EDITOR'S PROFILE of this issue

from a historical perspective …

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

SEPTEMBER, 1960:

Cover: depicts a WESCON message using radio waves bouncing off the ECHO I satellite, from Bell Labs (Holmdel, NJ) to JPL (Goldstone, CA), to celebrate Lee de Forest's birthday (p. 20). Lee de Forest, inventor of the audion radio tube, oscillation, and amplification, photo on cover (at 87 years old).

p. 6: Bay Area had 17 chapter-like entities, with 100 professional-group meetings a year; today (2021) it has over 45 local groups.

p. 8: Prof. Joshua Lederberg of Stanford speaks on "Exo-biology: Life Beyond the Earth" for the Bio-Medical Electronics chapter; Gene Amdahl (IBM) speaks on "New Systems' Concepts in Control".

p. 9: Prof. George Pake speaks on "Paramagnetic Resonance"; he assembled a first-rate collection of research talent at Xerox-PARC; its auditorium is named for him. APS prize named for him.

p. 14: David Packard receives Western Electronic Medal of Achievement at WESCON, says "I didn't see one single electronic device [in Russia] which represented an advance over what we have in this country."

p. 22: Bernard (Barnie) Oliver, HP (and future IEEE president in 1965), told Charles (Bud) Eldon (p. 26) in 1955 that Bill (Hewlett), president of HP and of the IRE in 1955, wanted him to start a new IRE Group. After many mergers and name changes, the Product Engineering & Production Group became today's Electronics Packaging Society (EPS). Bud went on to become IEEE president in 1985.

p. 22: Listing of Officers: not only each volunteer's company, but home address and home phone number ("DAvenport 4-1501")

p. 36: University of California Berkeley Extension gives tech classes in Menlo Park, Mountain View and Redwood City, including one on **Creativity and Inventive Design.**

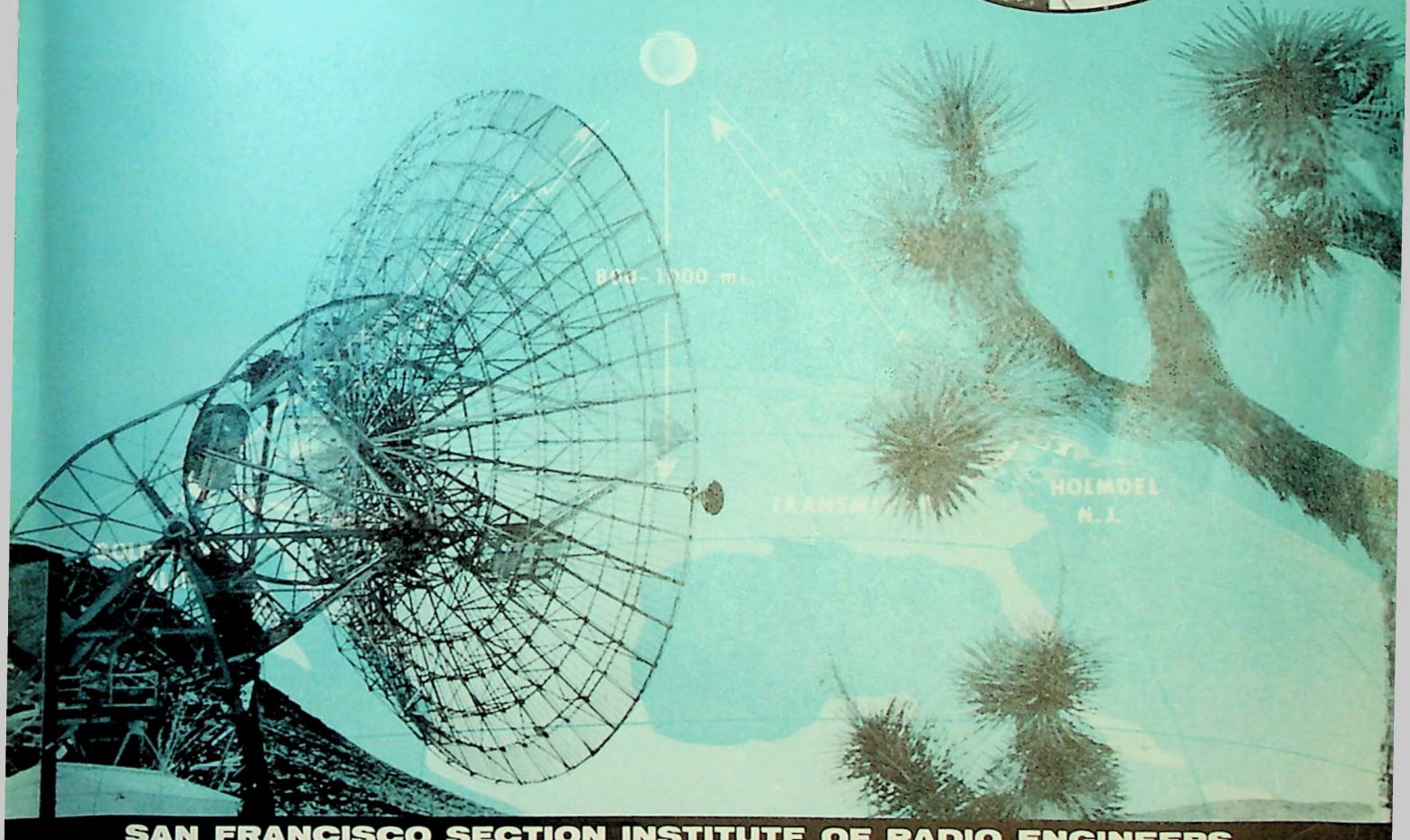
p. 38: Litton gets $4.6m contract for klystrons; new buildings for Eimac in San Carlos; HP votes a three-for-one stock split.

p. 40: William (Bill) Perry promoted at Sylvania EDL; later he founded ESL to develop digital signal intelligence; then became Secretary of Defense.

p. 44: 136 IRE members move to SF Bay Area (Silicon Valley) from other parts of USA; 48 engineers join IRE; 3 promoted to Senior Member.

Grid

September 1960



SAN FRANCISCO SECTION INSTITUTE OF RADIO ENGINEERS

WESCON REPORT

LOWEST NOISE* POWER KLYSTRONS FOR CW RADAR AND ILLUMINATORS

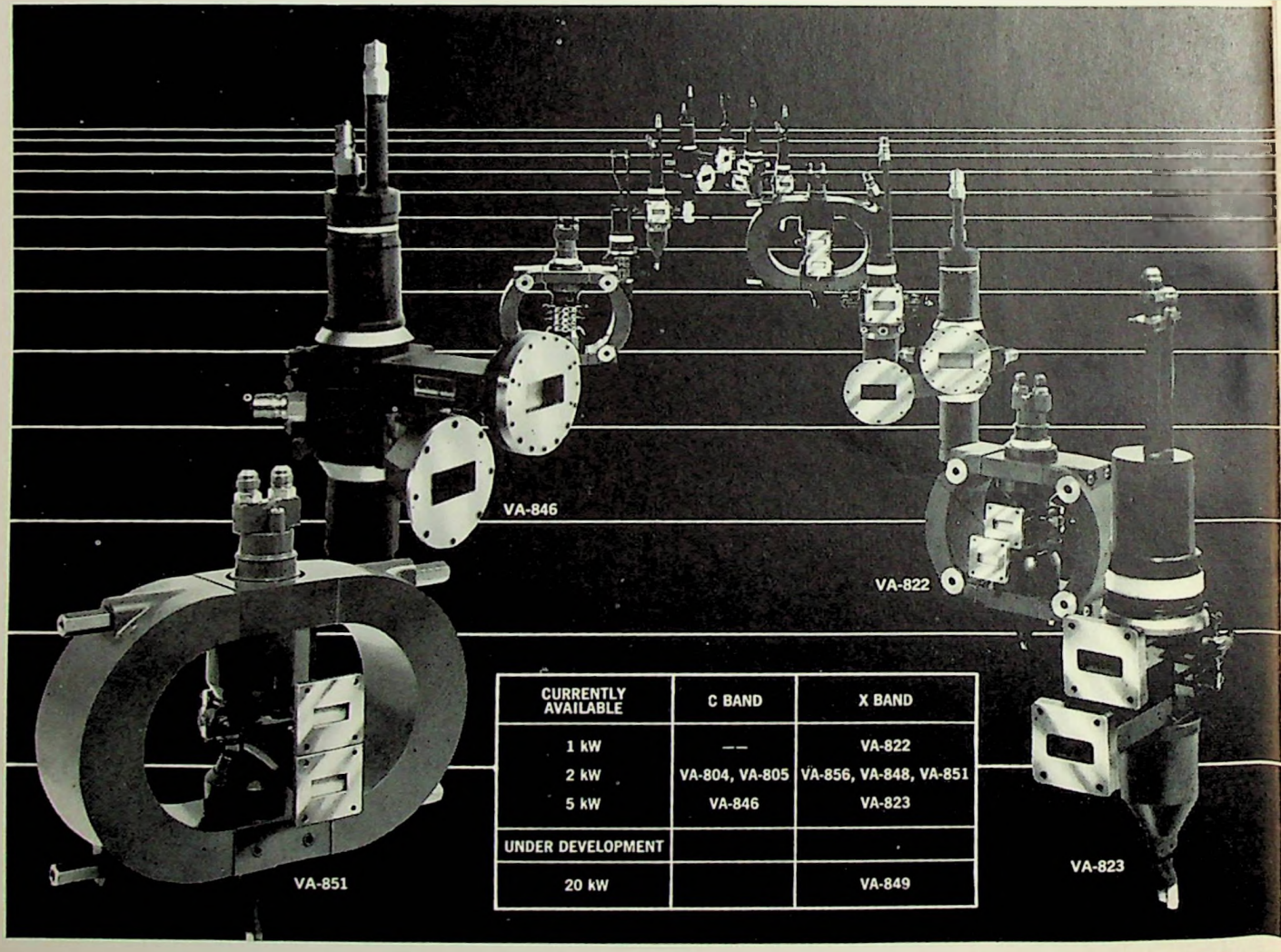
- 1 to 5 kilowatts CW power
- 50 db gain (most types)
- Efficiency up to 45%
- Noise 100 db below carrier*
- C and X band frequencies
- Focusing by electromagnet or permanent magnet

*AM and FM noise is more than 100 db below carrier in any 1 kc channel more than 1 kc removed from the carrier.

Varian is delivering many high-power low-noise CW klystrons for CW radar and illuminators; eight types are unclassified and are listed below. A 20 kilowatt X band type, soon to be added, will be another extension of the state-of-the-art by Varian.

Because of their extremely low noise close to the carrier, these types will enable you to design radar and illuminator systems of great sensitivity and precision. They also afford new design opportunities in radio astronomy and communications systems.

May we send full specifications or discuss development of special types for your requirements?



CURRENTLY AVAILABLE	C BAND	X BAND
1 kW	—	VA-822
2 kW	VA-804, VA-805	VA-856, VA-848, VA-851
5 kW	VA-846	VA-823
UNDER DEVELOPMENT		
20 kW		VA-849

Representatives thruout the world

VARIAN associates
PALO ALTO 16, CALIFORNIA

KLYSTRONS, WAVE TUBES, GAS SWITCHING TUBES, MAGNETRONS, HIGH VACUUM EQUIPMENT, LINEAR ACCELERATORS, MICROWAVE SYSTEM COMPONENTS, NMR & EPR SPECTROMETERS, MAGNETS, MAGNETOMETERS, STALOS, POWER AMPLIFIERS, GRAPHIC RECORDERS, RESEARCH AND DEVELOPMENT SERVICES

NOW! TRANSISTORIZED 100-600 AMPERES DC POWER SUPPLY

by PERKIN!

Response time adjustable to 20 milliseconds . . .

Excellent dynamic load regulation . . . low ripple

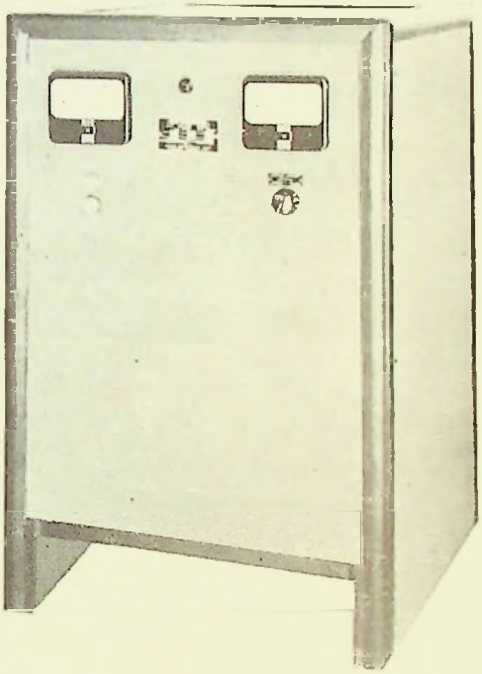
Proven in production use in the . . .

THOR . . . BOMARC . . . ATLAS . . .

JUPITER . . . POLARIS . . .

VANGUARD AND LA CROSSE

MISSILE PROGRAMS



SPECIFICATIONS

A.C. INPUT: 208/230/460 volt ±10%, 3 phase, 60 cycle.

RIPPLE: Less than 1% RMS.

RESPONSE TIME: A special control internally mounted in the Power Supplies handles adjustment of response time. The "load on" response time is adjustable from 20 to 200 milliseconds, and the "load off" from 40 to 400 milliseconds. An important advantage of this adjustable response is when used with inductive loads, such as inverters; recovery can be adjusted to avoid interaction between inductive load and power supply.

RATINGS AVAILABLE:

Model Number	D.C. Output		Regulation		Dimensions W" x H" x D"	Weight Lbs.
	Volts	Amps	Static-Line or Load	Dynamic Load*		
MRST28-100	24-32	100	±0.1%	±6V	22"x36"x22"	430
MRST28-200	24-32	200	±0.1%	±6V	22"x36"x22"	550
MRST28-300	24-32	300	±0.1%	±6V	22"x46"x22"	700
MRST28-400	24-32	400	±0.1%	±6V	28"x58"x24"	1250
MRST28-500	24-32	500	±0.1%	±6V	26"x68½x32"	1650
MRST28-600	24-32	600	±0.1%	±6V	26"x68½x32"	1650
MRST2440-250	24-40†	250	±0.1%	±2V	26"x68½x32"	1650

* For Full Load Charge

† In 2 Ranges

TECHNICAL DESCRIPTION

These units use silicon power rectifiers for increased reliability and efficiency. Silicon rectifiers provide constant efficiency and exhibit no aging characteristics as is more common in other type rectifiers. Magnetic components utilize grain oriented silicon steel and Class B insulation for compact design and efficient operation. The power section consists of a 3 phase magnetic amplifier with extremely high gain. Preamplifier is fully transistorized and utilizes silicon zener diodes as a reference element.

ADDITIONAL FEATURES

Output of units can be shorted without damage to the silicon rectifiers

Units can withstand 400% overload for periods up to 1 second without damage to Power Supply components.

Remote sensing
low output impedance

Militarized versions of above units are also available.

