Electronic Show and Convention, is in San Francisco in 1965 and, as usual, will be held during the latter part of August—more exactly, August 24 through 27.

WESCON is jointly sponsored by the 6th Region of the IEEE and the Western Electronic Manufacturers Association (WEMA) and has been held every year since 1953 under the present arrangement. Since this year it is held in San Francisco, the responsibility for organizing and carrying out its functions is handled by hundreds of local volunteers organized through 14 committees reporting to the executive committee of the board of directors, assisted by the WESCON business office.

Meyer Leifer

The executive committee consists of two representatives of WEMA, John Chartz of Dalmo Victor and Phil Gundy of Technical Systems, Inc., and two members elected by the San Francisco Section of the IEEE, John McCullough of Litton Electron Tube Division and Meyer Leifer of Energy Systems, Inc. The last-named individual was elected to replace Dr. Ed Herold, who resigned late last year to return to the RCA Laboratories in Princeton. For the '65 WESCON, McCullough is the convention director, Gundy the show director, Chartz the chairman of the executive committee, and Leifer chairman of the board of directors.

The primary objective of WESCON is the advancement of the elec-

(Continued on page 12)

cover

Dr. Myron G. H. Ligda, manager of the aerophysics lab of the electronics and radio science division of Stanford Research Institute, demonstrates LIDAR, a maser radar, newest instrument of the weatherman. For more on this new application, see page 5.

meeting ahead

ENGINEERS' WEEK SPEAKER

William F. Raborn, Jr., retired rear admiral, sometimes called "father of the Polaris," and now vice president for program management of Aerojet General Corporation at El Monte, Calif., will be speaker at this year's dinner in San Jose celebrating National Engineers' Week, February 21 through 26.

Admiral Raborn will speak to the national theme, "Engineering . . . for Human Needs," at Lou's Village Thursday evening, February 25. A social hour at 6:30 p.m. will be followed by the dinner, with the admiral speaking about 9 o'clock. The event is jointly presented by the Santa Clara Valley Engineers Council and the Santa Clara Valley Subsection of IEEE.

Harry R. McLaughlin, Lockheed, Palo Alto, is a member of the banquet committee, and Oswald Wedekind, Underwriters Laboratories of Palo Alto, is on the coordinating committee. Ten other societies are joined with IEEE in the Santa Clara Valley Engineers Council, celebration sponsor.

The banquet is open to the public. Reservations may be obtained from any of the engineering societies or from R. J. Jodoin, Bio-Form Corp., chairman of ticket sales.

meeting ahead

NOISE IN AMPLIFIERS

David B. Jepsen, electronic engineer in the development section of the Los Gatos facility of Ampex Consumer and Educational Products Division, Elk Grove Village, Ill., will discuss optimizing the noise figure in transistor audio amplifiers at a joint meeting of the Audio chapter and the Audio Engineering Society on February 18.

Transistor manufacturers will supply data describing the noise figure of a specific transistor versus other transistor parameters. To operate a transistor as an active and stable device, base biasing resistors and, sometimes, unbypassed emitter resistors are necessary. Additionally, feedback may be applied to either the base or the emitter of the transistor. The effects of these external resistances as well as of source impedance on the transistor noise figure are investigated.

Jepsen received the B.S.E.E. degree from San Jose State College in 1958, and the M.S.E.E. degree from the University of Santa Clara in 1961.

MEETING CALENDAR

S.F. BAY AREA ENGINEERING COUNCIL

7:00 P.M. • Wednesday, February 24

Engineers' Week awards banquet
Place: Palace Hotel Gold Ballroom
Tickets ($6.00) may be purchased from Herman Spaeth, Pacific Fire Rating Bureau, San Francisco; SU 1-8828

SAN FRANCISCO SECTION

8:00 P.M. • Monday, March 22

(Joint with East Bay Subsection, see below)
The electronics of San Francisco Bay Area Rapid Transit
Speakers and place to be announced
Reservations and information: Mrs. Jean Helmke, Section Office, 327-6622

SANTA CLARA VALLEY SUBSECTION

7:30 P.M. • Thursday, February 25

(Joint with Engineers' Council, Santa Clara Valley; ladies included)
Engineers' Week Banquet: Human engineering aspects of the Polaris program
Vice Admiral William F. Raborn, Jr., USN, Ret., vice president, program management, Aerojet-General Corp.
Place: Lou's Village, 1465 W. San Carlos Street, San Jose
Social hour: 6:30 P.M.
Dinner: 7:30 P.M.
Reservations: R. J. Jodoin, 294-4130, or Ed Stahl, 354-7540, by February 23

EAST BAY SUBSECTION

8:00 P.M. • Monday, March 22

(Joint with San Francisco Section)

