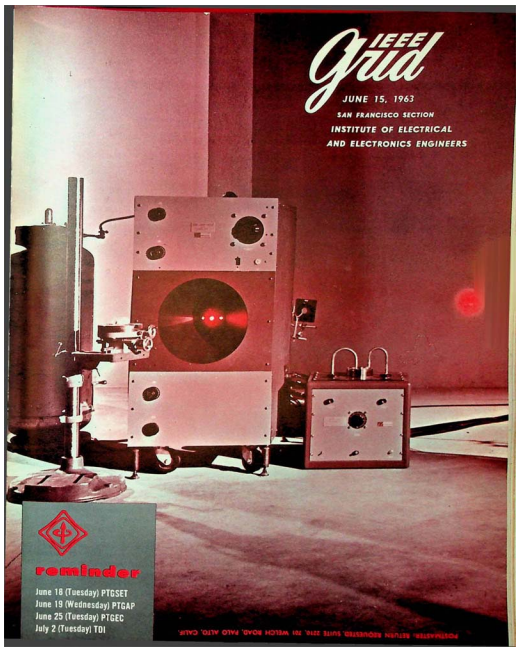
EDITOR'S PROFILE of this issue

from a historical perspective …

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



June, 1963 (mid-month):

Cover: This laser amplifier/oscillator is designed for high energy coherent light research. It has an optical-pumping cavity, energy-storage capacitor bank, trigger generator and liquid nitrogen cooling. More on pages 8 and 10.

Page 6: A listing shows the 30 technical parts of IEEE, and the local membership in each. Electronic Computers is largest (579), followed by ED (555) MTT (527), Circuit Theory (490), Space Electronics (357), Engineering Management (299), and Antennas and Propagation (267). 19 out of the 30 have local chapters, with one more (Vehicular Communications) coming soon. These IEEE groups cost between $2 and $6 to join.

Page 6: Doug Perham points out that the first ship-to-shore radio signals on the West Coast were in 1898, from a troop ship to the station at the Cliff House. It wasn't until 1901 that the Marconi Company opened its station in Hawaii. A photo shows radio pioneer and Stanford grad Cyril Elwell, founder of our first electronics company, who linked Chicago, Seattle, SF and Honolulu with a radio network. I have an undated receipt from around 1976 from the Perham Foundation acknowledging my $10 donation and my status as a contributing member; I joined after attending an IEEE event at their new location in Foothill College's planetarium.

Page 20: Stanford professor and Nobel prize winner Arthur Schawlow finally joins the IEEE.

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

JUNE 15, 1963

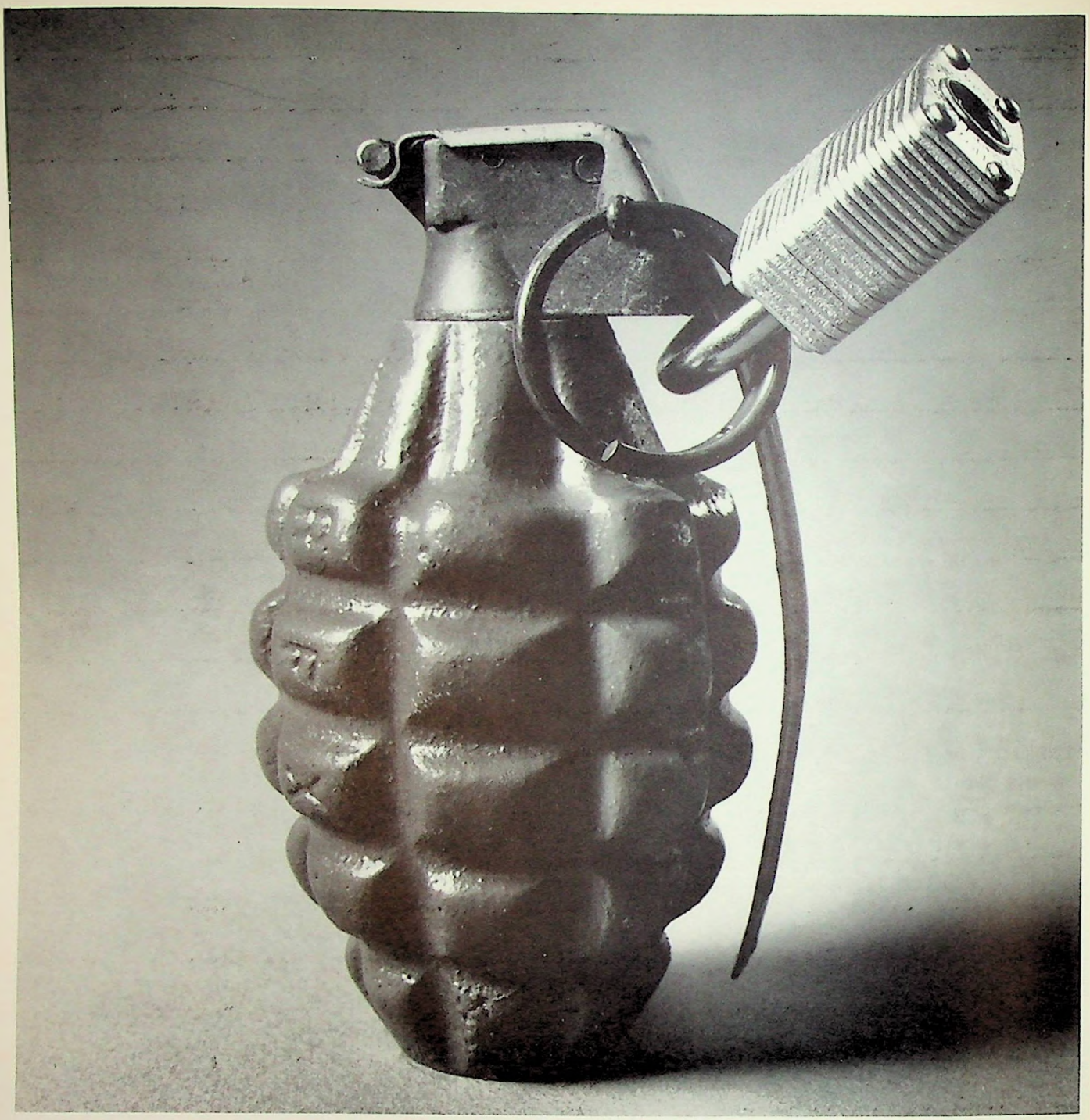
SAN FRANCISCO SECTION

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS

reminder

June 18 (Tuesday) PTGSET
June 19 (Wednesday) PTGAP
June 25 (Tuesday) PTGEC
July 2 (Tuesday) TDI

POSTMASTER: RETURN REQUESTED, SUITE 2210, 701 WELCH ROAD, PALO ALTO, CALIF.



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But — please — to make your advice of greatest value — let us hear from you, if at all possible, *within the coming week.* Please address your comments to Mr. W. Carlson, General Instrument Corporation, 65 Gouverneur St., Newark 4, New Jersey.