For additional data contact factory or sales offices below:

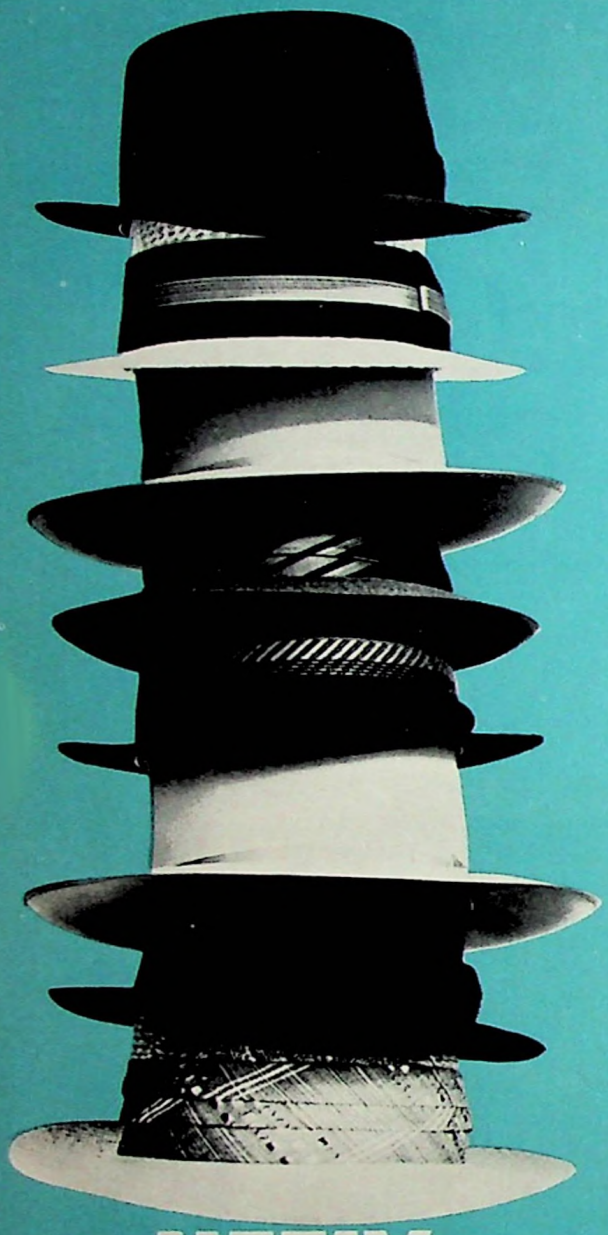
Albuquerque, N.M. AMherst 8-1724
Angola, Ind. 217 & 8101-R
Atlanta, Ga. BLackburn 5-6660
Chicago, Ill. JUniper 8-0905
Cleveland, Ohio REdwood 2-7444
Dallas, Tex. FLeetwood 7-7080
Dayton, Ohio CHapel 4-5551
Denver, Colo. SUnset 1-7375
Detroit, Mich. HOward 8-2461
Indianapolis, Ind. STate 7-0009
Kansas City, Mo. HEdrick 2-2528
Los Angeles, Calif. HOllywood 9-7294
Minneapolis, Minn. Midway 6-2621
New York, N.Y. DIgby 4-2997
Orlando, Fla. CHerry 1-2128
Philadelphia, Pa. WAlnut 7-1820
Phoenix, Ariz. WHitney 6-2111
St. Louis, Mo. PArkview 1-6403
San Diego, Calif. ATwater 3-2081
San Francisco, Calif. EMerson 9-3354
Seattle, Wash. PArkway 3-9000
Syracuse, N.Y. GIbson 6-0220
Washington, D.C. JUniper 5-7550
Agincourt, Canada AXminster 3-7011

PERKIN

PERKIN ENGINEERING CORPORATION

345 KANSAS ST. • EL SEGUNDO, CALIF. • ORegon 8-7215
or EAstgate 2-1375.

Represented by: Cerruti Associates, P.O. Box 509, Redwood City, California, Phone: EMerson 9-3354



your Neely man wears eight hats

When your Neely Field Engineer tackles a problem, he's speaking for eight of the country's leading electronic manufacturers. From the products they represent there is hardly an instance in which Neely cannot fill your needs quickly, dependably, and within budget. Neely men have had the best training, and never stop learning about applications for the products they sell. Eight offices strategically located throughout California, Arizona, Nevada and New Mexico are ready to serve you. Call now and see how adept your Neely Field Engineer is at wearing the right hat for your job.

NEELY *enterprises*

ELECTRONIC MANUFACTURERS' REPRESENTATIVES

BALDWIN-LIMA-HAMILTON, E. & I. Division, Waltham, Massachusetts
BOMAC LABORATORIES, INC., Beverly, Massachusetts
DYMEC, A Division of Hewlett-Packard Co., Palo Alto, California
HEWLETT-PACKARD COMPANY, Palo Alto, California
KIN TEL, San Diego, California
F. L. MOSELEY CO., Pasadena, California
SANBORN COMPANY, Waltham, Massachusetts
VARIAN ASSOCIATES, Palo Alto, California

NORTH HOLLYWOOD
3939 Lankershim Blvd.
Phone: TRiangle 7-0721
TWX: N-HOL 7133

SAN CARLOS
501 Laurel St.
Phone: LY 1-2626
TWX: San Carlos-Belmont CAL 94

SACRAMENTO
1317 Fifteenth St.
Phone: GI 2-8901
TWX: SC 124

SAN DIEGO
1055 Shafter St.
Phone: AC 3-8106
TWX: SD 6315

ONE OF NEELY'S EIGHT OFFICES IS LOCATED CONVENIENTLY NEAR YOU . . . FULLY STAFFED TO HELP FILL YOUR ELECTRONIC NEE

ALBUQUERQUE
6501 Lomas Blvd., N.E.
Phone: AL 5-5586
TWX: AQ 172

LAS CRUCES
114 S. Water St.
Phone: JA 6-2486
TWX: Las Cruces NM 5851

PHOENIX
641 E. Missouri Ave.
Phone: CR 4-5431
TWX: PX 483

TUCSON
232 S. Tucson Blvd.
Phone: MA 3-2564
TWX: TS 5981

volume 7

number 1

Grid

September 1960

Published monthly except July and August by the San Francisco Section, Institute of Radio Engineers

contents

From the Chair 6
Meeting Calendar 8, 9
Meeting Ahead 8
PGI 8
PGBME, PGED/PGMTT 9
WESCON Report 10
San Francisco Section
Organizational Chart 22
Directory of Officers 23
Meeting Schedule 27
Standards and Style 28
Election News 30
Meeting Review (PGI) 32
Grid Returns 36
Grid Swings 38
Events of Interest 42
Membership Status 44
Manufacturers Index 46
Index to Advertisers 46

PLEASE SEND FORM 3579 TO: EDITORIAL AND CIRCULATION OFFICE: P. O. BOX 966, SAN MATEO, CALIFORNIA

SUBSCRIPTION: $1.00 (SECTION MEMBERS); $2.00 (NON-MEMBERS) PER ANNUM.

OFFICE OF PUBLICATION: 394 PACIFIC AVE., FIFTH FLOOR, SAN FRANCISCO, CALIFORNIA.

SECOND-CLASS POSTAGE PAID AT SAN FRANCISCO, CALIF.

cover

Establishment of the new de Forest Award at WESCON (see report, page 10), brings together on the cover that patriarch of the electronic art, a schematic view of the path over which the WESCON message of 87th birthday greetings traveled, and a photograph of the JPL Goldstone receiving antenna, the Echo-bounce terminus for East-West transmissions. Other San Francisco Section area contributors to this pioneering communication experiment include the Rucker Co. of Oakland, who built hydraulic drives for the antennas; and Varian Associates, whose 800C klystron powers the return-link transmitter.

Donald A. Dunn

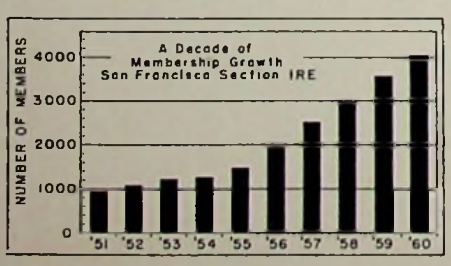
FROM THE CHAIR

Big & Busy

The San Francisco Section has matured during the last few years in a number of ways. We are now an organization of 4000 members with an operating budget of approximately $50,000. There are 17 active professional groups in our Section. We have a permanent office in Palo Alto with a full-time office manager. Our publication, the **Grid**, has been running for five years as a highly successful operation.

The WESCON show and convention which we co-sponsor with WEMA and the Los Angeles Section of the IRE is a well-established operation with its own full-time staff. Our Section organization has been set up in a way that should last for some years without further major overhauls and this organization is now spelled out in a set of by-laws adopted at our last annual meeting. An organization chart that illustrates our present setup is published in this issue. See page 22.

These major steps toward an efficient and effective Section organization have consumed the attention of our Section officers and committee members for some years. This year will be our first opportunity to operate within this new structure and to test it out without also trying to change it at the same time. In a sense, we have at last caught up with the organizational problems created by the rapid growth illustrated in the accompanying graph of Section membership over the last 10 years.



I believe we are now in a position to turn our attention, as a Section, to some new business. One problem, not just a Section problem but a national problem, is associated with our newfound bigness. The electronics industry and the IRE have grown together and, in many respects, are at the same point. In few other industries of the past have engineers played such a major part in the management and growth of an industry, and in few other industries does an engineering society stand in the same relation to the industry as does the IRE. We, therefore, are in an especially significant position with respect to the future of our industry.

As I view the electronics industry today, we are not at a leveling-off place where our problems are ones associated with a stabilized level of activity, but instead, we are in the middle of a period of continued growth. Our problem is how to plan for a continued expansion at a time when we have barely been able to keep pace with and digest the growth we have already experienced. The new expansion, even if not at the same rate as that of the past, will represent an even larger increase in the absolute number of people involved. Of course, these statements assum that we meet the challenges of size and don't turn the new business over to some new small group outside our industry and our Society.

A major problem associated with any expansion is that of keeping up adequate communications between the people involved. The IRE has, as one of its major purposes, the job of providing for this communication need in the electronics industry with publications and meetings.

The simple, first-order, approach to communication in a growing organization is to have more meetings and publications in proportion to the size of the organization. The effect of this approach is, for any one individual, that he eventually either spends all of his time communicating or he doesn't attend all the meetings that, in principle, it would be desirable for him to attend.

The second-order approach to this problem is to subdivide the organization into groups such that one individual needs to attend the meetings of only one group.

As far as the IRE is concerned, our professional group structure was evolved to meet this challenge when it first arose. It is the structure we have to work with. It has done an excellent job in the past, and, if properly handled, would seem to be well adapted to deal with our future expansion. It does seem, however, that it is time to review the situation, because it appears that a third-order approach may be called for.

If it eventually develops that the groups are too large or there are too many overlaps between groups, coordination is required. This coordination in the IRE is provided both at a section level and at the national level.

As an indication of the size of the problem, this coming year between August 1, 1960, and June 1, 1961, there will be 44 IRE and IRE jointly sponsored national meetings. This is an average of 4.4 national meetings per month or essentially one meeting per week throughout the year.

Our Section will have about 100 local professional group meetings during the same period. Many of us belong to other societies besides the IRE. This is a lot of meetings. It may not be too many, but in a few years, if the trend continues, it appears that we may have more meetings going on than is best for effective communication.

In view of these facts, I have appointed an ad hoc Section committee to study the problem of too many meetings and to recommend a Section policy on this subject. I believe it is time to begin on this problem. As chairman of this committee I have appointed John S. McCullough, a past chairman of our Section. I believe this subject of organizing for continued growth merits broad consideration, beyond that of a Section policy on the subject of meetings alone. I hope that we in this Section can make a contribution to our national policy in this area that affects both our society and our industry, and if you, as Section members, have thoughts on this subject, I will welcome hearing from you.

—Donald A. Dunn, Chairman,
San Francisco Section

Donald A. Dunn

John S. McCullough

ARNOLD:
WIDEST SELECTION OF MO-PERMALLOY POWDER CORES FOR YOUR REQUIREMENTS

For greater design flexibility, Arnold leads the way in offering you a full range of Molybdenum Permalloy powder cores . . . 25 different sizes, from the smallest to the largest on the market, from 0.260″ to 5.218″ OD.

In addition to pioneering the development of the cheerio-size cores, Arnold is the exclusive producer of the largest 125 Mu core commercially available. A huge 2000-ton press is required for its manufacture, and insures its uniform physical and magnetic properties. This big core is also available in three other standard permeabilities: 60, 26 and 14 Mu.

A new high-permeability core of 147 Mu is available in most sizes. These cores are specifically designed for low-frequency applications where the use of 125 Mu cores does not result in sufficient Q or inductance per turn. They are primarily intended for applications at frequencies below 2000 cps.

Most sizes of Arnold M-PP cores can be furnished with a controlled temperature coefficient of inductance in the range of 30 to 130° F. Many can be supplied temperature stabilized over the MIL-T-27 wide-range specification of −55 to +85° C . . . another special Arnold feature.

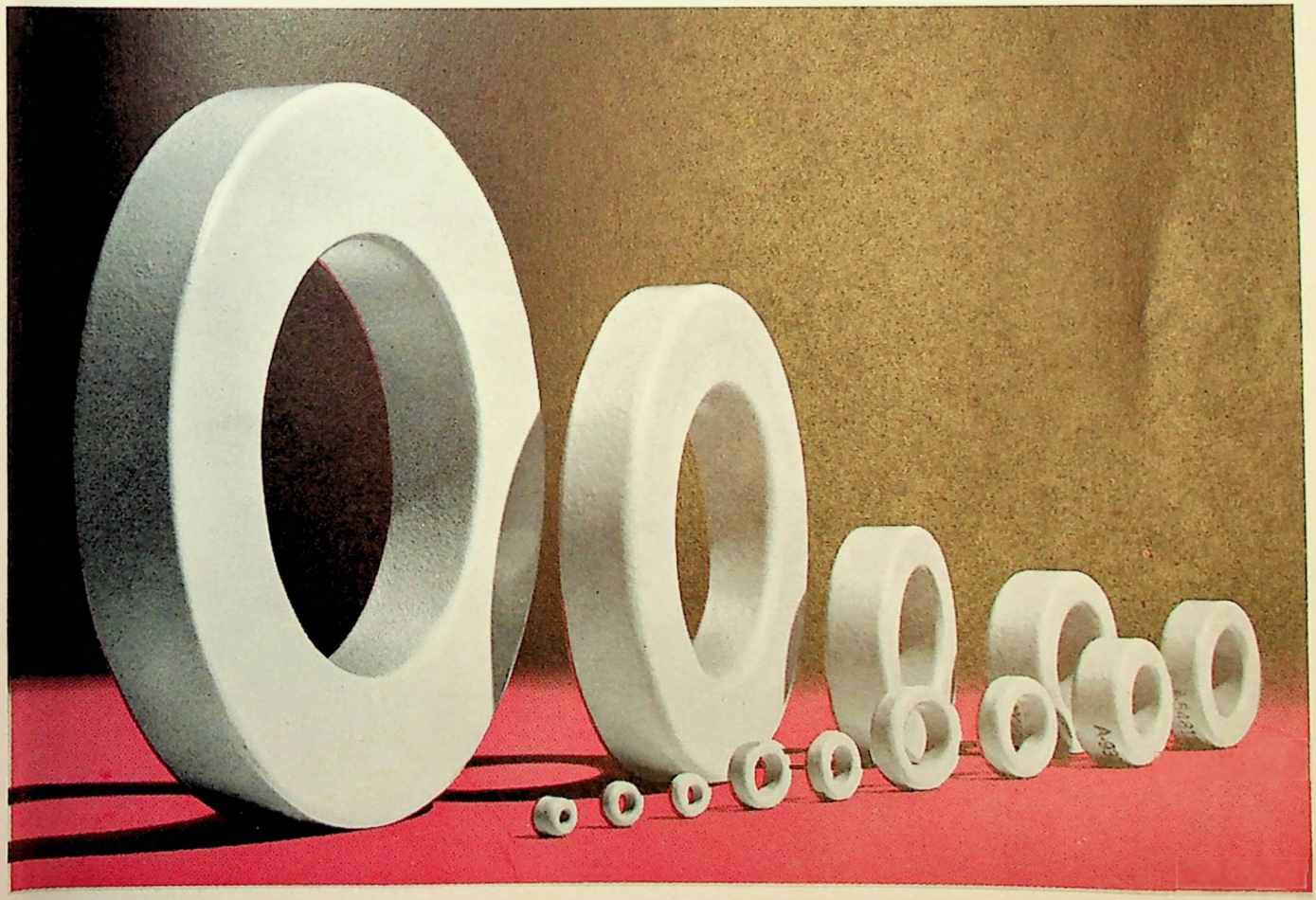
Graded cores are available upon special request. All popular sizes of Arnold M-PP cores are produced to a standard inductance tolerance of + or −8%, and many of these sizes are available for immediate delivery from strategically located warehouses.

Let us supply *your* requirements for Mo-Permalloy powder cores (*Bulletin PC-104C*). Other Arnold products include the most extensive line of tape-wound cores, iron powder cores, permanent magnets and special magnetic materials in the industry. • Contact *The Arnold Engineering Co., Main Office and Plant, Marengo, Illinois.*

ADDRESS DEPT. TG-9

ARNOLD
SPECIALISTS In MAGNETIC MATERIALS

LOS ANGELES, Office: 3450 Wilshire Blvd. DUnkirk 8-0361
SAN FRANCISCO, Office: 701 Welch Road, Palo Alto, Calif.
Telephone: DAvenport 6-9302



Grid Staff

EDITOR—**Frank Haylock**, 109 Hickory Lane, San Mateo. FIreside 5-1138

ASSOCIATE EDITOR—**Mary Haylock**

EDITORIAL ASSISTANTS—
Emma Scarlott, Marjorie Silva

HISTORIAN — **William R. Patton**, Sylvania Electric Products, Mountain View

Reporters

SAN FRANCISCO SECTION

Robert J. DeLorenzo, Eitel-McCullough, San Carlos

EAST BAY SUBSECTION

John Lavrischeff, Lawrence Radiation Laboratory

Hugh Gray (Photography) Hugh Gray Co., San Francisco

PROFESSIONAL GROUPS

ANTENNAS & PROPAGATION
Tetsu Morita, Stanford Research Institute

AUDIO
Stanley Oleson, Stanford Research Institute

BIO-MEDICAL ELECTRONICS
Harmon H. Woodworth, Stanford Research Institute

BROADCASTING
H. W. Granberry, General Electric Co.