GROUP CHAPTERS

Antennas and Propagation

8:00 P.M. • Tuesday, February 9

Synthesis of high performance dual reflector antenna systems
Phillip D. Potter, Jet Propulsion Lab, CalTech
Place: Ph 101, Stanford University
Dinner: 6:30 P.M., Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto
Reservations: 845-6000, Ext. 3539, by February 8

Audio

8:15 P.M. • Thursday, February 18

(Joint with Audio Engineering Society)
Optimizing the noise figure in transistor audio amplifiers
David B. Jepsen, development section, Ampex consumer and educational products division (Los Gatos facility)
Place: SRI conference room B, 333 Ravenswood Avenue, Menlo Park
Cocktails: 6:00 P.M.
Dinner: 6:30 P.M., Ramor Oaks, El Camino Real, Atherton
Reservations: Marc Brun, 742-9387

Automatic Control

8:00 P.M. • Tuesday, February 16

(Joint with Biomedical Engineering, see below)

Biomedical Engineering

8:00 P.M. • Tuesday, February 16

(Joint with Automatic Control, see above)
A new class of pulse-frequency modulated feedback systems and its application to neural nets
Dr. E. I. Jury, professor, University of California, Berkeley
Place: Stanford Medical School, Room M-112
Dinner: 6:15 P.M., Red Cottage Restaurant, El Camino Real, Menlo Park
Reservations: Dr. J. Bliss, 326-6200, Ext. 3488, by February 15

Computer

8:00 P.M. • Tuesday, February 23

Isodata: novel data analysis technique with applications to pattern recognition and data analysis
Geoffrey H. Ball and David J. Hall, staff members, SRI
Place: General Electric Computer Lab, 310 DeGuigne Drive, Sunnyvale
Dinner: 6:15 P.M., Old Plantation, El Camino and Bernardo, Sunnyvale
Reservations: None required

MEETING CALENDAR

Electromagnetic Compatibility
8:15 P.M. • Wednesday, February 24

(Joint with Instrumentation and Measurement, see below)

Electron Devices
8:00 P.M. • Wednesday, February 24

Interactions between light and sound
Dr. Robert Adler, vice president, research, Zenith Corp., Chicago
Place: Ph 101, Stanford University
Dinner: 6:00 P.M., Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto
Reservations: R. Borghi, 854-3300, Ext. 557, by February 23

Engineering Writing and Speech
8:00 P.M. • Wednesday, February 24

Proposal philosophy; a new angle in market development
Frank Mansur, senior sales representative, LMSC, Sunnyvale
Place: 3251 Hanover Street, Palo Alto—Lockheed Auditorium, Bldg. 202
Dinner: 6:00 P.M., Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto
Reservations: Robert Howland, 324-0768, evenings; 399-2951, days; or Douglas W. Matthews, Area Code 408, 739-4510, Ext. 2301

Information Theory
8:10 P.M. • Thursday, February 25

On the measurement and use of time-varying channels
Prof. W. L. Root, University of Michigan
Place: Philco Auditorium, 3825 Fabian Way, Palo Alto
Dinner: 6:15 P.M., Rickeys Hyatt House, El Camino Real, Palo Alto
Reservations: Mrs. D. Saltzman, 326-4350, Ext. 4101, by February 25

Instrumentation and Measurement
8:15 P.M. • Wednesday, February 24

(Joint with Electromagnetic Compatibility, see above)
The technique of spectrum analysis
Arthur Fong, senior staff engineer, Hewlett-Packard, Palo Alto
Place: HP Auditorium, 1501 Page Mill Road, Palo Alto
Dinner: 6:15 P.M., L'Omelette, 4170 El Camino Real, Palo Alto
Information: Renda Blackler, 948-0571

Instrumentation and Measurement
8:15 P.M. • Wednesday, March 24

Voltage references, old and new
Dave Hilbiber, Fairchild Semiconductor, Palo Alto
Place: Fairchild, 4001 Junipero Serra, Palo Alto
Dinner: 6:15 P.M., L'Omelette, 4170 El Camino Real, Palo Alto
No reservation required

Microwave Theory and Techniques
8:00 P.M. • Tuesday, February 23

Third of three lectures on solid-state devices
Hot carrier devices
Richard Soshea, hp associates, Palo Alto
Place: Room 1A, Hewlett-Packard, 1501 Page Mill Road, Palo Alto
Dinner: 6:30 P.M., Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto
Reservations: Bob Prickett, 326-7000, Ext. 2117, by February 22

Military Electronics
8:00 P.M. • Wednesday, February 17

Video file—a television record storage system
Robert A. Miner, product planning staff, Ampex Corp.
Place: Lockheed Auditorium, Bldg. 202, 3251 Hanover Street, Palo Alto
Dinner: 6:30 P.M., Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto
Reservations: Ralph W. Franks, 743-2778, by February 16

Nuclear Science
8:00 P.M. • Wednesday, March 3

The 200 BeV LRL accelerator design proposal
Edward C. Hartwig, project engineer, Lawrence Radiation Lab, Berkeley
Place: Granada Bowl, 1620 Railroad Avenue, Livermore
Dinner: 6:30 P.M.
Reservations: 447-1100, Ext. 8011, by March 1

(Continued on page 6)

meeting ahead

LASER RADAR

Dr. Myron G. H. Ligda, manager of the aerophysics laboratory of Stanford Research Institute, will address the February 23 meeting of the Space Electronics and Telemetry chapter. He will discuss LIDAR, the weatherman's newest instrument, shown on the cover.