Thank you!

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SEMICONDUCTOR PRODUCTS GROUP
65 Gouverneur St., Newark 4, New Jersey

IEEE Grid

volume 9, number 20

JUNE 15, 1963

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contents

cover

Marking the recent entry of Radiation at Stanford into the laser field, the amplifier/oscillator on the cover is the hottest of its type in the world today and is designed for high energy coherent light research applications. The model 3220 is a complete operating system consisting of an optical-pumping cavity, a charging supply and control unit, an energy storage capacitor bank, and a trigger generator and liquid nitrogen cooling system. For more on lasers see the spring series reviews on pages 8 and 10.

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MEETING CALENDAR

all those interested, members or nonmembers, are welcome

TECHNICAL DIVISIONS

Industrial

6:00 P.M. • Tuesday, July 2

(Social "get together" with electrical maintenance engineers)
Dinner: 6:30 P.M., Concord Inn, Concord
7:00 P.M., introduction of Howard Grotts, electrical engineer, Tidewater Oil, and Moon Yuen, electrical project engineer, Bechtel Corporation
7:30 P.M., group will immediately leave for guided tour of new $20,000,000 iso-cracking installation at Tidewater Plant installed by Bechtel
Following plant tour there will be a meeting at the Tidewater Recreational Facility building for review of electrical design features of this computer-controlled installation
Reservations: Art Wells, JU 6-4074 or YO 8-1222, or Howard Grotts, AC 8-1220 (Avon)

PROFESSIONAL TECHNICAL GROUPS

Antennas and Propagation

8:00 P.M. • Wednesday, June 19

"Inflatable Mechanisms for Space Antennas"
Speaker: Glen Fisher, supervisor of microwave application dept., Lockheed Missiles and Space Company, Sunnyvale
Place: Stanford Research Institute, 333 Ravenswood Ave., Bldg. 1, Conference Room B, Menlo Park
Meet-the-Speaker Dinner: 6:00 P.M., L'Omelette Restaurant, 4170 El Camino Real, Palo Alto
Reservations: None required

Electronic Computers

8:00 P.M. • Tuesday, June 25

"Synthetic Speech"
Speaker: Herman D. Maxey, research staff member, IBM Research Laboratory
Place: IBM Research Lab., research cafetorium, Monterey & Cottle Rds., San Jose
Dinner: 6:00 P.M., Hyatt House, Coffee Shop, First St. & Bayshore Fwy., San Jose
Reservations: None required

Space Electronics and Telemetry

8:00 P.M. • Tuesday, June 18

"Parametric Amplifiers".
Speaker: Dr. George Matthaei, Stanford Research Institute, Menlo Park
Place: Lockheed Auditorium, Bldg. 202, 3251 Hanover St., Palo Alto
Dinner: 6:15 P.M., El Camino Bowl, 2625 El Camino Real, Mountain View
Reservations: Tom Linders, RE 9-4321, Ext. 28394 or 28453, by 1:00 P.M., June 18

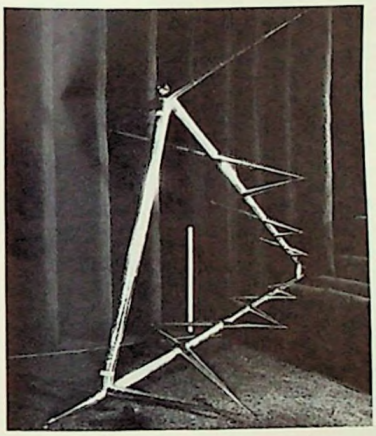
meeting ahead

LARGE ANTENNAS/SMALL SPACE

Glen E. Fisher, supervisor of the microwave application dept., Lockheed Missiles & Space Co., Sunnyvale, will discuss inflatable mechanisms for space antennas at the June 19 meeting of PTGAP.

Large antennas are often needed in space programs, yet they must be confined to small spaces during the launch phase. Since gravity imposes no structural limitations once in space, a variety of practical antennas can be constructed by inflating thin metal balloons. The technique has progressed far beyond the talking stage and can be documented by hardware experience. Included in Mr. Fisher's demonstration will be a motion picture film presentation.

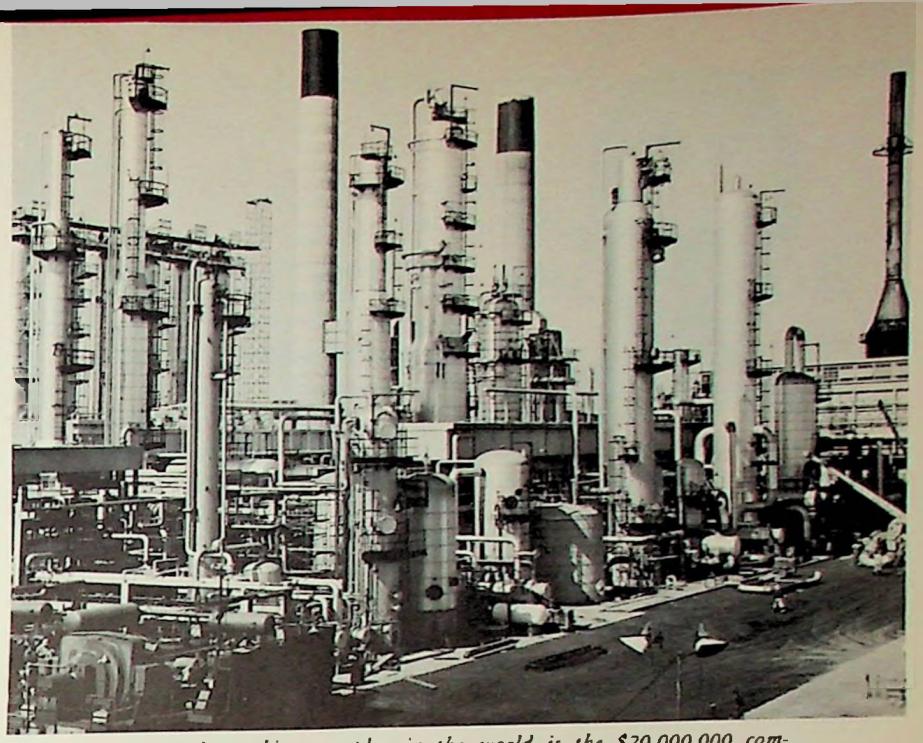
The speaker received the B.S. in mechanical engineering from the University of Illinois. After graduation he joined Collins Radio Co., Cedar Rapids, Iowa, moving to Dalmo Victor Co., Belmont, in 1951 as senior mechanical engineer. Joining Lockheed in 1959, he has been a technical consultant in mechanical design supporting the research group in such projects as the unfurlable antenna and a radio astronomy antenna.



Typical unfurlable antenna is fabricated of Mylar laminate .0015 inch thick.

In addition to mechanical design and microwave applications, his interests are electromagnetics, electronics, and research and development. He holds or has applied for several patents.