CIRCUIT THEORY

COMMUNICATIONS SYSTEMS
Kenneth P. Patterson, Sperry Gyroscope Co., Sunnyvale

ELECTRON DEVICES
Richard Borghi, General Electric Microwave Laboratory

ELECTRONIC COMPUTERS
John Boysen, Lockheed MSD

ENGINEERING MANAGEMENT
Charles Meyer, Sylvania EDL
Leonard M. Jeffers, Sylvania EDL

ENGINEERING WRITING & SPEECH
Douglas Dupen, Associated Techdata, Inc., Palo Alto

INSTRUMENTATION
Les Burlingame, Lenkurt Electric Co.

MICROWAVE THEORY & TECHNIQUES
Frank Barnett, Hewlett-Packard Co.

MILITARY ELECTRONICS
Jerome J. Dover, Ampex Military Products Co.

PRODUCT ENGINEERING & PRODUCTION
W. Dale Fuller, Lockheed MSD
Olof Landeck, Electro Engineering Works

RELIABILITY AND QUALITY CONTROL
Rudy Cazanjian, Sylvania Electronic Systems, Mountain View

SPACE ELECTRONICS & TELEMETRY
Robert D. Baker, Granger Associates

INSTITUTIONS

D. J. Angelakos, Cory Hall, University of California, Berkeley 4

MEETING CALENDAR

EAST BAY SUBSECTION

8:00 P.M. • Monday, Sept. 26

Lecture and tour of LARC Computer (fastest computer in operation)
Speakers: James M. Moore, LARC project engineer, Lawrence Radiation Laboratory, Livermore; and Robert Dougthitt, LARC technical representative, Remington Rand
Place: Lawrence Radiation Laboratory Auditorium, end of East Avenue, Livermore
Dinner: "Meet-the-speaker," 6:15 P.M.; Livermore Lanes, Rincon and Pine Streets, Livermore
Reservations: Marge Bennett, HIlltop 7-1100, Ext. 84203; or Virginia Cherniak, THornwall 3-2740, Ext. 5434; before Sept. 16
Tour open to U. S. citizens only

PROFESSIONAL GROUPS

Audio

8:00 P.M. • Wednesday, Oct. 5

"What's New at Ampex?" New professional products line of Ampex Audio Division will be discussed and demonstrated by the engineers responsible for their development
Place: Conference Room B, Stanford Research Institute, Menlo Park

Bio-Medical Electronics

8:00 P.M. • Monday, Oct. 24

"Exobiology—Experimental Approaches to Life Beyond the Earth"
Speaker: Joshua Lederberg, professor of genetics at Stanford Medical School
Place: Stanford Medical School

Electronic Computers

8:00 P.M. • Tuesday, Sept. 27

"New Systems' Concepts in Control"
Speaker: G. M. Amdahl, member of research staff, IBM, San Jose
Place: Lockheed Auditorium, Bldg. 202, 3251 Hanover St., Palo Alto
Dinner: 6:00 P.M., Red Shack (formerly Hal's), 4085 El Camino Way, Palo Alto
Reservations: None required

Electron Devices

8:00 P.M. • Wednesday, Sept. 21

(Joint meeting with PGMTT, see page 9)

Electron Devices

8:00 P.M. • Thursday, Oct. 13

(Joint meeting with PGMTT)
"Tube Trends for the Space Age"
Speaker: Dr. Harold I. Ewen, president, Ewen-Knight Corp. and research associate, Harvard Observatory
Place: Room 320, Geology Bldg., Stanford University

Electron Devices

8:00 P.M. • Wednesday, Nov. 9

(Joint meeting with PGMTT)
"Getting Close to the Ultimate Noise Limit"
Speaker: A. E. Siegman, associate professor of electrical engineering, Stanford University
Place: Room 100, Physics Lecture Hall, Stanford University

MEETING AHEAD

Towards Standards

Activity of the new Professional Group Chapter on Instrumentation has resulted in a fast start for the new season with a meeting, "Whither Instrumentation?" having already taken place by closing time for this first issue of the **Grid's** 1960-61 season.

For its second meeting, the Chapter will gather jointly with Precision Measurements Society and address themselves to the topic of "Progress in Development of Electronic Standards." As detailed in the Calendar, page 9, this meeting will combine a round-table discussion between five speakers from local companies, a question-and-answer period, and a final resume by the moderator, Chuck Miller of Varian. Jerry Stoces, chief of the Alameda Naval Air Station Standards Laboratory, will outline the services his group can give.

MEETING CALENDAR

Instrumentation 8:00 P.M. • Tuesday, Oct. 4
(Joint meeting with Precision Measurements Society)
"Progress in Development of Electronic Standards"—round-table discussion and question period.
Modelator: Chuck Miller, Varian Associates
Speakers: Les Burlingame, Lenkurt; Vince Diehl, Ampex; Jim DuCharme, General Electric; Phil Hand, Hewlett-Packard; Jerry Stoces, Alameda Naval Air Station; Tom Whittemore, Philco
Place: Room 320, Geology Building, Stanford University
Dinner: 6:30 P.M., L'Omelette, 4170 El Camino Real, Palo Alto
(Social hour preceding dinner)

Instrumentation 8:00 P.M. • Tuesday, Nov. 1
"Missile Range Instrumentation"
Speaker: Alan Smolen, laboratory director, ITT Lab, Nutley, New Jersey
Place: Room 320, Geology Building, Stanford University

Microwave Theory & Techniques 8:00 P.M. • Wednesday, Sept. 21
(Joint meeting with PGED)
"Paramagnetic Resonance"
Speaker: Dr. George E. Pake, professor of physics, Stanford University
Place: Room 101, Physics Lecture Hall, Stanford University

Microwave Theory & Techniques 8:00 P.M. • Thursday, Oct. 13
(Joint meeting with PGED, see page 8)

Microwave Theory & Techniques 8:00 P.M. • Wednesday, Nov. 9
(Joint meeting with PGED, see page 8)

Product Engineering & Production 8:00 P.M. • Tuesday, Sept. 27
"Welded Electronics—a Survey"
Speaker: C. E. Harthun, senior reliability engineer, Lockheed Missiles and Space Division
Place: Lockheed Missiles and Space Division cafeteria, Sunnyvale

Space Electronics & Telemetry 8:15 P.M. • Tuesday, Sept. 20
"Physiological Parameters in Bio-Medical Instrumentation"
Speaker: Stan Hall, project engineer, bio-medical systems development, Lockheed
Place: Lockheed Auditorium, Palo Alto
Dinner: "Meet-the-Speaker," 6:45 P.M., Red Shack (formerly Hal's), 4085 El Camino Way, Palo Alto
Reservations: J. Miller, DAvenport 1-4175, Ext. 13, by noon September 19

CHRONOLOGICAL RECAP

September 20—Space Electronics & Telemetry
September 21—Microwave Theory & Techniques/Electron Devices
September 26—East Bay Subsection
September 27—Electronic Computers, Product Engineering & Production
October 4—Instrumentation
October 5—Audio
October 13—Electron Devices/Microwave Theory & Techniques
October 24—Bio-Medical Electronics
November 1—Instrumentation
November 9—Electron Devices/Microwave Theory & Techniques

MEETING AHEAD

The Close Look

Esoteric matters will come under consideration at the first fall meeting of PGBME in October. See about the details in the Calendar.

Sending a microscope to the moon and telemetering information from it back to the earth will be discussed as Dr. Joshua Lederberg of the Stanford Medical School discusses his research work under the topic, "Exobiology—Experimental Approaches to Life Beyond the Earth."

MEETING AHEAD

Tubes in Space

There is wide interest among IRE members at this time in the latest achievements in low-noise devices, in competing approaches to low-noise amplification, and in the nature and requirements of current applications for low-noise devices. The local Chapters of PGED and PGMTT have jointly planned a series of three lectures dealing with these topics, to begin in October.

First in the series will be a talk titled "Tube Trends for the Space Age."

The forecast of tube requirements, both low-noise receiving tubes and high-power transmitting tubes, will be presented on the basis of space-age requirements.

Application to special progress requirements will be discussed, together with a time schedule of the needs which are now apparent.

Dr. Harold I. Ewen is president and technical director of the Ewen-Knight Corp., which he founded in 1951. He is a graduate of Amherst College, and is now a member of the faculty. He graduated from Harvard in 1951.

Ewen did research and development on a special type low-dark current photocell used in astronomical research. He developed a technique for frequency-modulating a cyclotron with a single rotating stub tuner, and also developed a cyclotron particle-orbit calculator and constructed a magnetic channel to obtain the first external beam from the Harvard cyclotron.

His PhD thesis work was concerned with measurement of the first signal at a unique radio frequency from interstellar matter, obtained by detecting the hydrogen hyperfine line at 1420 mc.

Ewen has published several technical papers, and has several patents. He is a member of the national radio astronomical facility study group at AUI, a member of the advisory panel for the National Radio Astronomy Laboratory; a member of the astronomy committee of ONR, 1956-59; Fellow of the American Association for the Advancement of Science; Fellow of the American Academy of Arts and Sciences.

A second talk in the series is scheduled in November. See the Calendar, page 8, for topic and speaker.

Dr. Harold I. Ewen

Traffic jam in space, Time-magazine-inspired group of models, hovers over 1960-WESCON

WESCON REPORT

Information Interchange

To begin with, let's operate on the assumption that you did not venture into the Southland for this year's WESCON. Otherwise, there isn't much point in bringing the subject up. All right?

If you had, you would have found most of the events taking place in a new structure, somewhat familiar to video-oriented Democrats, and known to the local residents as the Los Angeles Memorial Sports Arena. What it memorializes, none of the generally knowledgeable informants on whom we normally depend for information was able to say.

This is a homey place bearing an exterior resemblance to a large external-anode air-cooled electron tube. Exhibits, to a total of 987 booths, covered the lower level, 200 by 300 feet; circumscribed the concourse level in a double rank; and filled the 140-by-410-ft tent or annex.

Had you been there and elected to traverse every aisle, you would have taken 14,555 steps plus or minus a small constant factor needed to rationalize the length of your stride with that of our investigator, who clocked his trek with the aid of a Veeder-Root counter. Your wife (if you have one) or other feminine companion (if you had one) would have had to take approximately 17,466 steps on this same basis.

If you are a literature collector, your steps would have been increased by several trips to the parking lot since the yield would have produced several loads. One investigator known to us collected a specimen of every piece of literature on display by Los Angeles concerns alone. This formed a pile 12 in. high by 8½ by 11 inches.

Sociologically, the 40,074 registrants at the Sports Arena moved back and forth in their individual ways between that point and their dwellings and the scenes of several outside activities along a waveguide-like device known as the Los Angeles Freeway. This is equipped with various types of matching devices suitable in various degrees of efficiency for obtaining outputs at remote points, the whole scheme under some form of control not immediately ascertainable.

Industrial Design Awards

One of the first events of the week was the presentation of awards of industrial design excellence to five outstanding electronic products and systems, and awards of merit honors to 22 other design entries in the annual WESCON competition. Two of the former category were from the Bay Area.

Ampex Data Products Company was honored for the FR-600 magnetic tape recorder with special acknowledgement to Frank T. Walsh, industrial design manager; F. Arden Farey, industrial designer; and John M. Wernli, chief project engineer. Eitel-McCullough was honored for the Eimac X762B power triode with acknowledgement to Raymond F. Rinaudo, project engineer; and Marraine E. Stangl, laboratory manager.

In the second category, Ampex Data Products Company turned up again with its TM-1 digital tape handler and more honors for Messrs. Walsh and Farey, plus Richard J. Trott, project engineer. Hewlett-Packard Company's variable attenuator brought honors to Carl J. Clement, Jr., design director; Allen Inhelder, industrial designer; Phil Hand, engineering; Edward Phillips, engineering; and Lawrence LaBarre, engineering. Huggins Laboratories was honored for its HA-58 traveling-wave tube; and Eitel-McCullough, Inc., for its X778 traveling-wave tube with credits to Murray I. Disman, group leader, and Albert Mizuhara, project engineer. Products were on display throughout WESCON.

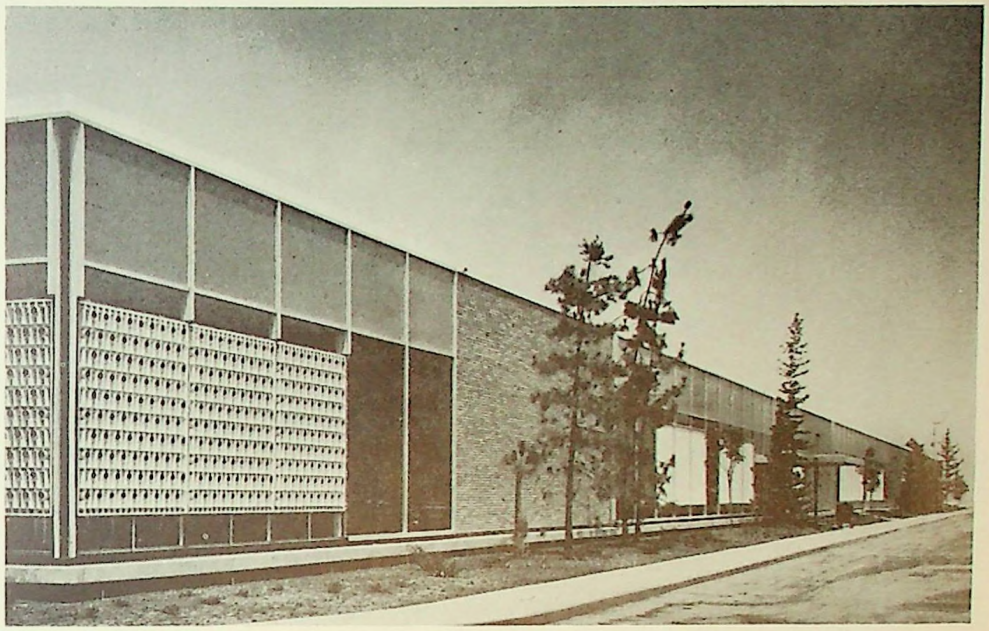
The Social Swing

Traditionally, the business of WESCON's first day has been capped by the All-Industry Cocktail Party and this year was no exception, 2600 turning up at the Ambassador Hotel for the purpose, as stated in the program, of seeing old friends and meeting new ones.

(Continued on page 12)

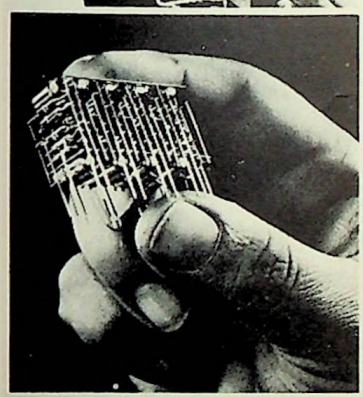
Design-Award recipients get their documentation from Ken Slee, right, chairman. Others, Charles Kress, Librascope; Arden Farey, Ampex; Hal Zierhut, commitee; Rowland Haegle, Eimac; and L. B. Horwitz, Beckman

ADVANCED FACILITY TO IMPLEMENT ADVANCED CONCEPTS IN COMPUTER SYSTEMS



This 180,000-square-foot building is the first unit of a facilities complex which eventually will comprise 825,000 square feet in the Los Angeles suburb of Woodland Hills, California. This facility of the Electronic Equipments Division of Litton Industries is designed for maximum convenience, comfort, and efficiency.

Merritt MacKnight, Manager, Systems Development Department, demonstrates the sophisticated design of a Litton digital computer assembly for the new Grumman A2F.



Welded wire techniques substantially increase component packing densities.

The primary areas of work here are the research, development and production of advanced real-time digital computer systems miniaturized for airborne applications; and high speed general purpose digital computers which incorporate the latest advances in the state of the art.