In the years since World War II, a number of new and powerful tools have been developed to help the weather forecaster solve the eternal question: "Is it going to rain tomorrow?" Thus, we have radar to observe storms and precipitation, rockets to probe the upper atmosphere, high-speed electronic computers to draw tomorrow's weather map, nuclear-powered automatic weather stations to float in midocean and report existing weather conditions, and artificial satellites to map the global cloud systems and measure the earth's radiation into space.

To this formidable array is now being added another—lidar, or laser radar. While the capabilities of this instrument are still incompletely determined, it has demonstrated applications to a number of important meteorological problems such as cloud height determination under adverse conditions, observation of atmospheric transmissivity and pollution, and continuous observation of the upper atmosphere.

The characteristics of some experimental equipment constructed at Stanford Research Institute, the observations which have been made, principal technological and scientific problems needing solution, and plans for future work will be discussed.

Dr. Ligda directs the Laboratory's research programs on radar meteorology, satellite meteorology, atmospheric analysis, and dynamic meteorology.

Dr. Ligda received the A.B. degree in astronomy and physics from the University of California in 1942, the S.M. in 1948 and Sc.D. in 1953, both in meteorology, from Massachusetts Institute of Technology. His minor for the Sc.D. was in astronomy, taken at Harvard University.

chapter news

VEHICULAR COMMUNICATIONS

In an effort to activate the authorized but never organized San Francisco chapter of the IEEE Vehicular Communications Group, Ben K. Wright, Kaar Engineering, Palo Alto, and the section office have sent questionnaires to 80 local members with encouraging results. Those members not yet returning the forms are urged to do so promptly.

MEETING CALENDAR

Power

7:30 P.M. • Wednesday, March 3

(Joint with San Francisco Section of ASME)

Two years' operating experience with a mine-mouth plant

John S. Anderson, superintendent of power, Utah Power & Light Co., Salt Lake City

Place: Engineers' Club of San Francisco, 206 Sansome Street, 15th floor
Cocktails: 5:30 P.M.
Dinner: 6:30 P.M.
Reservations: Call 421-3184 by March 1

Product Engineering and Production

7:00 P.M. • Tuesday, February 23

Plant tour (limited to 54)

Place: General Motor Assembly Plant, 4550 Fremont Blvd., Irvington (southeast of Fremont). Ask at guard station for direction to visitors' parking. Use main building entrance.
Note: tour trains leave promptly at 7:00 P.M.
No dinner
Reservations: Required for tour. Call 326-7000, Ext. 2459—Dorothy Hittenberger or Ron Church; PEP members will receive preference until February 15

Reliability

8:00 P.M. • Tuesday, February 16

The control of gambling in Nevada (postponed from December 17)

Edward A. Olsen, chairman, state gaming control board, Nevada Gaming Commission

Place: Ph 101, Stanford University
Dinner: 6:30 P.M., Ed's Chuck Wagon, El Camino Real, Mountain View
Reservations: Stuart Bessler, 327-4212, by February 15. (NOT ladies night)

Space Electronics and Telemetry

8:15 P.M. • Tuesday, February 23

Lidar—the weatherman's newest instrument

Dr. Myron G. H. Ligda, manager, aerophysics lab electronics and radio science division, Stanford Research Institute

Place: Lockheed Auditorium, Bldg. 202, 3251 Hanover Street, Palo Alto
Dinner: 6:15 P.M., El Camino Bowl, 2025 El Camino Real, Mountain View
Reservations: Charles Jamgotchian, 697-7774, by noon, February 23

Soshea

Potter

meeting ahead

HOT CARRIER DEVICES

Richard W. Soshea, hp associates, will deliver the third of three lectures on solid-state microwave devices at the February 23 meeting of the Microwave Theory and Techniques chapter.

The continuing need for faster switching diodes and better microwave devices has led to a renewed interest in the use of rectifying metal-semiconductor contacts (Schottky barriers). In a properly designed Schottky barrier diode most of the current consists of injection of majority carriers into the metal; thus, the rectification at high frequencies is not limited by minority carrier lifetime.The electrons or holes are injected into the metal with energies much greater than the thermal equilibrium energies, hence the designation "hot carrier." Hot carrier diodes are replacing point contact diodes in many mixer and detector applications.

This talk will include a brief review of the principles of hot carrier devices; the design, application, and performance of optimum hot carrier microwave diodes; and a report on the current status of the hot electron triode (metal base transistor).