The meeting will wind up a busy program year for PTGAP which was the prime sponsor of the highly successful spring joint laser series, the last two meetings of which are reviewed in this issue.



Largest isocracking complex in the world is the $20,000,000 computer-controlled complex just completed by Tidewater Oil Co. at Avon

meeting ahead

INDUSTRIAL TOUR

The largest isocracking complex in the world, just completed at Tidewater Oil Company's Avon refinery near Martinez, will be covered by speakers and a tour during the July 2 meeting of the Industrial Division.

Speakers will be Howard J. Grotts, senior electrical engineer, Tidewater, and Moon H. Yuen, electrical project engineer, Bechtel Corp., the latter organization having engineered and built the $20,000,000 plant.

Howard J. Grotts

The computer-controlled isocracker will convert low-value middle distillates into high-quality gasolines, diesel fuel, jet fuel, and other products. By adding hydrogen to the feed stock charged to the unit for upgrading, the isocracker can maintain the refinery's current output with a smaller amount of crude oil input. The complex uses a process licensed by California Research Corp.

Mr. Grotts received the B.S. in electrical engineering from the University of California and is a registered professional engineer in electrical engineering, State of California. During the past 17 years he has coordinated the electrical design with prime contractors on several process units, including the 42,000 bbl. per day fluid coker now in operation at the refinery. For the past two years he has coordinated, with Bechtel Corp., the design of the new unit.

Moon H. Yuen

Mr. Yuen is a graduate of Heald's Engineering College. A senior electrical engineer since 1957, he has been with the refinery division of Bechtel Corp. since his graduation in 1948. He is a registered professional engineer, State of California, and a member of IEEE and CPES. He co-authored an AIEE transaction paper in 1959 with Mr. C. Phillips of the General Electric Co.

H. D. Maxey

meeting ahead

SYNTHETIC SPEECH

Recent developments in synthetic speech will be reviewed by Herman D. Maxey, research staff member, San Jose research laboratory of IBM, at the June 25 meeting of PTGEC.

The speaker is engaged in speech synthesis work in the communication science dept. of the laboratory. His major responsibilities have been in speech analysis for storage and synthesis. He has been active in biphon analysis and design of equipment for speech generation.

Mr. Maxey joined IBM Corp. in 1957 and worked on the electronics of digital magnetic recording equipment. He has several publications in the field of magnetic recording and speech synthesis.

He received his B.S. in electrical engineering from Texas Technological College in 1957. He is a member of IEEE, Eta Kappa Nu and Tau Beta Pi.

ptg notes

PTG FACTS & FIGURES

According to figures recently received from national headquarters, these are the current memberships within the section of the professional technical groups indicated:

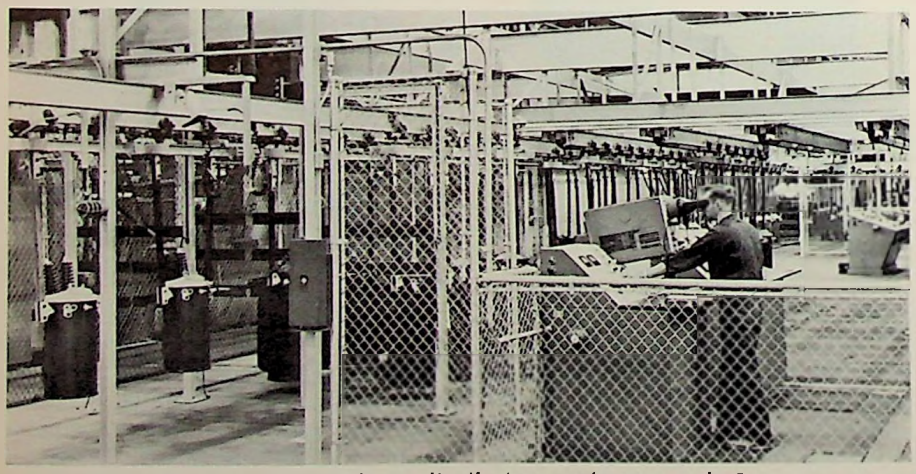
Audio, 234
Broadcasting, 66
Antennas and Propagation, 267
Circuit Theory, 490
Nuclear Science, 102
Vehicular Communications, 70
Reliability, 108
Broadcast and TV Receivers, 68
Instrumentation, 236
Space Electronics, Telemetry, 357
Aerospace and Nav. Elect'ics, 125
Information Theory, 234
Industrial Electronics, 72
Engineering Management, 299
Electron Devices, 555
Electronic Computers, 579
Microwave Theory, Techniques, 527
Bio-Medical Electronics, 156
Communications Systems, 264
Ultrasonics Engineering, 38
Component Parts, 73
Product Engineering, Production, 83
Automatic Control, 255
Military Electronics, 248
Education, 53
Engineering Writing, Speech, 88
Radio Frequency Interference, 58
Human Factors in Electronics, 30
Geoscience Electronics, 17
Aerospace, not yet announced.

Only those PTG's for which reporters are listed on page 4 are now active within the San Francisco Section, a total of 19 out of 30. New local chapters of PTG's can be activated through submitting a petition containing the signatures of 12 members of IEEE through the section office. Formation of a chapter on vehicular communications (PTGVC) is expected soon.

Formation of PTG's on power and industry with a potential membership of approximately 15,000 each is being discussed on the headquarters level. Until these are formed, every effort will be made through the section and the **Grid** to maintain the local strength and activity of these large divisions. A meeting is planned soon to advise such divisions as those on communications and instrumentation and controls who have expressed an interest in combining local forces with PTGCS and PTGI respectively.

All PTG's issue specialized publications out of their national headquarters in New York, in addition to newsletters on related activities. IEEE members may join any PTG of their choice for annual dues ranging from $2.00 to $6.00.

Application forms, recently mailed to all AIEE/IEEE members with the billing for their dues, are also available from the section office, the membership committee, and at PTG meetings.



Surge test station for pole top distribution transformers at the Sunnyvale division of Westinghouse Electric Corp. will highlight WESCON technical tour No. 3 for the special interest of electrical engineers on August 20. Surveyed will be large compressors, wind tunnel throats, solar telescopes, high volume production lines for distribution transformers and power transformers, and R&D work for Polaris missile launchers

historical notes

FIRST RECEPTION—1898

The first wireless reception in the continental United States was in 1898, according to Douglas H. Perham, Bay Area radio pioneer. The signals were copied at a receiving station installed in the Cliff House of San Francisco from the troop transport U.S.S. Thomas on her return from the Philippines. Bernard Linden, in his "History of Radio Communication on the Pacific Coast," mentions that it was not until 1901 that the Marconi Company of England erected wireless stations in the Hawaiian Islands for inter-island commercial traffic. These are believed to be the first commercial stations located on western United

Cyril Frank Elwell, late electronics pioneer who established an early radio network linking Chicago, Seattle, San Francisco, and Honolulu. Photo courtesy of Watt's Current.