In our Guidance Systems Laboratory, pure inertial, astro-inertial, and inertial-doppler guidance systems are brought from newborn concepts to operating equipments.

If personal reasons dictate that you seek a new association at any time during the year, contact Mr. Sheldon Hirsch, Head, Research & Engineering Staff, Ventura Freeway at Canoga Avenue, Woodland Hills, California.

LITTON SYSTEMS, INC.

Electronic Equipments Division

Woodland Hills, Canoga Park, Beverly Hills, California · Waltham, Massachusetts

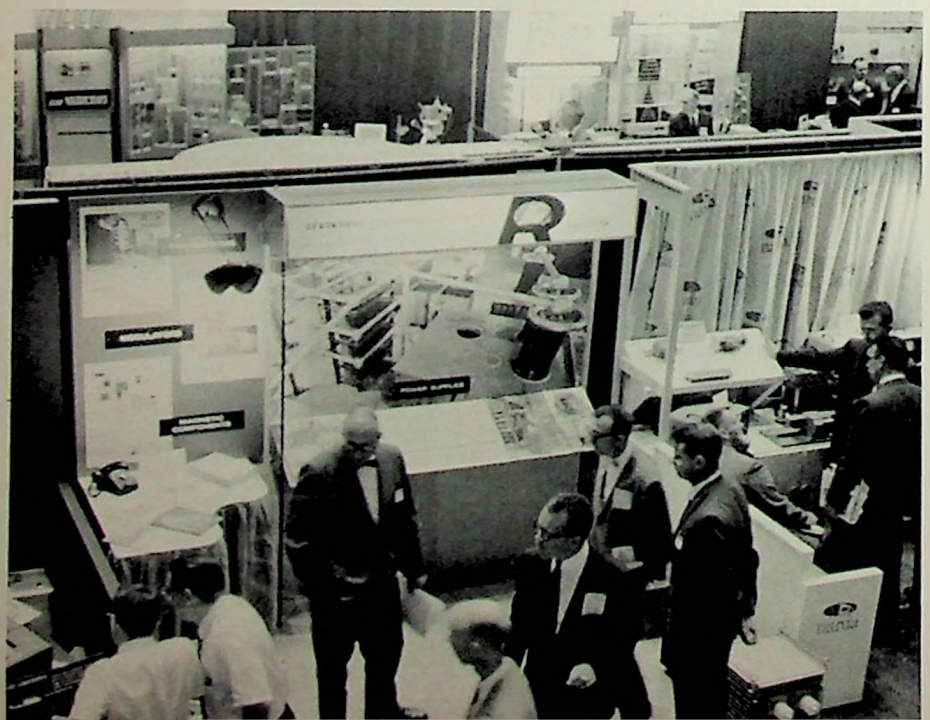
Computer & Control Systems • Tactical Data Processing Systems • Inertial Guidance & Navigation • Advanced Communication Techniques

Above, man/machine speakers face the press and television: Salzer, Gilson, Marzocco, and Carter

Below, at WESCON opening, H. P. Moore, executive-committee chairman; W. E. Peterson, board chairman; and B. S. Angwin, convention director, share the rostrum. Northern contingent at right includes Wes Carnahan, Varian, 7th Region director; Al Morris, Levinthal; Cal Townsend, Jennings; John Granger, Granger; and Hank Brown, Eimac (rear), directors; and, foreground, Manager Don Larson

Above, business/engineering speakers are Lane and Silberman

Below, WESCON director Al Morris appears in the center of a typical booth-area traffic pattern



MORE WESCON

In previous years, preposterous-sounding statistics have been published on the uptake parameters of this event, so let's not go into that. Perhaps the most interesting technical aspect of this event is the gently rising characteristic curve of the audio output with time, which sometimes gives rise to speculation about the feasibility of two possible experiments: 1) record the whole thing on tape and then, the following year, play the tape backwards, creating a flat characteristic, and getting the event off to a real flying start or, 2) play the tape straight from an even-numbered year on an odd-numbered year, thereby achieving cancellation and an absolutely silent cocktail party.

For the ladies at WESCON, Co-Chairmen Mrs. Jeff Montgomery and Mrs. Don Larson were acclaimed for their excellent organization of a four-day "Polynesian Holiday." Events included "enu-kopa" (drink coffee) in the Statler-Hilton, a "Hoolaulea" punch party, a scenic-homes tour, Disneyland tour, a Tamaaraa luncheon at the Polynesian Restaurant, and a swimming party and All-Industry luncheon for women.

Technical Sessions

In the 40 sessions and four workshops which composed the 1960 WESCON technical program, 210 speakers provided information interchange on the subjects of their specialties. Six specially constructed conference rooms were built in the grandstand areas, each capable of accommodating 600 persons, and designed along the sound-isolating fabric-wall concept utilized three years ago in the Cow Palace.

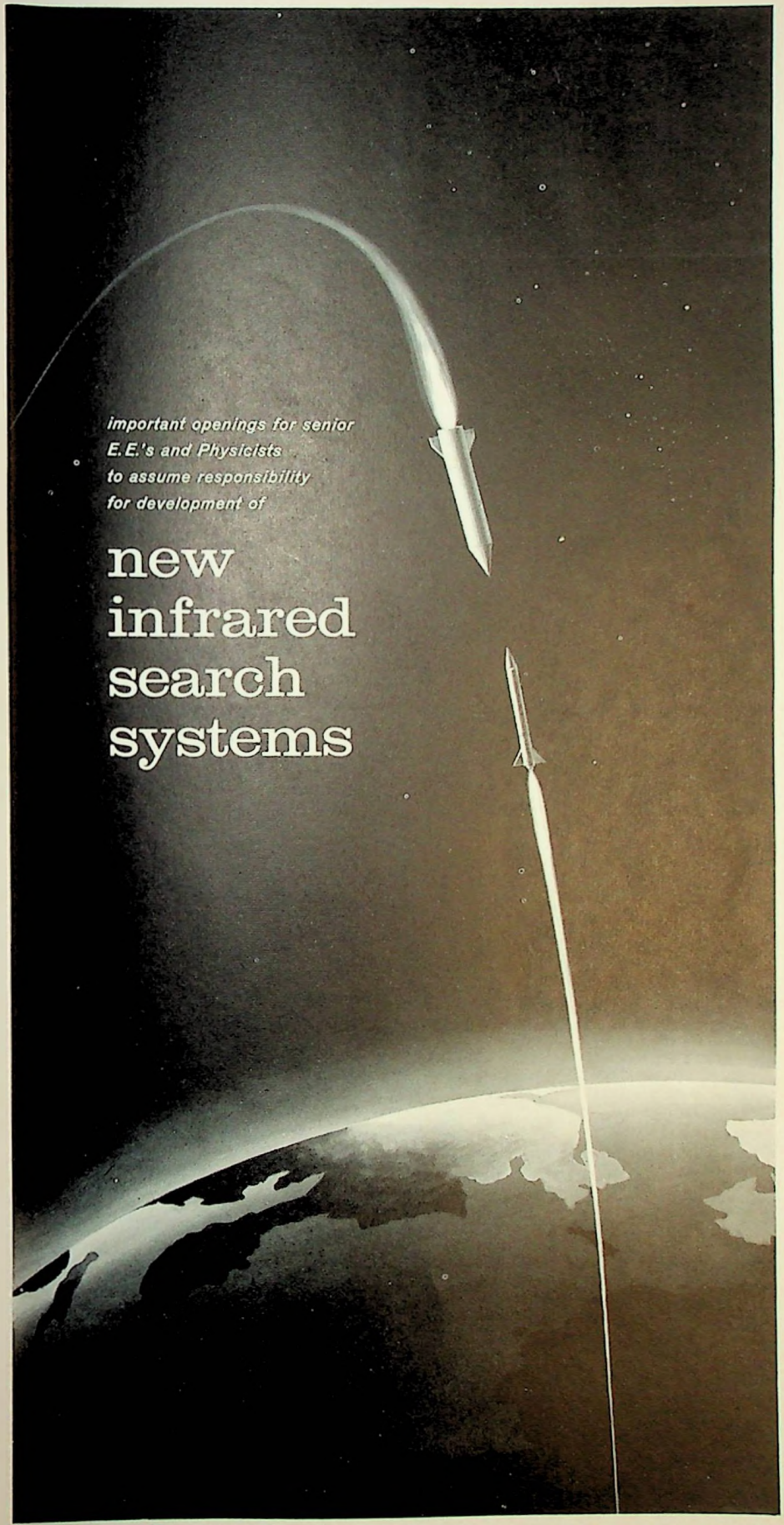
Special efforts had been made in the formulation of the program to heighten interest, refine paper selection, and improve presentation by emphasis on a conversational approach by speakers and subsequent discussion by panels of specialists.

General comment on a small-sample basis was favorable toward both the acoustical characteristics of the halls and the interest content of the presentations.

To provide, hopefully, significant measurement of the latter item, John R. McGaughey, chairman of the PGEWS chapter in the Los Angeles Section and a member of the technical staff at Space Technology Laboratories, headed a program of evaluation for individual papers during the technical sessions. The plan is to tabulate the resulting data in the form of an article to be submitted to "Proceedings."

Evaluators filled out a 23-question form during the talk with yes-or-no answers to questions like, "Did he read his paper?", "Did he stick to the point?", etc., and, after the paper was finished,

(Continued on page 14)



Progress of the Hughes Infrared Systems and Guidance Heads Department reflects Hughes' overall growth. In the past ten years, employment has risen from under 2,000 to over 30,000 in semi-autonomous divisions concerned with Engineering, Research, Commercial Products, Ground Systems, Communications and Manufacturing. The infrared activity includes these typical projects:

1. **Air-To-Air Missiles**
2. **AICBM**
3. **Air-To-Air Detection Search Sets**
4. **Satellite Detection & Identification**
5. **Infrared Range Measurement**
6. **Detection Cryogenics**
7. **Detector Application Physics**
8. **Optical Systems Design**

These activities have created a number of new openings for graduate engineers and physicists with analytical and inventive abilities.

You are invited to investigate these openings if you have several years of applicable experience in infrared, optics or electronics, and can assume responsibility for systems analysis and preliminary design.

The importance of infrared development at Hughes is shown in substantial development contracts and in the fact that Hughes is investing its own funds in further exploration.

We invite your earliest inquiry. Wire collect, or airmail resume directly to:
Mr. William Craven, Manager,
Infrared Systems and Guidance
Heads Department,
Hughes Engineering Division,
Florence and Teale Streets,
Culver City 40, California.

We promise that you will hear from us within one week!

Creating a new world with ELECTRONICS

HUGHES

ENGINEERING DIVISION

AEROSPACE GROUP
HUGHES AIRCRAFT COMPANY

Write for reprints of these important technical papers, written by Hughes staff members... Infrared Search-Systems Range Performance; R. H. Genoud/Missiles Seekers and Homers; W. A. Craven, et al. Servomechanisms Design Considerations for Infrared Tracking Systems; J. E. Jacobs/Simulation of Infrared Systems; H. P. Meissinger.

David Packard

MORE WESCON

provided grades of excellent, fine, passable, marginal, inferior, or unacceptable for such questions as, "Did he make his point?", "Did he appear to know what he was talking about?", "Did he add to his company's reputation?".

Although the forms were keyed to provide anonymity on the answer side, the project is so organized that any individual speaker can get results on his own presentation.

Human Factors

Man-machine systems was the topic for several interrelated sessions which began early in the program. Forming the nucleus of one in several press conferences held during WESCON, this topic was loosely organized around the question, "Is electronics making man obsolete?". The speakers agreed that far from being crowded out of the picture, man is looming ever larger in it, and today figures in the overall systems design as a key element rather than merely a dial watcher and knob twister.

In considering ways of utilizing electronic systems to assist man and extend his capabilities, Dr. John A. Salzer, director of the intellectronics laboratories of Ramo-Wooldridge, spoke about the relative problems of mechanizing perception, memory and recall, processing, and cerebration. They are, respectively, difficult, easy, easy, and very difficult—language translation being about the only example of the last of these.

Dr. Frank C. Marzocco, who is head of the human factors section of the Ramo-Wooldridge data systems project office, discussed a program for traffic study involving aerial photos and computer-handled recapitulation of information extracted from the photos by human analysts. Here the objective is to let the man and machine support each other by giving each the specialized task to do at which it is most capable. The new slogan of the day, said Marzocco, is, "Machines are no damn good."

Robert Gilson of Stromberg-Carlson Company spoke about the problems of evaluating people, how to pull equipment-oriented engineers and man-oriented psychologists together into a functioning group; and how to set standards, make measurements, and establish communication.

Dr. Launor F. Carter, director of research of System Development Corporation, described a $3 million laboratory currently under construction to permit simulation of the real world under conditions where parameters can be changed for studying the effect on human subjects. He also discussed the use of automatic teaching equipment in studies of symbolic logic, using computer programming with a Bendix G-15—the object being to maximize information transfer. He expressed a fear that automatic teaching may be harmed in its long-range aspects by premature introduction of systems which are not adequately researched and programmed.

Engineering-Business Interaction

Some of the speakers in the engineering-management area of discussion included Richard T. Silberman, executive vice president, treasurer, and director of Electronics Capital Corporation, who spoke about the investor aspects of the electronic industry. Pointing out that finance should be as sophisticated as technology, he explained the fact that investors have assigned a value to Hewlett-Packard Company almost twice the worth of the New York Central Railroad by stating that they are buying a participation in technology, and adding that he believes they are right in their evaluation.

Discussing the fact that the inventor doesn't always end up by getting the advantage of his product, he put forward the concept of "time-technical-advantage," which means that the invention must be supported by the ability to bring it to commercial exploitation.

William R. Lane, patent counsel for North American Aviation, Inc., also holds a bachelor of science degree in engineering. He put forward the information that only 50 per cent of patents are actually used, particularly within large companies, who differ generally from smaller companies in their willingness to license patent use.

Responding to a question about a proposed overhaul for the country's patent system, he stated his belief that the law was basically sound but that some changes are always needed in the course of time. He also expressed some current concern about government research and development and current law which puts government into commercial business in the sense of ownership of patents.

The WEMA Luncheon

Coming somewhat as an intermission in the midst of the technical program, the annual luncheon of Western Electronic Manufacturers Association featured David Packard, president of Hewlett-Packard Company, not only as principal speaker, but also as recipient of the Western Electronic Medal of Achievement, an honor presented by WEMA President S. H. Bellue of Osborne Electronics. It was awarded, "in recognition of his outstanding service to the electronics industry and to professional, educational, governmental, and humanitarian organizations."

Basing his speech on a recent tour through Russia, Packard related a number of impressions he had received—particularly one to the effect that there is a vast difference between what the Russians say about their country and what actually exists there. Talking about electronic manufacture, he said, "I did not see one single electronic device which represented an advance over what we have in this country and most of their electronic products look like devices which have been out of date for several years in America. I do not intend to categorically imply that they copy all of our equipment,

(Continued on page 16)

Mesdames A. J. Morris, J. V. N. Granger, and D. A. Dunn bedeck each other with the decor appropriate to the Polynesian theme of the ladies' events at WESCON

The Air Force Missile Family...Scions of Space Technology

Science and technology, especially as they relate to missile art, have advanced further in the last six years than in the preceding six centuries. Any review of the many milestones successfully attained since 1954 reveals an epic of hard work, inventiveness, accomplishment, and singleness of objective. This single objective—the achievement of operational weapon capability at the earliest possible date—is being realized.

The Air Force missile family including Atlas, Thor, Titan, and Minuteman, has achieved progress beyond expectation in a program unmatched for magnitude and complexity.

Space Technology Laboratories has had the responsibility since 1954 for the over-all systems engineering and technical direction of these programs. STL's scientific and technical management capabilities have not only helped to hasten the day of operational capability for Air Force ballistic missiles, but have also been applied in carrying out related space probe and satellite projects.

Scientists and engineers with outstanding qualifications find unusual opportunities for their skills and disciplines at STL. Positions on STL's technical staff are now available for those who wish to add a new dimension to their careers. Resumes and inquiries are invited.

SPACE TECHNOLOGY LABORATORIES, INC.

P. O. Box 95004, Los Angeles 45, California

Los Angeles • Santa Maria • Edwards Rocket Base • Cheyenne
Cape Canaveral • Manchester, England • Singapore • Hawaii

Left, John and Mrs. Chartz, were among the Cocktail Party crowds

Above, Myrl and Mrs. Stearns at the All-Industry Cocktail Party

MORE WESCON

but I did see a number of their products which were strangely familiar and I assure you I know enough about some of these devices to know that we did not copy theirs."