The speaker earned the Ph.D. in electrical engineering at the University of Minnesota. He spent two years in the research department of Rheem Semiconductor Corp., Mountain View. He presently heads the exploratory development department of hp associates, Palo Alto.

meeting ahead

ANTENNA SYSTEMS

Phillip D. Potter, supervisor, antenna and microwave group, Jet Propulsion Laboratory, Cal Tech, will address the February 9 meeting of the Antennas and Propagation chapter. He will discuss the synthesis of high performance dual reflector antenna systems.

The speaker received his B.S.P.H. and M.S.E.E. degrees in 1954 and 1955 from the California Institute of Technology. Since that time he has been employed at the Jet Propulsion Laboratory in Pasadena. His primary area of work for the past two years has been low-noise feed systems for large paraboloidal antennas.

Adler *Fong*

meeting ahead

LIGHT AND SOUND

Dr. Robert Adler, vice president and director of research of the Zenith Radio Corp., Chicago, will discuss interactions between light and sound at the February 24 meeting of the Electron Devices chapter.

Dr. Adler, who received the Ph.D. in physics in 1937 from the University of Vienna, joined Zenith in 1941 and was named director of research in 1963. The electron beam parametric amplifier is one of the products of Dr. Adler's group in recent years. Earlier work in the vacuum tube field includes the development of the phasitron modulator, of receiving tubes such as the 6BN6 and 6AR8, and of transverse field traveling wave tubes. Dr. Adler has also been active in the development of mechanical filters and of ultrasonic remote control devices.

Dr. Adler has been a Fellow of the IRE since 1951. His abstract follows: When a light beam traverses a beam of ultrasound, conspicuous diffraction phenomena appear. These can be explained in terms of simple classical physics; they can also be interpreted as parametric processes or as quantum interactions. A lower frequency form, the Debye-Sears effect, has been well known for many years. A simpler form, observable at higher sound frequencies, has recently received much attention, and many interesting experiments have been made with laser light and with sound ranging from 40 mc to X-band. A variety of applications have been suggested; some of these await the discovery of materials with larger interaction coefficients.

meeting ahead

SPECTRUM ANALYSIS

Arthur Fong, senior staff engineer, Hewlett-Packard Co., will briefly review the history of spectrum analysis at the February 24 meeting of the Instrumentation and Measurement chapter.

The relationship between the frequency and time function will be developed and the formation of the display by scanning and contiguous filters will be described. The discussion will cover instrumentation requirements affecting the choice of

meeting ahead

VIDEOFILE

Robert A. Miner, product planning staff of Ampex Corp., will discuss Videofile, a television record storage system, at the February 17 meeting of the Military Electronics chapter.

Television pictures of documents—pictures which can be stored on magnetic tape and conveyed from one point to another over a pair of wires—present intriguing possibilities for mechanized record systems. The total television art is at an evolutionary point today, wherein many of these possibilities can be reduced to practice in the form of Videofile systems. The functional capabilities of such systems and their applications will be discussed in this paper.

Miner has been a member of the firm since October, 1950. He joined Ampex as a development engineer and became successively service manager, southeastern district sales manager, national sales manager, professional products division marketing manager, and video products division market planning manager. Over the past five years he has been actively engaged in analyzing and planning activities for the "television micro-storage" field.

meeting ahead

TIME-VARYING CHANNELS

Prof. W. L. Root, University of Michigan, will address the February 25 meeting of the Information Theory chapter on the measurement and use of time-varying channels.

The theory of bounded integral operators is used to characterize linear time-varying channels. The problem of measuring such channels to various degrees of approximation will be considered.

Root received his Ph.D. in mathematics from the Massachusetts Institute of Technology, where he also worked at the Lincoln Laboratories from 1952 to 1961. Since that time, he has been professor of instrumentation engineering at the University of Michigan, Ann Arbor. He is co-author (with W. Davenport) of the well-known book, "Introduction to the Theory of Random Signals and Noise." Professor Root has recently been made a Fellow of the IEEE.

---

scan rate and filters, new applications, and future trends of spectrum analysis instrumentation.

A graduate of the University of California, Fong is currently doing graduate work at Stanford University. He was formerly a staff member of the M I T Radiation Laboratory.

meeting ahead

MARCH POWER MEETING

A joint meeting of the San Francisco Chapter of the IEEE Power Group and the ASME San Francisco Section will be held on March 3 at the Engineers' Club. The subject is "Naughton Steam Electric Station—Two Years' Operating Experience with a Mine-Mouth Plant" and the speaker is John S. Anderson, superintendent of power, Utah Power and Light Company, Salt Lake City.

The Naughton SES is located four miles southwest of Kemmerer, Wyo., and Unit No. 1 has a nominal capability of 150 mw. Coal is supplied by the Kemmerer Coal Company from the adjacent strip mine over a coal conveyor system of approximately a mile in length. A unique coal stacker and handling facilities on the plant site complete the coal system.