States territory. The first stations to be established on the West Coast were located at San Pedro, California, and Avalon, Catalina, in 1901. Their primary purpose was to furnish news to a paper printed on Catalina Island called the "Wireless."

Such is the record of radio's early history on the Pacific Coast. These and many other accounts of early events are to be found in the exhibits and archives of the New Almaden museum. For the past several weeks work has been going forward on the inventory and cataloging of the Perham Foundation electronic collection. Members of the historical committee in cooperation with the Santa Clara County Office of Education and support received through a National Defense Education Act grant have completed an itemized listing of the entire collection. As previously reported, a photographic record is being made of each major item in the collection. In addition, documentary tapes are to be made on which Douglas Perham will record the sources, known users, and applications for each item.

With the photographic catalog and taped documentary the preparation of film strip and written materials will be facilitated. In this way the collection will be readily available to schools, youth and civic organizations interested in the history of radio throughout the Pacific Coast area.

Future plans of the foundation include the relocation of the exhibits, a staff to exhibit the collection and prepare displays and classroom materials, and the final approval by the Treasury Department of the foundation's non-profit tax-deductible status. Action

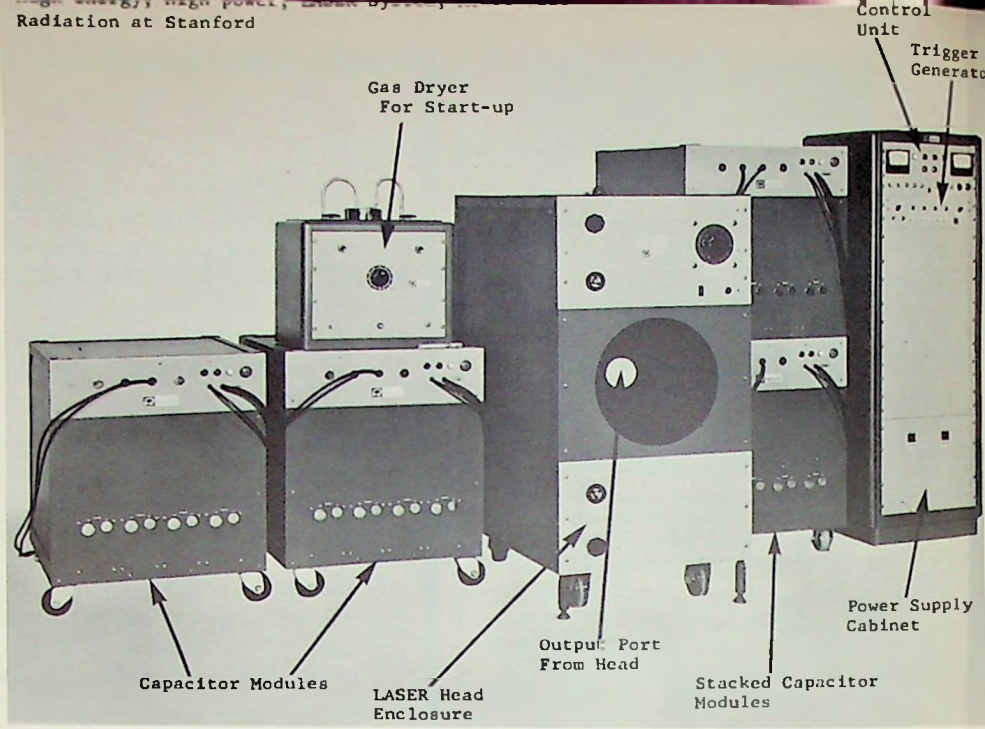
MORE SIEGMAN ON LASERS

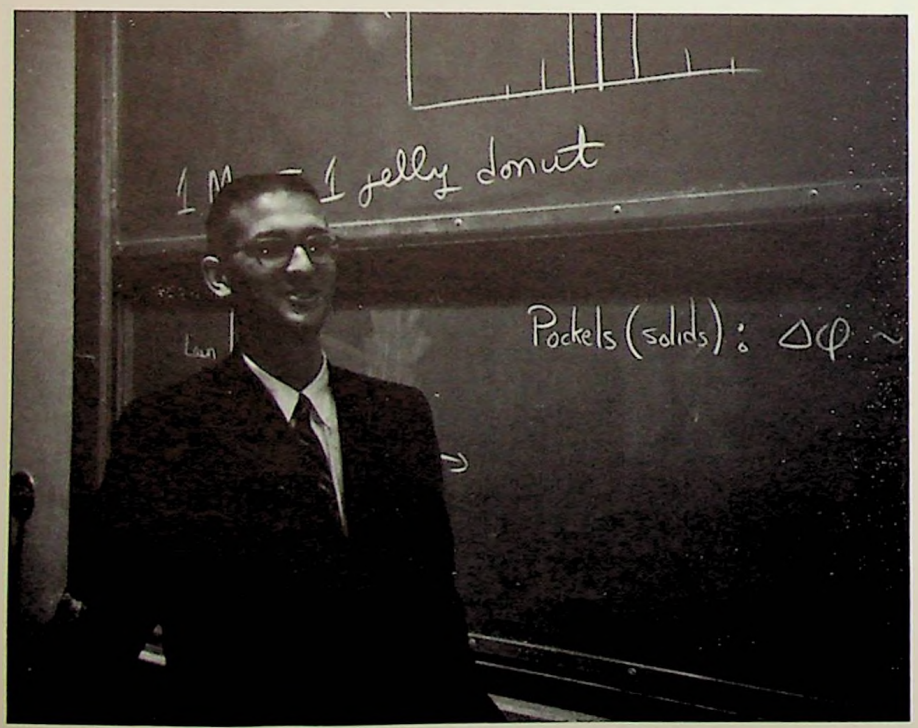
The third of the series of four lectures on laser theory, techniques, and applications was held on March 27, 1963, at Stanford University. Professor Anthony E. Siegman discussed primarily the techniques associated with the operation of lasers. The problems and techniques under discussion were mode selection, Q switching, laser amplifiers, modulation, demodulation, and optical waveguides.

The problem of the existence of several spatial modes at the same time reduces the purity of the output signal. The existence of the spatial modes is due both to the existence of imperfections in the ruby of the solid-state laser and to the large diameter of the laser material in terms of wavelengths. A method of holding the laser in one spatial mode is the use of a converging lens and pinhole system inserted between the laser material and the mirror. Since different spatial modes are focused to slightly different positions, the pinhole may be adjusted until only one mode is present. A second problem having to do with mode selection results from the large number of wavelengths between the mirrors of the cavity. The laser has the possibility of oscillating at several frequencies at the same time. One method of correcting this problem is to introduce an extra partially reflecting mirror between the laser material and the end mirror. This has the effect of introducing a new set of frequencies, and the net result is a frequency cancellation so that the laser oscillates only in one mode.