Addressing himself to the matter of what he believed the United States should do, he answered that it should continue to develop the strength of its free enterprise, minimize government control, have more faith in the capabilities and character of our own system, and work to counteract the false impressions which have been spread concerning imperialism and capitalism.

WEMA figures concerning western electronic sales were presented during introductory remarks at the luncheon. See adjoining column.

More Technical Program

Getting back to the papers sessions, other topics included the woman's role in engineering. Noel Porter, who likes girls, was chosen to moderate the discussion.

He observed that in electronics, more than in other industries, women are widely employed, perhaps because there are so many jobs they can do better. In some plants, Hewlett-Packard for example, at least 50 per cent of the employees are women, many of whom, without formal engineering education, have been trained for technical positions.

Rose Mary (Decker) Bernstein, engineer with Douglas Aircraft Co., has been active in the field of transducers and instrumentation since her graduation with a BSEE from Tulane University in 1957. She posed such questions as, "Can a woman engineer?" (Yes), "Are women accepted in engineering?" (Yes, if they are doing a good job), "Can a woman accomplish an engineering job and remain a lady through it all?" (Yes, if she wants to).

Barbara Leitner devoted her discussion to "Debugging the Engineer." An IRE member herself, with vast experience, not only as an engineering secretary, but also as the wife of a prominent engineer (Richard G. Leitner, SDC and chairman of the technical program committee for 1960 WESCON), Mrs. Leitner said that engineers are people. Actually, they were brilliant little boys who skipped from third grade to MIT, thus accounting for their atrocious spelling and lousy handwriting.

Phyllis Huggins, who tells people about computers, thinks that engineers are marvelous. They are, she says, basically gentlemanly and generous, and her dearest friends. Whereas the MD used to be the hero, the engineer and scientist is now the glamor boy of the world. Mrs. Huggins defined several classifications of the contemporary glamor-boy engineer (mathematician who doesn't trust words or numbers, only symbols; classified man, scared to death by security; term qualifier, worrying about such things as "is straighter straighter than straight?"; non-talker, afraid to be quoted; and her favorite, the engineer who likes to talk).

All members of the panel suggested that girls should be encouraged to enter the technical field. Engineering, they agreed, is nothing to be afraid of. Daughters and secretaries should be exposed to the fascination of electronics.

Another pair of sessions covered air traffic control and one of these, a series of related papers, covered the user's point of view. Later, manufacturers discussed their side of the subject. Vernon Weihe of General Precision Inc., Washington, D. C., was chairman of the session. He stated that there is no single navigational system capable of meeting the needs for overall control, and that coordination is a first goal. Time has been lost, he said, through lack of recognition of the problem and there is now in effect a crash program.

Answering the question of whether he was hopeful for a solution, he said he felt that the complexity of the situation will force an evolutionary trend helpful to individual problems, but there will be no panacea for the overall situation. On another question concerning the comparison between air traffic control in Europe and the United States, he said that the comparison is as though all of our separate states were operating on their own without a single head like the Federal Aviation Agency. As a result, coordination is chaotic, and flying is like "a bunch of fireflies in a bottle."

Victor J. Kayne of the Aircraft Owners and Pilots Association provided a few statistics on the general aviation

(Continued on page 18)

THE INDUSTRY

WEMA Sales Figures

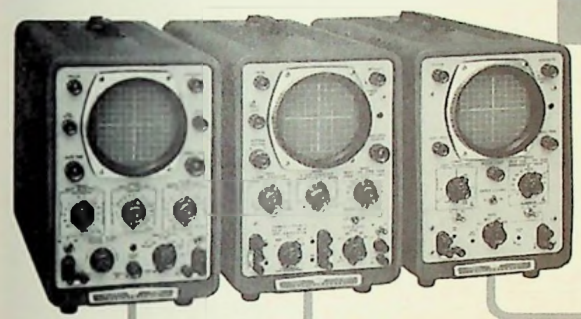
	1959 (adjusted)	1960 (estimate)
LOS ANGELES-ORANGE COUNTY		
Sales	$1,157,000,000	$1,374,000,000
Employees	93,000	97,000
Firms	461	495
SAN FRANCISCO BAY AREA		
Sales	$439,000,000	$530,000,000
Employees	35,000	40,000
Firms	144	156
PORTLAND-SEATTLE		
Sales	$70,000,000	$75,000,000
Employees	6,000	6,200
Firms	35	37
SAN DIEGO		
Sales	$62,000,000	$69,000,000
Employees	4,000	4,400
Firms	31	38
PHOENIX-TUCSON		
Sales	$62,000,000	$68,000,000
Employees	5,000	5,300
Firms	21	38
DENVER		
Sales	$42,000,000	$50,000,000
Employees	3,100	3,800
Firms	18	21
BALANCE 11 WESTERN STATES		
Sales	$100,000,000	$114,000,000
Employees	9,000	10,000
Firms	60	55
TOTAL—11 WESTERN STATES		
Sales	$1,932,000,000	$2,280,000,000
Employees	155,000	167,000
Firms	770	840
TOTAL—U.S.A.		
Sales	$9.4 billion	$10.2 billion
Employees		1,180,000
Firms		4,200

(Note: These figures exclude broadcast, service, and distribution revenue.)

Speakers at the technical session for women were: Rose Mary Bernstein, Douglas Aircraft; Barbara B. Leitner; and Phyllis Huggins, Bendix Computer Div.

Call your hp rep today for a demonstration of one of these

3 POPULAR hp OSCILLOSCOPES



Production or lab instruments — Simple to use, even for non-technical personnel — Moderately priced — Full 10 cm x 10 cm display — Automatic calibration waveforms — Low phase shift — Automatic triggering for optimum presentation — "Times-5" sweep expander magnifies trace, improves resolution.

DC to 200 KC

Models 120A/AR combine minimum controls with automatic triggering for utmost speed, convenience. Horizontal amplifier dc to 200 KC; phase shift only ± 2° to 100 KC. More X-axis information due to horizontal amplifier sensitivity control, with vernier, 5% accuracy. Balanced input on most sensitive ranges for low level work. Times-5 sweep expander, all ranges. 15 calibrated sweep speeds, 5 μsec/cm to 0.2 sec/cm. Vernier, expander extend speed range 1 μsec/cm to 0.5 sec/cm. 10 mv/cm sensitivity calibrated vertical amplifier, drift-free trace. 120A (cabinet) or 120AR (rack), $435.

DC to 200 KC – DUAL TRACE

Models 122A/AR provide simultaneous two-phenomena presentation, are ideal for direct comparison of filter, amplifier output/input phenomena; vibration testing. Unique front-panel automatic calibrator waveform switch. Twin vertical amplifiers operate independently, simultaneously, differentially. Automatic triggering, automatic synchronization, single trace operation when desired. Sensitivity 10 mv/cm to 100 v/cm, 15 calibrated sweeps, vernier extension. Horizontal amplifier dc to 200 KC. 122A (cabinet) or 122AR (rack), $625.

DC to 300 KC – "BIG SCOPE" PERFORMANCE

Models 130B/BR provide wide usefulness, simple operation and rugged dependability. 21 calibrated sweep times, 1 μsec/cm to 5 sec/cm. Vernier, expander extend range 0.2 μsec/cm to 12.5 sec/cm. Twin horizontal and vertical amplifiers, phase shift ± 1° to 50 KC; sensitivity 1 mv/cm to 125 v/cm. Balanced input on 6 most sensitive ranges. Common mode rejection 40 db. Stability 1 mv/hour after warmup. Triggering automatic, internally, line power, externally, 0.5 v or greater. 130B (cabinet) or 130BR (rack), $650.

Data subject to change without notice. Prices f.o.b. factory.

Thirteen precision hp oscilloscopes, dc to 1,000 MC

HEWLETT-PACKARD COMPANY

1050A Page Mill Road, Palo Alto, California, U.S.A.
Cable "HEWPACK" DAvenport 6-7000

CONTACT OUR ENGINEERING REPRESENTATIVES. NEELY ENTERPRISES, FOR INFORMATION — Los Angeles, 3939 Lankershim Blvd., North H'wd., TR 7-0721; San Carlos, 501 Laurel St., LY 1-2626; Sacramento, 1317 Fifteenth St., GI 2-8901; San Diego, 1055 Shafter St., AC 3-8106; Phoenix, 641 E. Missouri Ave., CR 4-5431; Tucson, 232 So. Tucson Blvd., MA 3-2564; Albuquerque, 6501 Lomas Blvd., N.E., AL 5-5586; Las Cruces, 114 S. Water St., JA 6-2486.

6715

Donald Shapero of Palo Alto receives congratulations on scholarship award in Future Engineers event, from J. H. Axe, chairman; E. Finley Carter, SRI; and John Sinclair, judging-panel member

MORE WESCON

fleet, the private fliers. His association has 83,000 members, covering all flying outside of the scheduled airlines and the military. The 12 million hours logged by these fliers is three times the total for the airlines. There are 108,000 registered airplanes with 70,000 active at any given time as compared to the 1800 airline craft.

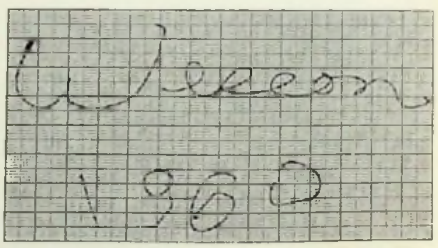
As a market, there would appear to be 8000 planes per year in need of retrofit expenditures of about $1000 each on new communications equipment. In his estimation, a $100,000 airplane requires about $30,000 worth of electronic equipment.

Speaking for the airline pilots, J. D. Smith of the Airline Pilots Asociation stated that the all-weather system proposed for 1963 completion is inadequate in the view of his group. He felt that there was a lack of communication to the pilots and insufficient consideration of their particular point of view. As examples, he cited electronic flying aids which work well when operative, but create serious safety problems under conditions of undetected failure. When good systems are developed, Smith feels that too much time is lost in getting them into the planes. He also stated a problem that arises with increased automation in that pilots tend to lose the opportunity to mainain their proficiency. And proficiency is essential for backup of automatic equipment which fails.

Molecular Electronics

Microminiaturization, or mmz, formed the subject of other sessions. W. V. Wright of Electro-Optical Systems served as moderator in one of these, a panel discussion involving eight panelists. Wright stated his belief that molecular electronics will be the revolution of the next decade. It is a field which was launched 13 years ago by the transistor and the diode, but the current and future steps are into the development of non-isolated-component functional electronic blocks.

Sample quantities of some of these are now available and it would appear that five years will elapse before they will reach production. He displayed examples of dendritic germanium in which 1/8-inch lengths of wire form complete amplifiers and he demonstrated a piece of equipment by means of which handwriting in the air performed with a light source was able to pen-write the inscription, "WESCON 1960," which appears below. The equipment utilizes the lateral photo effect in single-crystal silicon.



Plotter transcription of light-beam handwriting. See text

Bio-Instrumentation Systems

Patrick Meehan, M.D., was one of a series of four speakers in a session headed, "Seeking a Logical Bio-Instrumentation System." Speaking to the press, he described the healthy, conscious individual in an abnormal environment. The topics of his colleagues included the anesthetized individual in a normal environment, and the unhealthy, conscious individual in a normal environment.

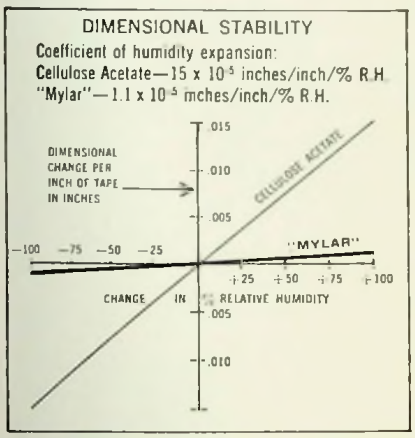
Discussing the bio-instrumentation systems designed for the U. S. astronaut, he expressed the belief that when this adventure takes place, we will know, through instrumentation, more

(Continued on page 20)

Magnetic tapes of "Mylar"® insure reliability of recording and playback

Much information recorded on magnetic tapes can never be replaced because of the tremendous cost of duplicating test conditions. You can protect your investment in such valuable data with tapes of "Mylar"* polyester film. Their small additional cost is negligible compared to the cost of the data they contain. Here's why they provide higher reliability than any other tapes:

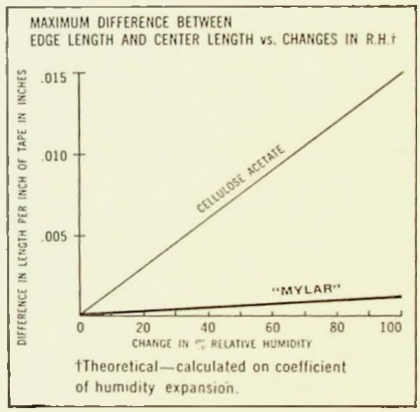
CHART NO. 1



Less signal dropout.

Chart 1 shows that dimensional change in "Mylar" with humidity change is negligible compared to acetate. This exceptional stability prevents tape shrinking, swelling or cupping that could result in shifting of tracks or loss of contact with the recording or playback head. Possibility of signal dropout or garbled or weak signals are minimized and reliability of recorded data is assured.

CHART NO. 2



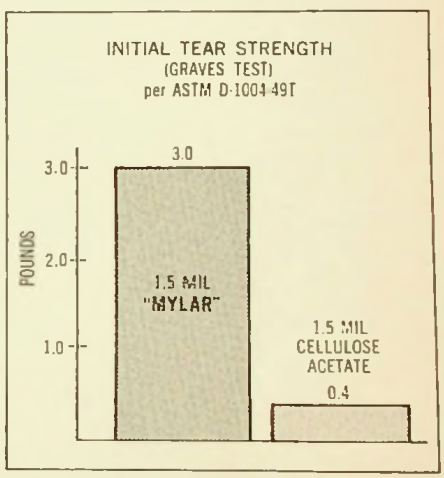
Fewer garbled signals.

If magnetic tape picks up or loses moisture unequally across the tape width there will be a difference in length between the edges and center. Chart 2 compares this effect for "Mylar" and cellulose acetate tapes. Because "Mylar" is virtually nonhygroscopic there is no dimensional difference between edges and center to cause poor registration of timing across adjacent tracks on the tape.

Less tape breakage.

Since most breaks start as edge nicks, the high initial tear strength of "Mylar" reduces chance of breakage and subsequent failure to record critical information. Chart 3 compares initial tear strength of "Mylar" and acetate. In addition, "Mylar" has the highest tensile strength of any instrumentation tape base. And "Mylar" does not lose its toughness with age, repeated playbacks or storage because it has no plasticizer to dry out.

CHART NO. 3



The superiority of "Mylar" can make an important contribution to reliability of your magnetic tape system. Ask your magnetic tape supplier to recommend the specific tape of "Mylar" for your needs.

DU PONT
REG. U.S. PAT. OFF.
Better Things for Better Living . . . through Chemistry

DU PONT MYLAR® POLYESTER FILM

*Du Pont's registered trademark for its polyester film

E. I. du Pont de Nemours & Co. (Inc.)
Film Department G9, Wilmington 98, Delaware

Please send free, 12-page booklet of comparative test data to help me evaluate magnetic tape reliability.

Name_____ Position_____
Company_____
Address_____
City_____ Zone____ State_____

Admiral Jaap speaking before the All-Industry Luncheon on the closing day of WESCON. Eberhardt Rechtin, at right, was 7th Region Achievement Award winner

MORE WESCON

about his condition than our opposite numbers ever knew about any earlier human adventurers. Computer techniques will be used to reveal either present or future trouble for the space-borne astronaut.