Being in an area where water is scarce, the make-up water system presented unusual design problems and involves a 7½-mile underground pipeline. Condenser circulating water is cooled in a cooling tower, which has presented some interesting operating problems. The data logging system, control room design, and plant personnel problems will also be discussed.

Integration of the remote plant into the system of the Utah Power and Light Company has caused a number of unexpected and interesting operating situations. Anderson will present slides and discuss in some detail the unusual design, construction, and operating problems associated with the Naughton plant development.

The meeting at 7:30 p.m. will be preceded by a cocktail hour at 5:30 p.m. and dinner at 6:30 p.m.

Advertisers Index

meeting ahead

ACCELERATOR PROPOSAL

E. C. Hartwig, project engineer, Lawrence Radiation Laboratory, Berkeley, will discuss the present status of the engineering study of the proposed 200 BeV proton accelerator at the meeting of the new Nuclear Science chapter on March 3.

The machine, as presently envisioned, would be a major national research facility to be constructed by 1972. In order to achieve the desired energy, the accelerator would be about a mile in diameter. In addition, provision would be made for later addition of storage rings to the basic accelerator. One of the sites being considered for the accelerator is Parks Air Force Base in Pleasanton. For comparison, the present Bevatron at the Lawrence Radiation Laboratory in Berkeley operates at an energy level of 6.2 BeV and has a diameter of 100 feet.

Hartwig has been a member of the LRL electronics engineering department since 1952. Until recently he was project engineer assigned to the Bevatron, and at present is also project engineer for the new accelerator engineering study.

MANUFACTURER / REPRESENTATIVE INDEX

Abbey Electronics Corp. ..... McCarthy Assoc.
Accutronics, Inc. ..... G. S. Marshall Co.
Aertech ..... Jay Stone & Assoc.
Airborne Instruments Lab. ..... Wright Engineering
Alfred Electronics ..... Moxon Electronics
American Electronics Labs ..... Perlmuth Electronics
Antlab, Inc. ..... Jay Stone & Assoc.
Applied Magnetics Corp. ..... The Thorson Co.
Applied Research, Inc. ..... Jay Stone & Assoc.
Astro Communication Laboratory ..... Costello & Co.
Astrodata, Inc. ..... Moxon Electronics
Astronics Corp. ..... The Thorson Co.

Bausch & Lomb, Inc., Elect. Sect. ..... Perlmuth
Beattie-Coleman, Inc. ..... T. Louis Snitzer Co.
Beckman/Berkeley Division ..... V. T. Rupp Co.
Beckman/Computer Operations ..... V. T. Rupp Co.
Behlman/Invar Electronics ..... T. Louis Snitzer Co.
Blaw-Knox ..... The Thorson Co.
Bryant Computer Products ..... Costello & Co.
Burr-Brown Research Corp. ..... W. K. Geist Co.

Century Electronics & Instruments ..... V. T. Rupp Co.
Ceramaseal, Inc. ..... Wadsworth-Pacific Mfg. Assoc.
Cimron Corporation ..... Moxon Electronics
Clairex Corp. ..... Moxon Electronics
Collectron Corporation ..... Costello & Co.
College Hill Industries (form. Speidel) ..... Perlmuth
Comcor, Inc. ..... Moxon Electronics
Computer Instruments Corp. ..... Components Sales
Computer Measurements Co. ..... Moxon Electronics
Cook Electric-Data-Stor Div. ..... Costello & Co.
Curry, McLaughlin & Len Inc. ..... Kipp Assoc.
Custom Materials, Inc. ..... Jay Stone & Assoc.

Data Equipment Co. ..... Moxon Electronics
Datamark, Inc. ..... Costello & Co.
Datamec Corporation ..... Moxon Electronics
Diamond Antenna & Microwave Corp. ..... Wright
DI/An Controls, Inc. ..... Wright Engineering
Dielectric Products Eng. Co. ..... Jay Stone & Assoc.
Digitronics Corp. ..... Components Sales Calif.
Dynaplex Corp. ..... Components Sales

Eckel Corporation ..... White & Co.
Electro-Mechanical Research ..... T. Louis Snitzer
Electron Products ..... G. S. Marshall Co.
Electronic Compon. Div. Bur. Corp. ..... Tech-Ser, Inc.
Electronic Products, Inc. ..... Jay Stone & Assoc.
Electronic Research Associates, Inc. ..... Tech-Ser, Inc.
Electro Switch Corp. ..... Willard Nott & Co.
Elgenco, Inc. ..... V. T. Rupp Co.
Emcor, Ingersoll Products Div. ..... T. Louis Snitzer Co.
Eppley Laboratory, Inc. ..... W. K. Geist Co.

Fabri-Tek, Inc. ..... Costello & Co.
Fairchild Scientific Products ..... Moxon Electronics
Fairchild Semiconductor ..... G. S. Marshall Co.
Fifth Dimension, Inc. ..... Perlmuth Electronics
Glow-Lite Corp. ..... Wadsworth-Pacific Mfg. Assoc.