The output of a laser is usually a series of more or less irregularly spaced bursts of power during the pump time. It would be more useful to have either one high-amplitude pulse or a series of equally spaced lower-amplitude pulses. This may be accomplished in the first case by mounting one end mirror on a rotating drum so that the mirrors are aligned only once for each rotation of the drum. Thus the drum can be synchronized with the pump so that there is almost a complete population inversion before the mirrors become aligned and the output is single pulse of very high amplitude. To obtain a series of pulses, a liquid medium is inserted between the ruby and one end mirror, and acoustical waves are generated in the liquid by an appropriate transducer at the desired pulse rate. The optical output is then a train of pulses at a repetition rate determined by the acoustical modulation.

When used as an amplifier, the gain of the laser is rather low, so that any practical amplifier will probably use at least two stages. To insure that the system will not oscillate, an isolator should be included between stages, and the ends of the ruby will





Dr. Anthony E. Siegman, an expert on the techniques of laser operations

MORE HISTORY

has been taken to comply with the Treasury Department's recommendation relative to the foundation's application for tax-free status, and indications are that this will be achieved within the next few months. At such time as the foundation achieves this status it is planned to conduct a sustaining membership drive to enlist the support of all who are interested in helping to preserve and make available this part of the area's history.

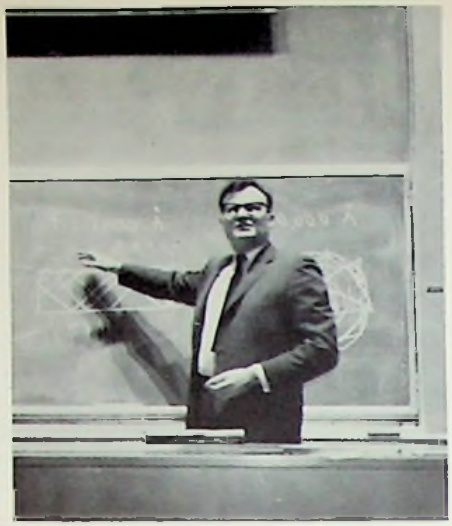
EARL G. GODDARD

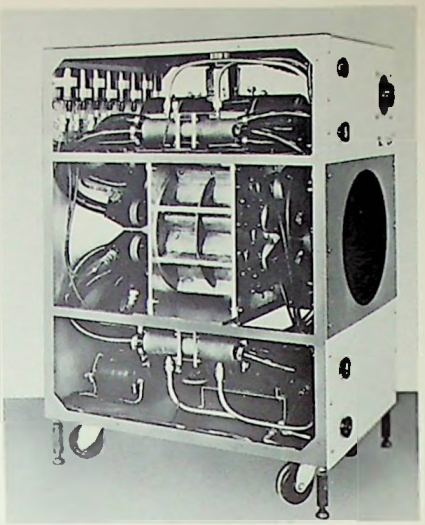
be ground at the Brewster angle for low internal reflection. The isolator could be a material which exhibits Faraday rotation when placed in a magnetic field.

The modulation of light at microwave frequencies has been accomplished by the use of a crystal whose index of refraction varies both with crystal orientation and with applied electric field. In this system a polarizer is used on either end of the crystal; thus the light enters the crystal with a polarization determined by the first polarizer. Then the amount of light that leaves the second polarizer will be determined by the change in polarization caused by the crystal which in turn depends upon the modulating electric field applied to the crystal. Liquids which exhibit the Kerr effect may also be used for the modulating material. The demodulation of light may be accomplished by allowing the light to strike a photoelectric surface. One method is to direct the modulated light beam onto the surface of a photoelectric cathode of a traveling-wave tube. Then the microwave modulation will appear as current modulation on the electron beam and will be amplified in the traveling-wave tube section. Since the photoelectric surface operates as a square law device, "optical heterodyning" may be accomplished through the use of a local oscillator, which in practice will also be a laser.

The last subject discussed was transmission lines suitable for optical frequencies. The optical waveguide in the example used was a system of converging lenses located inside of a metal tube. Propagation is confined to the lens system alone, while the tube provides a shield and a method for mounting the lenses. Typical sizes and spacings might be 6-inch-diameter lenses spaced about 1,000 feet apart.

M. FISHER





Dr. Malcolm Stitch, head of Hughes Aircraft Co. laser research program, detailing U.S., French, and British advances in the field. At the right is another view of the Radiation at Stanford unit shown on the cover and page 8.

meeting review

LAST IN SERIES

One hundred IEEE members attended the fourth and final lecture of the laser tutorial series on April 10. Dr. Malcolm Stitch, head of Hughes Aircraft Company laser research program, commenced his talk with an American's view of the Third Quantum-Electrodynamics Conference. Despite French past and present activity and recent U.K. upsurge of laser research, the conference was dominated by U.S. papers showing experimental and theoretical domination of the field. Soviet accomplishments were not apparent.

Dr. Stitch then discussed several aspects of laser operation, related to papers presented by his colleagues. A laser beam operated in a Michelson interferometer arranged in the shape of a circle or square is sensitive to rotation because of opposite phase distortion in the two legs. The number of wavelengths in each leg is on the order of one million, hence we have a sensitive angular rate sensor. Although the device is easy to digitize, it unfortunately is not sensitive to the sign of the rotation.

He then told the story of Woodbury's discovery of the Raman frequency spectra. In this case the nitrobenzene used in a pulsed laser Kerr cell was found to emit infrared Raman frequencies as a consequence of optical illumination. This introduces a host of new frequencies of laser output; 85 percent efficiency of conversion has been demonstrated. Harmonic generation (up to 20 percent efficiency has been demonstrated) and mixing also add to the frequency list currently available.

The speaker then discussed limitations to power output of the Q-switched laser, such as spontaneous decay by random avalanching, prelasering caused by undesired optical interfaces. One solution is deliberately to roughen the ruby or mount in water.

Finally, Dr. Stitch described a pulsed laser radar which can be carried by one man and aimed like a rifle.

This lecture concluded the well-attended four-part series.

ROLF B. DYCE

wescon news

MORE ON LASERS

Another round on lasers, this one dated to the opening of Wescon, has been organized by Dr. A. E. Siegman of Stanford University. Appearances have been scheduled for Dr. Glen Wade of Raytheon, Burlington, Mass., on "Laser Fundamentals"; Dr. George Decey of Sandia Corp., Albuquerque, N.M., assessing the effort going into laser development and the relative slow payoff; Dr. R. C. Fletcher of Bell Telephone Laboratories, Murray Hill, N.J., on "New Communications Applications of Lasers"; and Dr. Warren Macek of Sperry Gyroscope Co., Great Neck, N.Y., speaking on "Laser Rotation Rate Sensor."

COLEMAN ON THE GAP

On April 3 a joint meeting of the San Francisco Section and the PTGMTT heard a lecture by Professor Paul D. Coleman. The subject was "Spanning the Infrared-Microwave Gap." This part of the spectrum has many problems that must be solved before the gap can be closed.