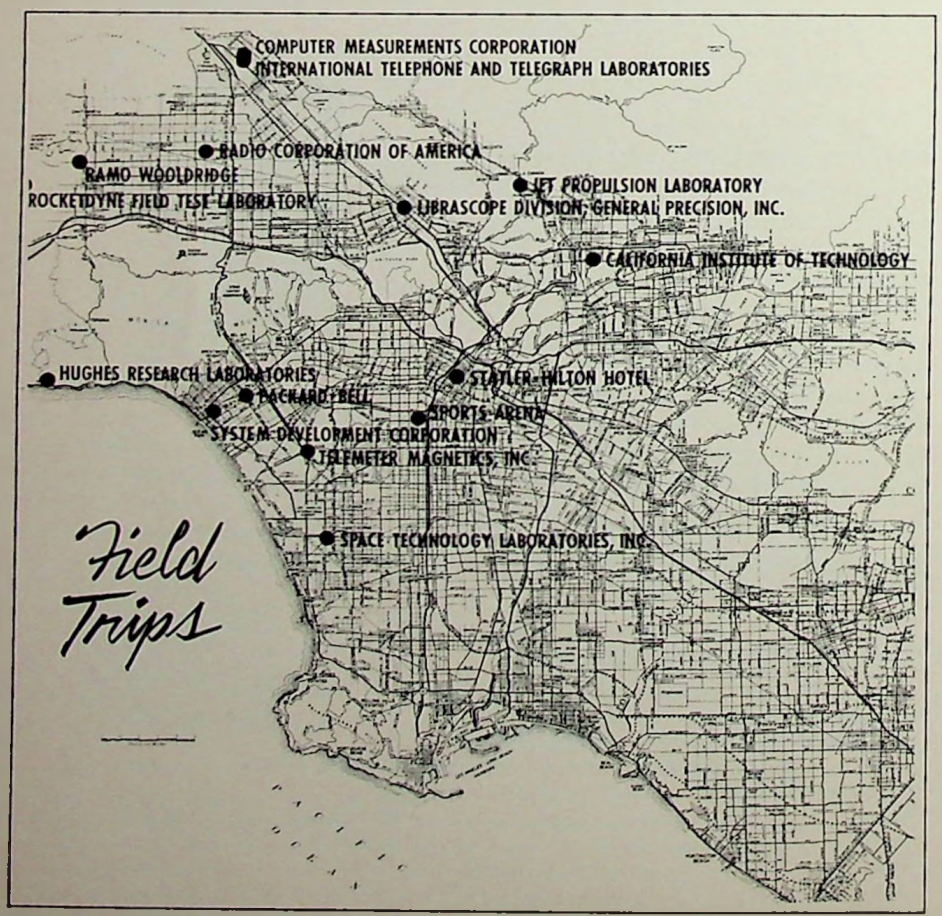
Field Trips

As shown in the accompanying map, field trips were as geographically widespread as Los Angeles itself. Interestingly enough, the eight field trips scheduled and attended by 1055 bussing registrants covered facilities which did not exist two years ago.

Future Engineers

An exhibit area for the Future Engineer displays was located adjacent to the registration desks in the annex. Thirty science students from nine western states put their projects on view. Sponsored by the San Francisco Section were four participants, one of whom, Donald Shapero, a student at Cubberley High School, Palo Alto, won second place in the awards, a $600 scholarship for his work on magnetometry.

First presentation of the new deForest Award was made to the top winner from Los Alamos, N. M., Dwight Jaeger. A Future Engineers Symposium was held in connection with the youth activities and ten of the 30 exhibitors presented talks.



All-Industry Luncheon

Culminating the major events of WESCON is the All-Industry Luncheon which, this year, was addressed by Rear Admiral J. A. Jaap on the topic of, "Salt-Water Electronics." His discussion covered the special needs and requirements of electronic equipment and systems for the Navy. Both environmental and capability requirements present increasing problems, as does the fact that costs keep rising. One of the problems he mentioned is the fact that where things used to take place with speeds measured in knots, they are now frequently measured in machs.

Salute to de Forest

As it happened, the day of the All-Industry Luncheon was also the 87th birthday of Dr. Lee de Forest, invalided in his Hollywood home. A message of greeting to de Forest, frequently called the father of radio, was voiced by Walter E. Peterson, chairman of the WESCON board of directors. It was transmitted on 960 mc by the devious, though appropriate, route from Bell Telephone Laboratories at Holmdel, N. J., to Echo I on pass No. 131, to the Jet Propulsion Laboratory facility at Goldstone, Calif.

During the luncheon, the message was heard over the sound system. The text was as follows:

"Dr. de Forest, this message of congratulations on your 87th birthday comes from WESCON 1960 and a gathering of many of your friends and admirers at the All-Industry Luncheon in Los Angeles.

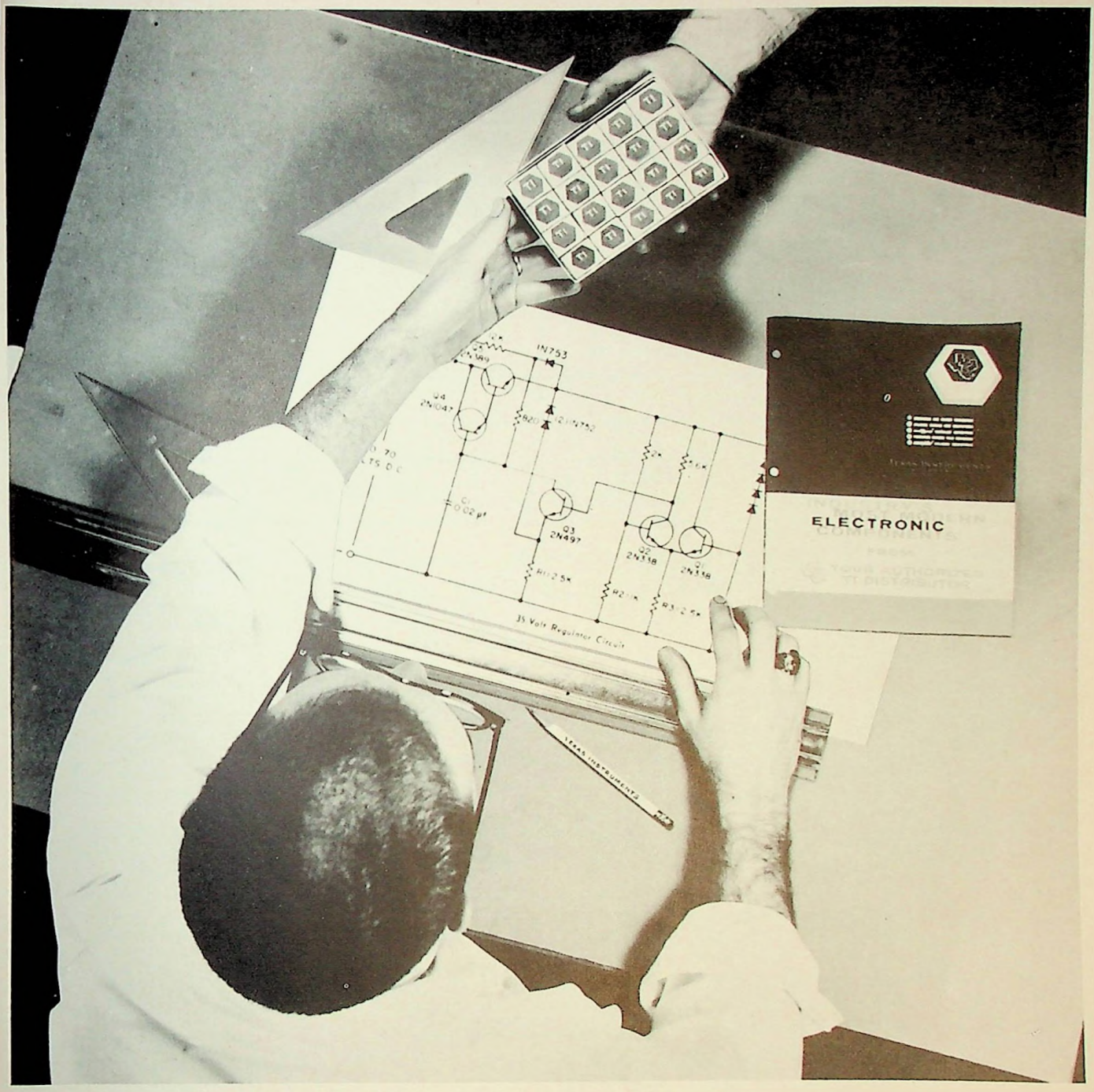
"I am Walter E. Peterson, chairman of the WESCON board of directors, and am privileged from my presiding position at this event to send you our heartfelt greetings with the wish that you could have been with us to receive them in person.

"This message reaches you through a new miracle of communications, having been reflected from the Echo I balloon satellite circling the earth 1000 miles out in space. It was brought about through an arrangement with colleagues at Jet Propulsion Laboratory and other agencies associated with this extraordinary demonstration of the ingenuity of American engineers and physicists.

"Your own pioneering contributions to electronic communication have similarly captured public attention in their day and served us well over the years.

"We are indeed proud that you have agreed to the use of your name for the "de Forest Award" henceforth to be associated with the chief honor to a young person in our annual Future Engineers competitions.

"Your distinguished career is a source of inspiration to us all and you have our most sincere felicitations on this anniversary of your birth."



Texas Instruments Semiconductors at Your Fingertips NOW...
From Elmar Electronics Your Authorized TI Distributor

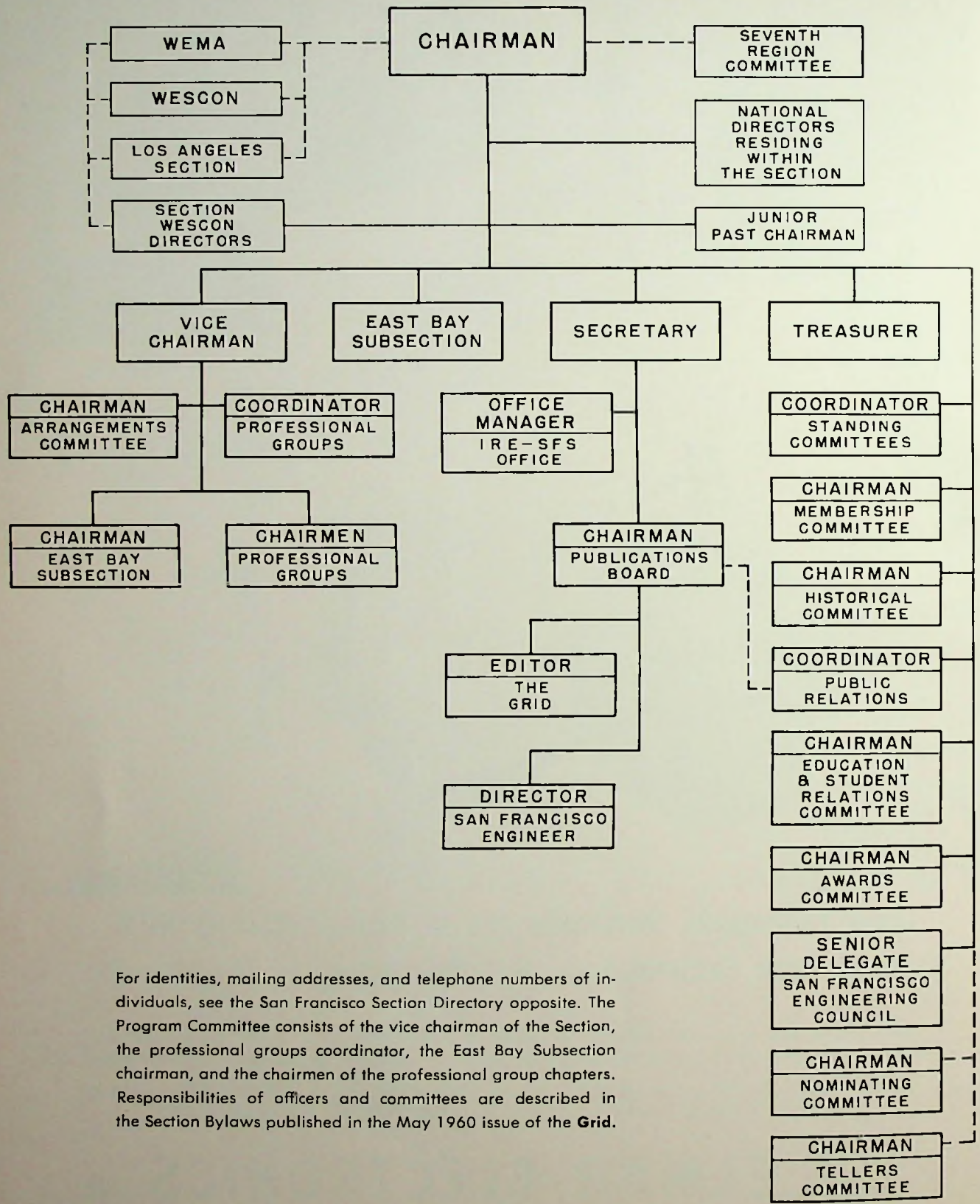
For immediate off-the-shelf delivery on any of TI's complete line of use-proved, guaranteed semiconductors and components, order today in the following quantities . . . factory prices: silicon transistors, germanium transistors, silicon diodes and rectifiers, and carbon film resistors: 1-999 • *sensistor* silicon resistors: 1-499 • *tan*-TI-*cap* tantalum capacitors: 1-99

ELMAR ELECTRONICS INC.

140 Eleventh Street • Oakland 7, California

Tel: TE 4-3311 • TWX: —OA73

THE INSTITUTE OF RADIO ENGINEERS, INC.
SAN FRANCISCO SECTION
ORGANIZATION



For identities, mailing addresses, and telephone numbers of individuals, see the San Francisco Section Directory opposite. The Program Committee consists of the vice chairman of the Section, the professional groups coordinator, the East Bay Subsection chairman, and the chairmen of the professional group chapters. Responsibilities of officers and committees are described in the Section Bylaws published in the May 1960 issue of the **Grid**.

DIRECTORY OF OFFICERS

SAN FRANCISCO SECTION

Chairman—**Donald A. Dunn****

Eitel-McCullough, Inc.
San Carlos, Calif.
LYtell 1-1451, Ext. 421

713 Partridge Ave.
Menlo Park, Calif.
DAvenport 5-1420

Vice Chairman—**Stanley F. Kaisel****

Microwave Electronics Corp.
4061 Transport St.
Palo Alto, Calif.
DAvenport 1-1770

921 Newell Road
Palo Alto, Calif.
DAvenport 3-0412

Secretary—**Peter D. Lacy****

Wiltron Company
717 Loma Verde Ave.
Palo Alto, Calif.
DAvenport 1-7428

324 Lakeview Way
Redwood City, Calif.
EMerson 9-3615

Treasurer—**Charles Susskind****

Cory Hall
University of California
Berkeley 4, Calif.
THornwall 5-6000, Ext. 2663

671 Santa Barbara Road
Berkeley 7, Calif.
LAndscape 6-4400

Jr. Past Chairman—**Victor B. Corey****

Palomar Scientific Corp.
4039 Transport Street
Palo Alto, Calif.
DAvenport 3-9005

10531 Berkshire Drive
Los Altos, Calif.
WHitecliff 8-7393

Director-at-Large—**Bernard M. Oliver****

Hewlett Packard Co.
1501 Page Mill Rd.
Palo Alto, Calif.
DAvenport 6-7000

13310 La Paloma
Los Altos Hills, Calif.
WHitecliff 8-3200

Director, Seventh Region—**C. W. Carnahan****

Varian Associates
611 Hansen Way
Palo Alto, Calif.
DAvenport 6-4000, Ext. 2215

120 Fawn Lane
Menlo Park, Calif.
ULmar 1-0280

Section WESCON Director—**Albert J. Morris****

Levinthal Electronic Products, Inc.
Stanford Industrial Park
Palo Alto, Calif.
DAvenport 6-1640

26520 St. Francis Dr.
Los Altos Hills, Calif.
WHitecliff 8-8619

Section WESCON Director—**John V. N. Granger****

Granger Associates
966 Commercial St.
Palo Alto, Calif.
DAvenport 1-4175

320 Encinal Ave.
Menlo Park, Calif.
DAvenport 2-5958

SECTION OFFICE

Manager—**Grace M. Pacak***

701 Welch Road
Palo Alto, Calif.
DAvenport 1-1332

675 Roble Avenue
Menlo Park, Calif.
DAvenport 4-1501

STANDING COMMITTEES

Standing Committee Coordinator—
Robert J. DeLorenzo

Eitel-McCullough, Inc.
San Carlos, Calif.
LYtell 1-1451, Ext. 421

1210 Lime Drive
Sunnyvale, Calif.
REgent 9-5663

Arrangements Committee
Chairman—**Henry W. Schroeder***

Sylvania Electric Products, Inc.
500 Evelyn Avenue
Mountain View, Calif.
YOrkshire 8-6211, Ext. 2137

129 Dana Street, Apt. 12-A
Mountain View, Calif.
YOrkshire 8-1066

Awards Committee
Chairman—**Donald B. Harris***

Stanford Research Institute
Menlo Park, Calif.
DAvenport 6-6200, Ext. 2776

24910 La Loma Court
Los Altos Hills, Calif.
WHitecliff 8-5213

Member—**Karl R. Spangenberg**

2100 Page Mill Road
Palo Alto, Calif.
DAvenport 1-1531

2100 Page Mill Road
Palo Alto, Calif.
DAvenport 3-4537

Member—**Thomas H. Morrin**

Stanford Research Institute
Menlo Park, Calif.
DAvenport 6-6200

897 Southampton Drive
Palo Alto, Calif.
DAvenport 2-0113

Member—**John R. Whinnery**

College of Engineering
315 Engineering Bldg.
University of California
Berkeley 4, Calif.
THornwall 5-6000, Ext. 3268

10 Irving Court
Orinda, Calif.
CLifford 4-3098

Member—**Leonard J. Black**

College of Engineering
312 Engineering Bldg.
University of California
Berkeley 4, Calif .
THornwall 5-6000

243 - 30th Street
Oakland 11, Calif.
TEmplebar 2-2478

Member—**John V. N. Granger****

Granger Associates
966 Commercial Street
Palo Alto, Calif.
DAvenport 1-4175

320 Encinal Avenue
Menlo Park, Calif.
DAvenport 2-5958

Education and Student Relations Committee
Chairman—**Earl J. Shelton***

Eitel-McCullough, Inc.
San Bruno, Calif.
JUno 8-1212, Ext. 283

(M) 12690 Viscaino Drive
Los Altos Hills, Calif.
WHitecliff 8-6236

San Jose State—
Advisor—**Prof. Harry Engwicht**
Student Chairman—**Darrell Coble**

Santa Clara University—
Advisor—**Prof. Donlan Jones**
Student Chairman—**Fred Styles**

Stanford University—
Advisor—**Prof. Robert Scarlett**
Student Chairman—**Stuart Gilmor**

University of California—
Advisor—**Prof. Herbert Scott**
Student Chairman—**Donald Kidder**

U. S. Naval Postgraduate School—
Advisor—**Prof. G. Robert Giet**
Student Chairman—**Lt. G. W. Mizell**

Historical Committee
Chairman—**Earl G. Goddard***

Stanford Research Institute
Menlo Park, Calif.
DAvenport 6-6200, Ext. 2554

2522 Webster St.
Palo Alto, Calif.
DAvenport 5-2522

*Member, Executive Committee. **Member, Operating Committee and Executive Committee. (M) Preferred mailing address.