Holex, Inc. ..... The Thorson Co.
Holt Instruments Laboratories ..... W. K. Geist Co.
Honeywell-Denver Div., Lab Standards ..... Geist
Honeywell, Mpls., Enclosures ..... W. K. Geist Co.
Hughes Instruments ..... McCarthy Assoc.
Hyletronics Corp. ..... The Thorson Co.
Hyperion Industries, Inc. ..... McCarthy Assoc.

Impact-O-Graph Corp. ..... White & Co.
Inland Motor Corp. ..... Costello & Co.
Invac Corp. ..... V. T. Rupp Co.

Keithley Instruments ..... T. Louis Snitzer Co.
Kewaunee Scientific Equipment ..... White & Co.
Kemet Co. ..... G. S. Marshall Co.
Kepco, Inc. ..... V. T. Rupp Co.
Kinetics Corporation ..... The Thorson Co.
Knights Co., James ..... G. S. Marshall Co.

Lambda Electronics Corp. ..... Jay Stone
Landis & Gyr, Inc. ..... Recht Assoc.
Lavoie Laboratories, Inc. ..... McCarthy Assoc.
Liad Instruments, Inc. ..... The Thorson Co.
Lindgren & Associates, Erik A. ..... White & Co.

Magnetic Shield Div., Perfection Mica ..... Perlmuth
Marconi Instruments ..... Moxon Electronics
Maury Microwave Corp. ..... Kipp Assoc.
McLean Engineering Labs ..... T. Louis Snitzer Co.
Melcor Electronics Corp. ..... Components Sales Calif.
Mennen-Greatbatch Electronics, Inc. ..... Tech-Ser, Inc.
Metex Electronics Corp. ..... Perlmuth Electronics
Metron Instrument Co. ..... Components Sales Calif.
Microdot, Inc. ..... McCarthy Assoc.
Micro Instrument Co. ..... Jay Stone & Assoc.
Microsonics, Inc. ..... Perlmuth Electronics
Microwave Associates ..... Elliott Recht Assoc.
Microwave Electronics Corp. ..... Jay Stone & Assoc.
Microwave Physics Corp. ..... Kipp Assoc.
Millitest Corp. ..... Components Sales Calif.
Motorola Com. & Elect. Div. ..... Perlmuth

Northeast Scientific Corporation ..... White & Co.

Optimation, Inc. ..... McCarthy Assoc.
Oregon Electronics Mfg. Co. ..... White & Co.

Pac. Communications & Electronics ..... Artwel Elec.
Pentrix Corp. ..... Wright Engineering
George A. Philbrick Researches, Inc. ..... Tech-Ser, Inc.
Philco Corp., SSPO ..... Jay Stone & Assoc.
Polarad Electronic Instruments ..... T. Louis Snitzer
Potter and Brumfield ..... Elliott Recht Assoc.
Precision Mechanisms Corp. ..... Components Sales

Qualitron Corp. ..... Wadsworth-Pacific Mfg. Assoc.
Quan-Tech Labs ..... Jay Stone & Assoc.

Rawson Electrical Instrument Co. ..... McCarthy Assoc.
Raytheon-Rayspan ..... Perlmuth Electronics
Remanco Inc. ..... Jay Stone & Assoc.
Renco Dry Box Glove Company ..... White & Co.
Rixon Electronics, Inc. ..... Costello & Co.
Rohde & Schwarz Sales Co. ..... W. K. Geist Co.
Rowan Controller Co. ..... Artwel Electric
Royal McBee Corp., Ind. Prod. Div. ..... Costello
Rutherford Electronics ..... Moxon Electronics
Ryan Recording Thermometer Co. ..... White & Co.

Saegertown-Western ..... Wadsworth-Pacific Assoc.
Sage Laboratories ..... The Thorson Co.
Sandefur Engineering Co., Inc. ..... Tech-Ser. Inc.
Sangamo Electric, Elect. Sys. Div. ..... Perlmuth
Scott. Inc.. H. H. ..... W. K. Geist Co.
Sequential Electronic Systems ..... White & Co.
Sierra Electronic Div., Philco ..... T. Louis Snitzer Co.
Singer/Metrics/Gertsch ..... Dynamic Associates
Sonex Corp. ..... Perlmuth
Spectra-Physics, Inc. ..... O'Halloran Assoc.
Sperry Microwave Company ..... McCarthy Assoc.
Stewart Engineering Co. ..... Perlmuth Electronics
Straza Industries ..... Costello & Co.
Systems Research Corp. ..... Moxon Electronics

Tally Corp. ..... Moxon Electronics
Telonic Industries & Eng. ..... T. Louis Snitzer Co.
Tenney Engineering, Inc. ..... The Thorson Co.
Test Equipment Corp. ..... V. T. Rupp Co.
Trak Microwave Corp. ..... Wright Engineering
Trygon Electronics, Inc. ..... Moxon Electronics

United States Dynamics ..... White & Co.
Uptime Corporation ..... Costello & Co.
Utah Research & Development Co. ..... The Thorson Co.