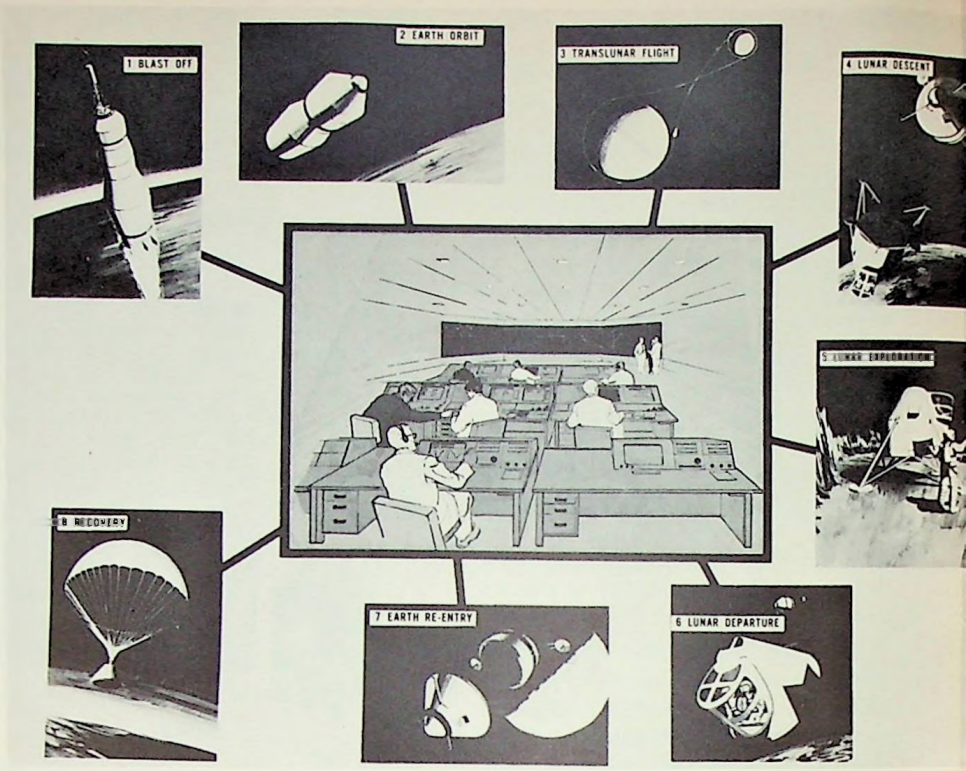
Perhaps the largest problem is one of generating these frequencies. Devices such as cavities are too small to be readily produced, and the necessary quantum energy from a photon is inconveniently small. At the other extreme, magnetic fields that can generate these frequencies are very large, and the density of a plasma must be high.

There are four possible approaches using classical electronics: vacuum tubes, Cerenkov radiation, acceleration radiation, and transition radiation. Most work has centered on tubes, and these have operated at frequencies as high at 0.7 mm. Quantum electronic devices can be broken into two classes, single quantum devices (such as the maser) and multiple quantum devices (employing harmonic generation and Raman effect). At present, masers have operated up to 88 gc.

Transmission systems employ either some form of waveguide or quasi-optical principles. Many kinds of guide have been tried, employing both metals and dielectrics. Some carry the field within the guide and others support a field outside the guide, but all are inconveniently small. The most practical system to date is the Goubau line, a quasi-optical line employing horn launchers and periodic focusing lenses.

Numerous detection schemes have been suggested. These include use of resistors, thermistors, superconductive bolometers, Golay cells, photodetectors, cyclotron resonance detectors, and crystal diodes. Here, too, much work remains to be done.

At this meeting recognition was given to section members who have received IEEE honors during the year. Included were Frederick Emmons Terman, recipient of the Founders Award; Chih-Tang Sah, Browder J. Thompson Memorial Prize Award; and Philip J. Rice, Jr., and William E. Evans, Jr., Vladimir K. Zworykin



Artist's conception of Mission Operations Control Room (MORC) and the role of Integrated Mission Control Center in proposed multi-manned space flights which the National Aeronautics and Space Administration has scheduled for mid-1964.

The manned space missions include the two-man earth orbit (Project Gemini) and the three-man lunar program (Project Apollo) which will be controlled by NASA's Manned Spacecraft Center.

MSC will direct operations from the Mission Operations Wing in the NASA complex near Houston, Texas.

The IMCC is being provided by Philco Corporation's team headed up by its Western Development Laboratories Division of Palo Alto, California. Included are three sister Philco Divisions: TechRep, Philco Scientific Laboratory, and Philco Communications and Electronics, all in or near Philadelphia, as well as the Ford Aeronutronic Division at Newport Beach, California.

meeting review

PLANETARY LIFE

"Detection of Planetary Life" was the title of the space instrumentation talk, April 24. The speaker, Dr. Elliott Levinthal, program director of the Stanford School of Medicine's instrumentation research laboratory, presented some contemporary thoughts on this age-old subject. The modern concept is a rather dynamic one. Dr. Levinthal's group is designing and building instruments that are expected to make the journey and help answer some of the basic exobiology questions. The immediate experimental programs are concentrated on the moon, Venus, and Mars because these bodies are within the range limitations of the next decade's spacecraft.

A conventional form of life on our lunar neighbor is doubtful because of the absence of atmosphere and water. These same conditions, however, have provided a convenient collection place for meteorites, and examination of such materials for extra-terrestrial fossils would be of great interest.

The Venus-Mariner experiments have confirmed that the surface temperature of our sister planet is in the neighborhood of 600°K. Even in this grossly undesirable environment for biota, localized variations that could permit sustained life should not be precluded; and the search will go on. This same thesis could be applied to portions of Jupiter, the asteroid belt, and the moon.

The red planet is the most likely

MORE PTGMTT

Award. Also honored were the new fellows from the section: Hewitt D. Crane, Von R. Eshleman, Robert L. Jepsen, Laurence A. Manning, John L. Moll, Albert J. Morris, Richard B. Nelson, Marshall C. Pease, Charles Susskind, John R. Woodyard, R. Stuart Mackay, and Paul D. Coleman.

R. J. PRICKETT

IEEE

June 16-21 — **Summer General Meeting.** Royal York Hotel, Toronto, Ont., Canada. IEEE. No exhibits. Program: E. C. Day, IEEE HQ.

June 17-18—**1963 Chicago Spring Conf. on Broadcast & TV Receivers.** O'Hare Inn, Chicago, Ill. PTGBTR, Chicago Section. Exhibits. Program: Norman Parker, Motorola, Inc., 9401 W. Grand Ave., Franklin Park, Ill. IEEE Transactions on Broadcast & TV Receivers.

June 19-21—**Joint Automatic Control Conf.** Univ. of Minnesota, Minneapolis, Minn. IEEE, ISA, ASME, AIChE. No exhibits. Program: O. L. Updike, Univ. of Virginia, Charlottesville, Va. IEEE Transactions.