Membership Committee
Chairman—**Frank K. Inami***

Lawrence Radiation Laboratory
P.O. Box 808 — 1168 Hillcrest Court
Livermore, Calif. — Livermore, Calif.
HIlltop 7-1100, Ext. 84-265 — HIlltop 7-1254

Vice Chairman—**Edwin F. Laine**

Lawrence Radiation Laboratory
P.O. Box 808 — 153 Alice Court
Livermore, Calif. — Danville, Calif.
HIlltop 7-1100, Ext. 285 — VErnon 7-4722

Program Committee
Chairman—**Stanley F. Kaisel****

Microwave Electronics Corp.
4061 Transport Street — 921 Newell Road
Palo Alto, Calif. — Palo Alto, Calif.
DAvenport 1-1770 — DAvenport 3-0412

Professional Group Coordinator—**Frank Mansur***

Lockheed Missiles and Space Division
P.O. Box 504 — (M) 908 Middle Ave., Apt. N
Sunnyvale, Calif. — Menlo Park, Calif.
DAvenport 4-3311, Ext. 45701 — DAvenport 6-3935

Public Relations Coordinator—**Peter N. Sherrill***

Hewlett-Packard Co.
1501 Page Mill Road — 1960 Edgewood Drive
Palo Alto, Calif. — Palo Alto, Calif.
DAvenport 6-7000 — DAvenport 6-1041

Publications Board
Chairman—**Howard Zeidler***

Stanford Research Institute — 881 Embarcadero Road
Menlo Park, Calif. — Palo Alto, Calif.
DAvenport 6-6200, Ext. 3284 — DAvenport 3-1712

Vice Chairman/Recording Secretary—
Milton Seymour

Lenkurt Electric Company
1105 County Road — 810 Sunset Drive
San Carlos, Calif. — San Carlos, Calif.
LYtell 1-8461, Ext. 329 — LYtell 3-8187

Treasurer—**Peter N. Sherrill**

Hewlett-Packard Co.
1501 Page Mill Road — 1960 Edgewood Drive
Palo Alto, Calif. — Palo Alto, Calif.
DAvenport 6-7000 — DAvenport 6-1041

Member—**Berkley J. Baker**

Litton Industries
960 Industrial Road — 1674 Kitchener Drive
San Carlos, Calif. — Sunnyvale, Calif.
LYtell 1-8411 — REgent 6-3428

Member—**Beardsley Graham**

Lockheed Missiles and Space Division
Dept. 50-03, Bldg. 201
3251 Hanover Street — 385 Golden Hills Drive
Palo Alto, Calif. — Portola Valley, Calif.
DAvenport 4-3311, Ext. 4-5563 — ULmar 1-0502

Member (Director, San Francisco Engineer)—
Howard Hansen

TECH-SER, Inc.
640 Donohoe Street — 1526 Lago Street
East Palo Alto, Calif. — San Mateo, Calif.
DAvenport 5-3251 — FIreside 1-9510

Member (Section Secretary)—**Peter D. Lacy****

Wiltron Company
717 Loma Verde Ave. — 324 Lakeview Way
Palo Alto, Calif. — Redwood City, Calif.
DAvenport 1-7428 — EMerson 9-3615

* Member, Executive Committee
**Member, Operating Committee and Executive Committee
(M) Preferred mailing address

Editor, GRID—**Frank Haylock***

109 Hickory Lane — 685 Barroilhet Avenue
San Mateo, Calif. — San Mateo, Calif.
FIreside 5-1138 — Diamond 4-7057

San Francisco Engineering Council
Senior Delegate—**Harry H. Smith***

Pacific Tel. & Tel. Co.
140 New Montgomery St. — 175 Manor Dr.
San Francisco 5, Calif. — Mill Valley, Calif.
EXbrook 9-5248 — DUnlop 8-8153

Delegate—**Harry F. Gray**

Hugh Gray Company
2166 Market Street — 2019 Mira Vista Drive
San Francisco 14, Calif. — El Cerrito, Calif.
KLondike 2-1777 — BEacon 2-4651

EAST BAY SUBSECTION

Chairman—**Alexander J. Stripeika***

Lawrence Radiation Laboratory
P.O. Box 808 — 2759 Miranda Avenue
Livermore, Calif. — Alamo, Calif.
HIlltop 7-1100, Ext. 84203 — YEllowstone 5-8992

Vice Chairman—**Eugene A. Aas**

Sandia Corporation — 2684 Kennedy St.
Livermore, Calif. — Livermore, Calif.
HIlltop 7-5100, Ext. 2555 — HIlltop 7-5858

Secretary-Treasurer—**John T. Lavrischeff**

Lawrence Radiation Laboratory — (M) 7029 Cutting Blvd.
Berkeley 4, Calif. — El Cerrito 6, Calif.
THornwall 3-2740, Ext. 5313 — BEacon 5-6153

PROFESSIONAL GROUPS

ANTENNAS & PROPAGATION

Chairman—**Richard C. Honey***

Stanford Research Institute — 111 Grove Drive
Menlo Park, Calif. — Portola Valley, Calif.
DAvenport 6-6200, Ext. 2759 — ULmar 1-0478

Vice Chairman—**Raymond L. Leadabrand**

Stanford Research Institute — 3556 Middlefield Rd.
Menlo Park, Calif. — Palo Alto, Calif.
DAvenport 6-6200, Ext. 3052 — DAvenport 5-8718

Secretary—**Tetsu Morita**

Stanford Research Institute — 946 El Cajon Way
Menlo Park, Calif. — Palo Alto, Calif.
DAvenport 6-6200, Ext. 2417 — DAvenport 4-1271

AUDIO

Chairman—**Mort Fujii***

Ampex Professional Products Co.
P.O. Box 3000 — 508 East Santa Inez
Redwood City, Calif. — San Mateo, Calif.
EMerson 9-7111, Ext. 878 — Diamond 2-3754

Vice Chairman—**Charles Wilkins**

Ampex Professional Products Co.
P.O. Box 3000,
Mail Stop 331-2 — (M) 2501 San Ramon Ave.
Redwood City, Calif. — Mountain View, Calif.
EMerson 9-7111, Ext. 436 — YOrkshire 8-5951

Secretary-Treasurer—**Stanley Oleson**

Stanford Research Institute — 140 Santa Margarita Ave.
Menlo Park, Calif. — Menlo Park, Calif.
DAvenport 6-6200, Ext. 2110 — DAvenport 5-8377

BIO-MEDICAL ELECTRONICS

Chairman—**Mark S. Blumberg, M.D.***

Stanford Research Institute
Menlo Park, Calif.
DAvenport 6-6200, Ext. 3106

3624 Lupine Ave.
Palo Alto, Calif.
DAvenport 6-2476

Vice Chairman—**Keith Killam**

Stanford University School of Medicine
Dept. of Pharmacology
Palo Alto, Calif.
DAvenport 1-1200, Ext. 5353

722 Mayfield
Stanford, Calif.
DAvenport 1-3178

Secretary-Treasurer—**Kenneth W. Gardiner**

Stanford Research Institute
Menlo Park, Calif.
DAvenport 6-6200, Ext. 2659

661 La Mesa Drive
Menlo Park, Calif.
DAvenport 3-3491

BROADCASTING

Chairman—**W. H. Hartman***

KCRA Inc.
310 Tenth St.
Sacramento, Calif.
HIllside 4-7300

7808 Greenridge Way
Fair Oaks, Calif.
YOrktown 7-3974

Secretary-Treasurer—**Hugh W. Granberry**

General Electric Company
565 Broadway
Redwood City, Calif.
EMerson 8-4681

3839 Vineyard Avenue
Redwood City, Calif.
EMerson 6-3995

CIRCUIT THEORY

Chairman pro tem—**R. C. Kiessling**

ITT Laboratories
937 Commercial Street
Palo Alto, Calif.
DAvenport 1-0211

1226 Parkington Ave.
Sunnyvale, Calif.
REgent 9-1267

COMMUNICATIONS SYSTEMS

Chairman—**Kenneth P. Patterson***

Sperry Gyroscope Company
294 Commercial Street
Sunnyvale, Calif.
REgent 9-2344

10592 Johansen Drive
Cupertino, Calif.
ALpine 2-6921

Vice Chairman—**R. A. Isberg**

Ampex Corporation
934 Charter Street
Redwood City, Calif.
EMerson 9-7111, Ext. 709

(M) 200 Concord Drive
Menlo Park, Calif.
DAvenport 3-1237

Secretary-Treasurer—**W. R. Vincent**

Stanford Research Institute
Menlo Park, Calif.
DAvenport 6-6200, Ext. 3054

245 Alvarado Ave.
Los Altos, Calif.
WHitecliff 8-7661

ELECTRON DEVICES

Chairman—**Joseph Hull***

Litton Industries
960 Industrial Road
San Carlos, Calif.
LYtell 1-8411, Ext. 247

500 Palomar Drive
Redwood City, Calif.
EMerson 8-9015

Vice Chairman—**H. J. Shaw**

Stanford Microwave Laboratory
Stanford University
Stanford, Calif.
DAvenport 3-2441, Ext. 260

719 Alvarado Row
Stanford, Calif.
DAvenport 3-5398

* Member, Executive Committee
(M) Preferred mailing address

Secretary—**Douglas W. Dupen**

Associated Techdata, Inc.
850 Hansen Way
Palo Alto, Calif.
DAvenport 1-2180

251 Leland Ave.
Menlo Park, Calif.
DAvenport 5-3302

Treasurer—**John P. Kern**

Lenkurt Electric Company
1105 County Road
San Carlos, Calif.
LYtell 1-8461, Ext. 204

30 Woodhue Court
Redwood City, Calif.
EMerson 8-3484

Secretary—**Jules Needle**

Sylvania Electric Products, Inc.
Electron Tube Division
500 Evelyn Ave.
Mountain View, Calif.
YOrkshire 8-6211, Ext. 2076

(M) 495 El Capitan Place
Palo Alto, Calif.
DAvenport 1-1590

Treasurer—**Murray Disman**

Eitel-McCullough, Inc.
San Carlos, Calif.
LYtell 1-1451, Ext. 475

1643 Kitchener Drive
Sunnyvale, Calif.
CHestnut 5-2334

ELECTRONIC COMPUTERS

Chairman—**Richard I. Tanaka***

Lockheed Missiles and Space Division
Dept. 58-51, Building 204
3251 Hanover Street
Palo Alto, Calif.
DAvenport 4-3311, Ext. 45473

3427 Janice Way
Palo Alto, Calif.
DAvenport 6-8802

Vice Chairman—**Gardiner L. Tucker**

IBM Research Laboratories
Monterey and Cottle Roads
San Jose 14, Calif.
CYpress 7-2950, Ext. 2182

12179 Brookglen Drive
Saratoga, Calif.
ALpine 2-7831

Secretary-Treasurer—**Hewitt D. Crane**

Stanford Research Institute
Building 306-A
Menlo Park, Calif.
DAvenport 6-6200, Ext. 2939

752 Kendall Ave.
Palo Alto, Calif.
DAvenport 5-7604

ENGINEERING MANAGEMENT

Chairman—**Oscar T. Simpson***

Philco Corporation
3875 Fabian Way
Palo Alto, Calif.
DAvenport 6-4350, Ext. 300

1546 Wistaria Court
Los Altos, Calif.
YOrkshire 7-8515

Vice Chairman—**William D. McGuigan**

Stanford Research Institute
Menlo Park, Calif.
DAvenport 6-6200, Ext. 2405

12681 Robleda Ave.
Los Altos Hills, Calif.
WHitecliff 8-1911

Secretary-Treasurer—**L. Bruce Johnson**

Lenkurt Electric Co., Inc.
1105 County Road
San Carlos, Calif.
LYtell 1-8461, Ext. 308

211 Gabarda Way
Menlo Park, Calif.
DAvenport 2-2925

ENGINEERING WRITING & SPEECH

Chairman—**Arthur M. Walters***

Hewlett-Packard Company
1501 Page Mill Road
Palo Alto, Calif.
DAvenport 6-7000, Ext. 871

22 Doud Drive
Los Altos, Calif.
WHitecliff 8-5278

Vice Chairman—**James M. Weldon**

Sylvania Electric Products Inc. EDL
P.O. Box 205
Mountain View, Calif.
YOrkshire 8-6211, Ext. 2361

(M) 971 Manor Way
Los Altos, Calif.
YOrkshire 8-8631

INSTRUMENTATION

Chairman—**Nicholas L. Pappas***

Iconix Incorporated
945 Industrial Ave.
Palo Alto, Calif.
DAvenport 3-1411

835 Thornwood Dr.
Palo Alto, Calif.
DAvenport 5-9382

Vice Chairman—**H. A. Kazanjian**

Peninsula Associates
1345 Hancock Street
Redwood City, Calif.
EMerson 9-1226

Stanford Villa Apts.
3351 Alma Street
Palo Alto, Calif.