Vactite, Inc. ..... McCarthy Assoc.
Vitramon, Inc. ..... G. S. Marshall Co.

Warren Components ..... Wadsworth-Pacific Mfg. Assoc.
Waters Corp. ..... White & Co.
Watkins-Johnson Co. ..... Perlmuth Electronics
Wayne-George Corp. ..... Wright Engineering
Weinschel Engineering, Inc. ..... Jay Stone & Assoc.
Weldmatic Div.—Unitek Corp. ..... Tech-Ser, Inc.
Western Microwave Labs ..... Kipp Assoc.
Wiltron Co. ..... O'Halloran Assoc.
Wyle Laboratories ..... V. T. Rupp Co.

Zissen Technical Associates ..... Tech-Ser, Inc.

REPRESENTATIVE DIRECTORY

Artwel Electric, Inc.
1485 Bayshore Blvd.,
San Francisco; 586-4074

Components Sales California, Inc.
Palo Alto; 326-5317

Costello & Company
535 Middlefield Road,
Palo Alto; DA 1-3745

Dynamic Associates
1011-D Industrial Way,
Burlingame; 344-2521

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

Kipp Associates
90 Stadler Drive
Woodside: 851-0123

Marshall Company, G. S.
890 Warrington Road
Redwood City; 365-2000

McCarthy Associates
1011-E Industrial Way,
Burlingame; 342-8901

Moxon Electronics
15 - 41st Avenue,
San Mateo; 345-7961

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

Perlmuth Electronics
1285 Terra Bella Ave.,
Mt. View; 961-2070

Recht Associates, Elliott
175 S. San Antonio Road,
Los Altos; 941-0336

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

Tech-Ser, Inc.
800 San Antonio Rd.,
Palo Alto; 326-9800

The Thorson Company
2443 Ash Street,
Palo Alto; 321-2414

Walter Associates
Box 790, Menlo Park;
323-4606

Wadsworth-Pacific Mfg. Assoc., Inc.
71 Parker Avenue, Atherton;
321-3619

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

White & Company
788 Mayview Ave.,
Palo Alto; 321-3350

Wright Engineering
126 - 25th Ave.,
San Mateo; 345-3157

section news

NOMINATING COMMITTEE NAMED

Section Chairman Jack Beckett has appointed a committee to nominate a slate of section officers (chairman, vice chairman, secretary, and treasurer) for the 1965-66 operating year. Also to be nominated is a Section/WESCON director to serve until November 30, 1969.

Members are Dr. William A. Edson, chairman, William R. Johnson, Victor Kaste, Dr. Peter Lacy, and Prof. John R. Whinnery. They may be contacted to recommend nominations.

Section bylaws provide that "additional nominations by petition may be submitted no later than April 1 to the section executive committee for inclusion on the ballot. To be valid, such petitions shall carry the signatures of no fewer than 25 voting members of the section and include a statement of the willingness of the candidate to serve. Election shall be by mail ballot and shall be completed by May 15. The incoming officers shall assume the duties on or before July 1 on a date fixed by the outgoing executive committee."

section inputs

CHANGE OF ADDRESS

If you plan to change your address, notify headquarters and the section office at least three weeks in advance of the effective date.

MORE WESCON

tronics art technically and industrially in the West. Both the engineers and the electronic firms which participate recognize the continual changes which characterize our industry, and we are mindful that our needs for fighting obsolescence are perhaps greater now than ever before. WESCON is important in reviewing and presenting the latest and more significant work in those fields of greatest continuing significance. This year the technical program will include invited speakers and sessions organized and contributed by leading organizations, universities, and companies.

WESCON also has a number of secondary benefits which are of special interest to the IEEE. It furnishes financial support to all sections of the 6th Region, it is the principal support of the Western Electronic Education fund, and it provides an unexcelled opportunity for establishment of professional standing in our own community.

MEYER LEIFER
Section/WESCON Director

Classified Advertising

CLASSIFIED ADVERTISING RATES
Members: $15 for 1st col.-inch, $10 for 2nd, $5 for each additional. Non-members: $20 for 1st col.-inch, $15 for 2nd, $10 for each additional. 10% frequency discount for 10 consecutive ads. None to exceed total of 4 col.-inches. Special type or logos not carried. Non-commissionable. Deadline 20th of month.
Write or call: Ernesto A. Montano, IEEE Grid, Suite 2210, 701 Welch Rd., Palo Alto, Telephone (415) 327-6622.