June 20-21—**Ninth Annual Pulp & Paper Industry Conf.** Sheraton Hotel, Boston, Mass. IEEE. No exhibits. Program: T. A. Likos, Westinghouse Elec. Corp., 10 High St., Boston 10, Mass.

July 9-11 — **PTGAP Int'l. Symp.** Central Radio Prop. Lab., NBS, Boulder, Colo. PTGAP. No exhibits. Program: Herman V. Cottony, NBS Labs, Boulder, Colo. Digest free with reg.; extra copies $3.00 from Alvin Wilson, NBS, Boulder, Colo.

July 22-26—**Fifth Int'l. Conf. on Medical Electronics.** Univ. of Liége, Liége, Belgium. IFME. Program: Dr. F. Bostem, 23 Blvd. Frere Orban, Liége, Belgium. Proceedings.

(Continued on page 19)

candidate, and many of the inhabitants of terra firma have preceded the scientists with an a priori "mental image" of their Martian brothers. To validate or repudiate these aberrations, the United States is planning a fly-by in 1964, and an instrument-package surface-landing in 1966. With regard to the earlier flight, it was shown from aerial photographs of the earth that it is extremely difficult to draw conclusion of existing life solely from high-altitude visual observations. However, spectroscopy to determine the abundance and distribution of compounds and radiation can provide some indication of the presence of organic matter.

The unique elegance of the work done by Dr. Levinthal's group was emphatically depicted by the proposed instrumentation package to be landed on Mars in 1966. Within the difficult constraints of extremely low weight, complete sterilization to prevent biological contamination, a data link repertoire of only 10^6 bits, and a gross uncertainty of the entities under surveillance, they are proposing an automated laboratory to analyze Martian soil. The predominant experiments to be carried out by this laboratory will be fluorometric assays for hydrolytic enzymes. Martian matter will be introduced into numerous reaction chambers. The chambers will be activated with appropriate solvents, and the degree of fluorescence telemetered to earth. Resolution abilities in the order of 10^3-10^4 bacteria per gram are anticipated.

In addition to fluorometry, various other measurements such as optical transmission and absorption are included in the automatic laboratory. To satisfy the more optimistic Homo sapiens, an accelerometer (or even perhaps a microphone) will be included to indicate how the capsule might be treated by curious Martians.

IRWIN WUNDERMAN

Biesele

DeGroot

Allen

Cooper

grid swings

IT IS REPORTED:

R. L. Biesele, Jr., has been elected president and chief executive officer of General Capacitor Co., Palo Alto, and will also serve on the board of directors of the firm, which manufactures a line of high-voltage capacitors and pulse-forming networks for use in high-power search radars, linear accelerators, and pulsed laser applications. He was formerly manager of operations of the Palo Alto plant of the Clevite Corp. and previously manager of research.

Richard DeGroot has been added to the staff of Walter Associates as sales engineer for the territory of San Mateo County, San Francisco, and the East Bay. Charles A. Walter also announced that the firm had moved to larger offices at 671-L Oak Grove Ave., Menlo Park, and was recently appointed northern California representative for Laser Systems Center of Lear Siegler (formerly Trion Inst.)

Lockheed Missiles and Space Co., Sunnyvale, has formed a physical electronics group to expand its experimental programs in lasers, cesium plasmas, ferroelectricity, nonlinear interaction of electromagnetic waves with plasmas, and measurements of low energy electron atom cross sections. Making up the new group, part of the electronic sciences lab, are H. W. Bandel, Eamon Barrett, William Culshaw, L. H. Fisher, D. E. Golden, G. F. Herrmann, R. M. Hill, S. K. Ichiki, Jaan Kannelaud, S. J. Tetenbaum, and R. F. Whitmer, all formerly with General Telephone Labs, Palo Alto.

Alfred C. Allen recently joined the staff of Electromagnetic Technology Corp. as sales manager. He was formerly marketing manager for the electroceramics division of Automation Industries, Inc., previously being instrumental in promoting the marketing growth of G.P.I.'s Kearfott division solid-state laboratory.

Paul D. Cooper, Jr., has been elevated to the position of business manager of MELABS, formerly serving as manager of cost contracts administration of Ampex Corp. and senior accountant with Eitel-McCullough, Inc.

Members are invited to bring this feature, featuring personnel items of the profession and the electrical and electronics industry, industrial news, and related items, to the attention of their companies' public relations departments.

Kramer

Dehlendorf

Judd C. Kramer has been appointed manager of marketing operations for Philco WDL, Palo Alto, and will be responsible for marketing administration, proposals management, and sales promotion and presentations. Prior to joining Philco he served with Thompson Ramo Wooldridge, Inc., Warner Corp., Reeves Instrument Corp., and Western Electric Inc. in technical capacities.

Robert O. Dehlendorf II was recently elected a vice president of Microwave Electronics Corp., Palo Alto, and will have over-all responsibility for the firm's administration, coordinating, and implementing plans to meet the company's business objectives. He will also continue to serve as corporate treasurer.

daSilva

Dalzell

Timothy M. da Silva has been appointed senior engineer in the product reliability dept. of Signetics Corp., Sunnyvale, and will be responsible for activities of the reliability engineering section.

Thomas D. Dalzell has been appointed European sales manager of Precision Instrument Co., Palo Alto, and will make his headquarters at Reading, Berkshire, England. He was formerly general sales manager for Ampex Corp. in Europe and Africa and has held technical sales positions for Ampex Data Products in Canada and for Canadian General Electric Co.

Professor Samuel Silver, dept. of electrical engineering, University of California, has been awarded the honorary degree of Doctor of Science from Temple University in Philadelphia. He is director of the space sciences laboratory and was formerly director of the electronics research laboratory.

Dr. William Shepherd has joined Fairchild Semiconductor, a division of Fairchild Camera and Instrument Corp., as a member of the technical staff in research and development. He was formerly a research chemist with Plessey Co., Ltd., Caswell, Towcester, England.

Ronald J. Berlin has been appointed personnel manager at Huggins Laboratories, Inc., Sunnyvale, after personnel experience with General Electric Co., San Jose, and Ames Research Center, NASA, Moffett Field.

Roy T. Stromberg, northern California manager of the J. T. Hill Co., announces the move of the office from San Carlos to 4117 El Camino Way, Palo Alto (telephone 327-0211), "in recognition of the gradual southerly migration of the electronics business on the Peninsula." With headquarters in San Gabriel, the company covers the four-state area of California, Arizona, Nevada, and Hawaii.

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580 Spargur Drive,
Los Altos: 948-0355

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

sentatives with whom they deal. Rate, effective September 1, $1.50 per line per issue.

MORE SWINGS

Stuart R. Hennies has joined Applied Technology, Inc., as senior engineer and will be involved in the development of advanced electronic reconnaissance, active countermeasures, and microwave telemetry equipment. He was formerly with E-H Laboratories, Inc., Granger Associates, Varian Associates, Northrop Aircraft Co., and the U.S. Navy.

Dr. Leopoldo B. Valdes of Raytheon Company's Rheem Semiconductor operation, Mountain View, has been selected as the fifth member of the company's newly established super-professional level, with the title of consulting engineer. The new level permits specialists to advance their careers without need for accompanying administrative responsibilities. He is a senior member of IEEE and has taught several courses in transistor theory at the University of California and the University of Santa Clara.

Beall Electronics Sales Co. of Palo Alto has been acquired by Welco, Inc., southern California firm, and will function as the Belsco Division of Welco, with offices at 502 Waverley St., Palo Alto, under the direction of Ralph W. Beall, who founded Belsco in 1959.

Al Oliverio has been appointed to the position of sales manager of Neely Enterprises after ten years with the firm. The position of sales manager was previously held by Bob Brunner, who is now sales manager of the oscilloscope division of the Hewlett-Packard Co., Palo Alto.

MELABS has moved its manufacturing activities into a new $800,000 supplement to the company's engineering facility, more than doubling working space and representing a sharp contrast to the quarters in which it was founded in 1956—a Prohibition wine cellar on the property of its president, Lloyd A. Addleman.

Nearly 3,000 visitors toured **Eitel-McCullough** facilities during a recent press tour and open house conducted by Ross Snyder, advertising and public relations manager. Snyder, whose electronic background includes Todd-AO, Ampex, and broadcast engineering, was appointed to his present position in 1962 after joining the company in 1960 as assistant to the director of marketing.

George Compton has been named to the new position of head of product engineering, special products, at Fairchild Semiconductor's diode manufacturing plant in San Rafael.

Ampex has published a special issue of "Head Lines" devoted to instructional television and the vtr in education, which may be obtained from Dept. 24-1, Ampex Corp., 934 Charter St., Redwood City, Calif.

NASA has awarded predoctoral training grants of $2,400 a year, plus allowances up to $1,000, to 12 Stanford graduate students, including four in electrical engineering.

Don Hutchins, sales engineer, has been assigned area account responsibilities for O'Halloran Assoc., operating out of the Anaheim branch office. Dave Evans fills the staff engineer function vacated by Hutchins' appointment.

Jetronics Laboratories, San Carlos, has retained the Mon-Ell Co., Menlo Park, as its marketing consultant. James L. Goodrich Associates has been appointed sales representative for the Jetronics line of standard and custom cable assemblies and harnesses.

INDEX TO ADVERTISERS

MORE EVENTS

Aug. 4-9—**Int'l. Conf. and Exhibit on Aerospace Support.** Sheraton-Park Hotel, Washington, D.C. IEEE, ASME. Program: F. K. Nichols, Air Defense Div. Directorate of Operations, DCS/O HQ, USAF, Washington, D.C. Publications: R. S. Gardner, IEEE HQ.

Aug 26-29—**Pacific General Meeting.** Davenport Hotel, Spokane, Wash. IEEE. No exhibits. Program and publication: E. C. Day, IEEE HQ.

Aug 27-Sept. 4—**Second Cong., Int'l. Fed. of Automatic Control.** Basle, Switzerland. IFAC, AACC. Program: Gerald Weiss, EE Dept., Polytechnic Inst. of Brooklyn, 333 Jay St., Brooklyn 1, N.Y. Proceedings.

Sept. 8-11 — **Petroleum Industry Conf.** Chase-Park Plaza, St. Louis, Mo. IEEE. No exhibits. Program: R. W. Cavanaugh, Allis-Chalmers Mfg. Co., E. Ohio Bldg., Rm. 1112, 1717 E. 9th St., Cleveland, Ohio. Proceedings.

Sept. 9-11—**Seventh Nat'l. Convention on Military Electronics.** Shoreham Hotel, Washington, D.C. PTGMIL. Exhibits. Program: J. J. Slattery, Martin Co., Friendship Int'l. Airport, Maryland. Proceedings.

Sept. 10-14 — **Electrical Insulation Conf.** Conrad Hilton Hotel, Chicago, Ill. IEEE, NEMA. Exhibits. Program: J. Swiss, Westinghouse Elec. Corp. Res. Labs., Pittsburgh 35, Pa. Publication: NEMA, 155 E. 44th St., New York 17, N.Y.

Sept. 12-13—**Eleventh Annual Joint Engrg. Management Conf.** Biltmore Hotel, Los Angeles, Calif. IEEE, ASME, AIIE, ASCE, et al. No exhibits. Program: Hugh Estes, General Electric Co., 570 Lexington Ave., New York 22, N.Y. Publication: ASME, 345 E. 47th St., New York 17, N.Y.

Sept. 18-19—**Twelfth Annual Industrial Electronics Conf.** Michigan State Univ., East Lansing, Mich. IEEE, ISA. No exhibits. Program: L. J. Giacaletto, Michigan State Univ. IEEE Transactions on Industrial Electronics after conference.

Sept. 30-Oct. 1-2—**Canadian Electronics Conf.** Toronto, Ont., Canada. Exhibits: IEEE Canadian Elec. Conf. 1819 Yonge St., Toronto 7, Canada. Program: same.

Oct. 7-9—**Ninth Nat'l Communications Symp.** Utica, N.Y. Exhibits.

MEMBERSHIP

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Following are the names of members who have recently been transferred to a higher grade of membership as noted:

Senior Member

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Member

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H. J. Hatt	F. M. Rasmussen
H. S. Hewitt	W. G. Reid
Paul M. Honore	D. O. Stanley
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M. J. C. Hu	D. P. Strandberg
M. P. Hurley	J. M. Tresidder

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L. A. Keelin	G. E. Strandin
G. A. Logan	K. I. Taylor
C. W. McCloskey	M. F. Thomas

M. J. Treado

Following are the names of IEEE members who have recently entered our area, thereby becoming members of the San Francisco Section:

A. A. Adamson	F. A. Olson
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T. L. Humphrey	R. G. Winslow
K. E. Marks	E. L. Wood

G. F. Wunderlich

N. R. Barker	A. Lubarsky
M. N. Botu	P. H. P. Lum
Shu-Park Chan	W. L. May
H. T. Chua	P. H. Moravek
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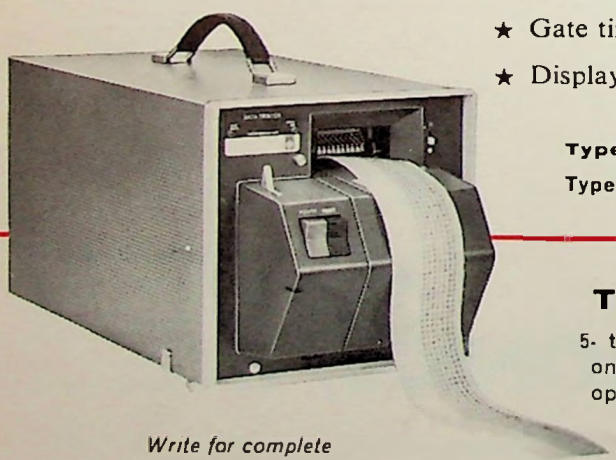

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