Consultants

RO ASSOCIATES
Incorporated
Dr. Robert H. Okada
Consultants in
Solid State Circuitry, Systems
917 Terminal Way, San Carlos, Calif.
593-7570

Equipment for Sale

Edison Voicewriter model VPC 7342 including receiver model 77612, all attachments, supply of discs. $50 or best offer takes. Excellent condition. To inspect, visit Section Office or call Mrs. Jean Helmke, 327-6622.

Positions Available

New signal generator / frequency meter

generates 10 kc–500 mc / measures 10 kc–1000 mc

- Unique synthesizer provides high resolution
- High stability—1 part in 10^7
- Digital Nixie readout
- Precision attenuator
- All Solid State

Gertsch Model SSG-1 combines, for the first time, voltage accuracy with the traditional *Gertsch* frequency accuracy in one compact unit. This all solid state Signal Generator/Frequency Meter has a range of from 10 kc to 500 mc with direct digital control and readout.

Provides increments as small as 1 cps in the range from 10 kc to 50 mc...as small as 10 cps from 50 to 500 mc. Stability throughout the total range is 1 part in 10^7. Even higher stability is obtainable by driving the system with a higher precision 1 mc oscillator.

Direct frequency display is provided by Nixie readout, with digital dial-in of frequency. Output may be set to 0 dbm and adjusted 0 to −130 db with a continuously variable calibrated attenuator. Internal amplitude modulation to 50% at 400 or 1000 cps is available by means of front-panel control, and there is provision for external AM modulation to 10 kc. Nonharmonically related spurious signals are at least 60 db down.

Measures frequency from 10 kc to 1 Gc. This range is extendable to 10 Gc by means of an accessory harmonic generator-mixer assembly.

For complete details and applications assistance, contact your nearest *Gertsch* representative, or the address below, requesting Bulletin SSG-1.

SPECIFICATIONS

FREQUENCY

Range	10 kc to 500 mc
Stability	1 part in 10^7
Resolution	1 cps—10 kc to 50 mc 10 cps—50 mc to 500 mc
Display	Digital (Nixie)
Adjust	Digital

AMPLITUDE

Output Level	0 db (50 ohm)
Attenuation Range	0 to −130 db
Accuracy	±2 db into 50 Ω load

MODULATION (Amplitude)

Frequency	400 or 1000 cps Internal to 10 kc External
Range	0 to 50%

PRICE: $12,500.00

Ask your Metrics Sales Representative about the new Singer Time Pay and Lease Programs—

Gertsch

THE SINGER COMPANY
METRICS DIVISION

3211 S. LA CIENEGA BLVD., LOS ANGELES, CALIFORNIA
TELEPHONE (213) 870-2761 • TWX 910-340-6352

Design and production of PANORAMIC • SENSITIVE RESEARCH • EMPIRE • GERTSCH instruments for measurement

Every E-H instrument has two sets of specifications:

EH PULSE GENERATOR MODEL 139
SPECIFICATIONS:

REP RATE: 1 KC TO 20 MC.
AMPLITUDE: 10 VOLTS INTO 50 OHMS EITHER POLARITY, INVERTING LOGIC, 3:1 VERNIER PLUS 1/3/10/30/100 ATTENUATOR.
OFFSET: VARIABLE TO 2 VOLTS, EITHER POLARITY
DUTY FACTOR: GREATER THAN 50%
WAVESHAPE: LESS THAN 5% P-P ALL FORMS OF DISTORTION, EXCEPT ON 100:1 ATTENUATOR SETTING LESS THAN 8%
RISETIME: 6 NS TO 100 μS RISE AND FALL, INDEPENDENTLY VARIABLE RAMPS. LINEAR TO BETTER THAN 5% ALL SETTINGS.
WIDTH: 20 NS TO 300 μS, CONTINUOUSLY VARIABLE.
DELAY: 50 NS TO 100 μS, CONTINUOUSLY VARIABLE.
TRIGGER JITTER: LESS THAN 0.1% + 50 PS.
PRICE: $1,275 - RACK MOUNTING $20 EXTRA.

EH PULSE GENERATOR MODEL 139
SPECIFICATIONS:

written &

(specs on the published data sheet)

unwritten.

(specs which give a comfortable performance margin)

The written specifications on any E-H instrument never indicate its maximum performance. Each instrument has a comfortable performance margin we don't tell you about—the "unwritten" set of specifications.

One reason E-H units more than live up to their specs is our insistence on the use of high reliability, precision components, and our habit of rating them conservatively. As a result, E-H instruments are remarkably free of internal adjustments and have an unmatched mean life to failure record.

Call your E-H representative and see the new E-H pulse generators · microwave sweep generators microwave amplifiers · electrometers · switching time meters · signal generators.

E-H RESEARCH LABORATORIES, INC.
163 ADELINE STREET · OAKLAND, CALIFORNIA 94607 · TEMPLEBAR 4-3030 · TWX-415-891-9651
IN EUROPE: E-H Research Laboratories, AG; P. O. Box 293, 6301 Zug, Switzerland