Secretary—**Leslie Burlingame**

Lenkurt Electric Company
1105 County Road
San Carlos, Calif.
LYtell 1-8461, Ext. 513

(M) 1079 Syracuse Dr.
Sunnyvale, Calif.
REgent 6-1857

Treasurer—**James G. Hussey**

General Radio Company
1186 Los Altos Avenue
Los Altos, Calif.
WHitecliff 8-8233

13366 Pastel Lane
Mountain View, Calif.
YOrkshire 8-3108

MICROWAVE THEORY & TECHNIQUES

Chairman—**Edward M. T. Jones***

Stanford Research Institute
Menlo Park, Calif.
DAvenport 6-6200, Ext. 2418

99 Stonegate Rd.
Portola Valley, Calif.
ULmar 1-1842

Vice Chairman—**Perry H. Vartanian, Jr.**

MELabs
3300 Hillview Ave.
Palo Alto, Calif.
DAvenport 6-9500, Ext. 295

335 Melville Avenue
Palo Alto, Calif.
DAvenport 3-0793

Secretary-Treasurer—**Peter D. Strum**

Applied Technology, Inc.
930 Industrial Ave.
Palo Alto, Calif.
DAvenport 1-5135

3490 Kenneth Drive
Palo Alto, Calif.
DAvenport 6-7676

MILITARY ELECTRONICS

Chairman—**Louis Gado***

Wiancko Engineering Co.
499 Hamilton Ave.
Palo Alto, Calif.
DAvenport 6-7053

1562 Landell
Los Altos, Calif.
YOrkshire 8-1860

Vice Chairman—**Walter J. Prise**

Lockheed Missiles and Space Division
P.O. Box 504,Dept. 83-31,
NIROP
Sunnyvale, Calif.
REgent 9-4321, Ext. 27410

1443 - 37th Avenue
San Francisco, Calif.
SEabright 1-0648

Secretary—**Jerome J. Dover**

Ampex Military Products Company
P.O. Box 727
Redwood City, Calif.
LYtell 1-5511

406 Deodara Drive
Los Altos, Calif.
YOrkshire 8-6310

Treasurer—**C. Boyd Norris**

Lockheed Missiles and Space Division
P.O. Box 504, Dept. 81-65,
Bldg. 102
Sunnyvale, Calif.
REgent 9-4321, Ext. 25321

(M) 385 S. El Monte Ave.
Los Altos, Calif.
WHitecliff 8-2867

* Member, Executive Committee
(M) Preferred mailing address

PRODUCT ENGINEERING & PRODUCTION

Chairman—**Charles A. Eldon***

Hewlett-Packard Co.
1501 Page Mill Road
Palo Alto, Calif.
DAvenport 6-7000, Ext. 470

3728 Carlson Circle
Palo Alto, Calif.
DAvenport 3-9843

Vice Chairman—**George F. Reyling**

Varian Associates
611 Hansen Way
Palo Alto, Calif.
DAvenport 6-4000

30 Toro Court
Portola Valley, Calif.
ULmar 1-0114

Secretary-Treasurer—**Olof Landeck**

Electro Engineering Works
401 Preda Street
San Leandro, Calif.
LOckhaven 9-3326

1061 Apple Drive
Concord, Calif.
MUlberry 5-3270

Program Chairman—**W. Dale Fuller**

Lockheed Missiles and Space Division
P.O. Box 504, Dept. 58-12
Plant 2, Bldg. 205
Sunnyvale, Calif.
DAvenport 4-3311, Ext. 45821

1049 Amarillo Ave.
Palo Alto, Calif.
DAvenport 5-6242

RADIO FREQUENCY INTERFERENCE

Organizer—**Peter Spencer**

Filtron Co., Inc.
926 Industrial Ave.
Palo Alto, Calif.
DAvenport 1-2280

RELIABILITY & QUALITY CONTROL

Chairman—**Robert A. Davis***

Philco Corporation
3875 Fabian Way
Palo Alto, Calif.
DAvenport 6-4350, Ext. 550

3417 Kenneth Drive
Palo Alto, Calif.
DAvenport 6-9160

Vice Chairman—**Julian Hilman**

Fairchild Semiconductor Corp.
1062 Linda Vista Street
Mountain View, Calif.
YOrkshire 7-5511

298 Waverly Street
Menlo Park, Calif.
DAvenport 6-9807

Secretary-Treasurer—**John W. Hall**

IBM Corporation
Dept. 546
Monterey & Cottle Rds.
San Jose 14, Calif.
CHerry 8-6067, Ext. 18

1296 Blaney Ave.
San Jose 29, Calif.
ALpine 2-2271

Program Chairman—**Rudy Cazanjian**

Sylvania Electronic Systems
P.O. Box 188, Bldg. 3
Mountain View, Calif.
YOrkshire 8-6211, Ext. 2517

1131 Covington Road
Los Altos, Calif.
YOrkshire 8-4111

SPACE ELECTRONICS & TELEMETRY

Chairman—**Boyd C. Roberts***

Lockheed Missiles and Space Division
P.O. Box 504, Bldg. 104
Sunnyvale, Calif.
REgent 9-4321, Ext. 26632

(M) 130 San Juan Court
Los Altos, Calif.
WHitecliff 8-4132

Vice Chairman—**Robert B. Morgan**

Lockheed Missiles and Space Division
P.O. Box 504, Bldg. 104
Sunnyvale, Calif.
REgent 9-4321, Ext. 28150, 26602

(M) 1042 Valley Forge Drive
Sunnyvale, Calif.
REgent 9-1523

Secretary-Treasurer—**Robert D. Baker**

Granger Associates
966 Commercial Street
Palo Alto, Calif.
DAvenport 1-4175

950 Kennard Way
Sunnyvale, Calif.
CHestnut 5-1476

Meeting Schedule 1960-1961

	Monday	Tuesday	Wednesday
1st		PGB, PGI	PGA, PGCT, PGMIL
2nd		PGRFI	PGAP, PGEM
3rd	EBSS	PGEWS, PGSET	PGBME, PGMTT,PGRQC
4th		PGEC, PGPEP	PGCS, PGED

September 1960
6 *PGI
7 PGCT
8 *PGED
20 PGSET
21 PGMTT/PGED
26 *EBSS
27 *PGEC; PGPEP

October 1960
4 *PGI
5 PGA; PGCT; PGMIL
12 *PGAP; PGEM
13 PGED/PGMTT
18 PGSET; PGEWS
19 PGRQC
24 *PGBME
25 *PGPEP; PGEC

November 1960
1 *PGI
2 PGMIL; PGCT
9 *PGAP; *PGED/PGMTT; PGEM
15 PGSET; PGEWS
16 PGBME; PGMTT
22 *PGPEP; PGEC; *PGI
23 PGED

December 1960
6 PGI
7 PGMIL; PGCT
13 PGEC
20 PGSET
21 PGRQC

January 1961
4 PGMIL; PGCT
11 *PGAP; PGEM
17 PGSET; PGEWS
18 PGBME; PGI; PGMTT
19 PGI
20 PGI
24 PGPEP; PGEC
25 PGED

February 1961
1 PGMIL; PGCT
7 PGI
8 PGAP†
15 PGAP†; PGRQC; PGBME; PGMTT
21 PGSET
22 PGAP†; PGED
28 PGPEP; PGEC

March 1960
1 PGMIL; PGCT
8 PGEM
15 PGBME; PGMTT
21 PGSET; PGEWS
28 PGEC

April 1961
5 PGMIL; PGCT
12 *PGAP; PGED
18 PGSET
19 PGRQC; PGBME; PGMTT
25 PGPEP; PGEC
26 PGED

May 1961
3 PGMIL; PGCT
5 PGRQC
10 PGEM; *PGAP; PGED
16 PGSET; PGEWS
17 PGBME; PGMTT
23 PGPEP; PGEC

June 1961
20 PGSET
22 PGEC

* Confirmed
† Tutorial series on plasma physics

EBSS—East Bay Subsection
PGAP—Professional Group on Antennas & Propagation
PGA—Professional Group on Audio
PGBME—Professional Group on Bio-Medical Electronics
PGB—Professional Group on Broadcasting
PGCT—Professional Group on Circuit Theory
PGCS—Professional Group on Communications Systems
PGED—Professional Group on Electron Devices
PGEC—Professional Group on Electronic Computers
PGEM—Professional Group on Engineering Management
PGEWS—Professional Group on Engineering Writing & Speech
PGI—Professional Group on Instrumentation
PGMTT—Professional Group on Microwave Theory & Techniques
PGMIL—Professional Group on Military Electronics
PGPEP—Professional Group on Product Engineering & roduction
PGRQC—Professional Group on Reliability & Quality Control
PGRFI—Professional Group on Radio Frequency Interference
PGSET—Professional Group on Space Electronics & Telemetry

Standards & Style

Numerous requests reach the **Grid** for information on the rules that govern our style for abbreviations and capitalization. Since these requests come from others besides **Grid** reporters, it would appear there is a general problem in this respect and the following information may be of interest. It was developed originally by the editors of "Electronics" in collaboration with representatives of the American Standards Association.

General Rules for Abbreviation

1. Omit periods except where the abbreviation spells a word, and except in cases such as the following:

Co.	Mfg.	St.
Corp.	Mr.	U.S.
Inc.	N.Y.	U.S.A.

2. Hyphenate two-letter abbreviations of two-word combinations. Do not hyphenate abbreviations consisting of three or more word combinations, as:
   - a-c (alternating current)
   - a-f (audio frequency)
   - f-m (frequency modulation)
   - avc (automatic volume control)
   - cro (cathode ray oscilloscope)
   - dpdt (double pole double throw)
3. In illustrations and text, adjustments and connections are in solid caps (corresponding with actual equipment), as: REGT OUT
4. Use the same abbreviation for both singular and plural forms of a word, and for the various grammatical forms such as nouns, adjectives, and adverbs.
5. Text abbreviations are lower case except where proper names are involved, and in cases such as the following:

A	(angstrom)
Awg	(American wire gage)
Btu	(British thermal unit)
C	(centigrade)
Eq.	(equation)
F	(Fahrenheit)
FCC	(Federal Communications Commission)
Fig.	(figure)
GMT	(Greenwich mean time)
IRE	(Institute of Radio Engineers)
JAN	(Joint Army-Navy)
K	(Kelvin)
L	(lambert)

6. In text, do not use the symbols:

°	(degrees)
′	(minutes, feet)
″	(seconds, inches)
#	(number, pounds)
/	(per)
%	(per cent)

Degrees are implied, without the use of either abbreviation or symbol, when specifying temperature values, such as –15 C or 77 F.

Common Text Abbreviations

A—angstrom unit
abc—automatic bass compensation
a-c—alternating current
a-c/d-c—a-c or d-c
a-f—audio frequency
afc—automatic freq. control
a-m—amplitude modulation
a.m.—ante meridiem
amp—ampere
amp hr—ampere hour
antilog—antilogarithm
atm—atmosphere
at. wt.—atomic weight
avc—automatic volume control
Btu—British thermal unit
C—degrees centigrade
c—candle
cal—calorie
cemf—counter emf
cgs—centimeter gram second
cir mils—circular mils
cm—centimeter
colog—cologarithm
Co.—company
Corp.—Corporation
cos—cosine
cosh—hyperbolic cosine
cot—cotangent
cps—cycles per second
c-r—cathode ray
cro—c-r oscilloscope
csc—cosecant
cu—cubic
cu cm—cubic centimeter
cu ft—cubic foot
cu in.—cubic inch
c-w—continuous wave
db—decibel
d-c—direct current
dcc—double cotton covered
deg—degree
d-f—direction finding
diam—diameter
dpdt—double pole double throw
dpst—double pole single throw
emu—electromagnetic unit
Eq.—equation
esu—electrostatic unit
etc—and so forth
F—degrees Fahrenheit
FCC—Federal Communications Commission
Fig.—figure
f-m—frequency modulation
f-m/a-m—f-m or a-m
fpm—feet per minute
fps—feet per second
ft c—foot candle
ft lb—foot pound
h—henry
h-f—high frequency
hp—horsepower
hr—hour
icw—interrupted c-w
i-f—intermediate frequency
iff—identify friend or foe
in.—inch
Inc.—incorporated
j—joule
JAN—Joint Army-Navy
K—Kelvin
kc—kilocycles per second
kg—kilogram
km—kilometer
kv—kilovolt
kva—kilovolt ampere
kw—kilowatt
kwhr—kilowatthour
lb—pound
l-f—low frequency
log—common logarithm
ma—milliampere
max—maximum
mc—megacycle
mcw—modulated c-w
meg—megohm
m-f—medium frequency
Mfg.—Manufacturing
mg—milligram
mh—millihenry
min—minutes, minimum
mm—millimeter
mmf—magnetmotive force
mph—miles per hour
mv—millivolt
mw—milliwatt
μ—micron
μa—microampere
μf—microfarad
μh—microhenry
μsec—microsecond
μv—microvolt
μw—microwatt
μμ—micromicron
μμf—micromicrofarad
N.Y.—New York
oz—ounce
p—page
p-f—power factor
p-m—phase modulation, permanent magnet
p.m.—post meridiem
psi—pounds per sq in.
qt—quart
r-f—radio frequency
rms—root mean square
rpm—rev. per min
rps—rev. per sec
scc—single cotton covered
sec—second; secant
shf—superhigh frequency
sin—sine
sinh—hyperbolic sine
spdt—single pole double throw
sp gr—specific gravity
sp ht—specific heat
spst—single pole single throw
sq—square
sq cm—square centimeter
sq ft—square foot
sq in.—square inch
ssc—single silk covered
s-w—shortwave
ton—tangent
tanh—hyperbolic tangent
t-m—time modulation
trf—tuned radio frequency
uhf—ultrahigh frequency
U.S.—United States
U.S.A.—United States of America
v—volt
v-a—volt ampere
vers—versed sine
vhf—very high frequency
vlf—very low frequency
vtvm—vacuum tube voltmeter
v-u—volume unit
w—watt
whr—watthour
yd—yard
yr—year

FROM EIMAC:

Breakthrough in tube technology opens up new range of reliability

You are looking at a major advance in tube design. This ceramic envelope is made with *beryllium oxide* —an amazing insulating material now introduced by Eimac for electron tubes. It offers thermal conductivity *ten times* greater than any other material in use today. It provides low losses, high breakdown strength and a comparatively low dielectric constant for improved bandwidth in critical applications such as output windows.

With the introduction of beryllium oxide, Eimac breaks through the problem of dissipating ever larger amounts of heat in dielectrics. And opens a new chapter in power-output capabilities of high power microwave and certain negative grid tubes. The result: a whole new spectrum of tube reliability and performance. Beryllium oxide is now being used in several Eimac production tube types generating ten kilowatts and above.

This significant advance in the state of the art of manufacturing electron tubes has been pioneered by an Eimac sponsored research program. Eimac sponsored research has also resulted in the recent introduction of the first practical quartz-to-metal seal. Eitel-McCullough, Inc., San Carlos, California.

Dunn

Kaisel

Lacy

Susskind

ELECTION NEWS

San Francisco Section

Chairman: **Donald A. Dunn,** director of research, Eitel-McCullough, Inc., and senior research associate, Stanford Electronics Laboratory. CalTech, BS 1946; Stanford, MS, Engineer, LLB, and PhD. Member California bar, Sigma Xi. Admitted to practice, U. S. Patent Office.

Vice Chairman: **Stanley F. Kaisel,** president and technical director, Microwave Electronics Corp. Washington University, BSEE; Stanford, MA and PhD. Litton Industries, 1955-1958; Stanford, ERL and ML research associate; RCA research engineer; Washington University, instructor; Harvard, special research associate; and USAF, technical observer.

Secretary: **Peter D. Lacy,** vice president and director of engineering, Wiltron Co. University of Florida, BSEE 1942; Stanford, MS 1947, PhD 1952. Stanford ML, research assistant and Sperry Gyroscope Fellow; Varian Associates, consultant; Hewlett-Packard Co., member of advanced development staff; Navy, radar countermeasures officer, member of technical mission to Japan.

Treasurer: **Charles Susskind,** associate professor, electrical engineering department, University of California. CalTech, BSEE 1948; Yale, MEng 1949, PhD 1951. Stanford, research associate and lecturer ML, assistant to director; University of California, 1955; USAF, radar specialist. Author, "Dictionary of Style," SF Press; Clerk-Maxwell Premium paper, British IRE, 1952. British IRE, APS, ASEE, History of Science Society, Society for the History of Technology, Sigma Xi, Tau Beta Pi.

East Bay Subsection

Chairman: **Alexander J. Stripeika,** head of research & development engineering divisions, electronics engineering department, Lawrence Radiation Laboratory, University of California. BSEE. U. S. Navy, electronics officer.

Vice Chairman: **Eugene A. Aas,** division leader, product-engineering department, Sandia Corporation. North Dakota Agricultural College, BSEE. Farnsworth Television and Radio Corp., missile guidance development; U. S. Army Signal Corps, radar officer; General Electric, test engineer. Tau Beta Pi.

Secretary-Treasurer: **John T. Lavrischeff,** Lawrence Radiation Laboratory, University of California.

Stripeika

Aas

Lavrischeff

Professional Group on Antennas & Propagation

Chairman: **Richard C. Honey,** technical program coordinator, electromagnetics laboratory, Stanford Research Institute. CalTech, BS physics; Stanford, EE, PhD. Navy, radio technician. PGMTT, RESA, Sigma Xi.

Honey

Leadabrand

Morita

Vice Chairman: **Raymond L. Leadabrand,** head of propagation group, Stanford Research Institute. San Jose State College, BS communication engineering 1950; Stanford, MSEE 1953. Stanford RPL, staff member 1952-1955; Philco Corp., field engineer 1950-1952. Sigma Xi, Commission III URSI, AAAS, AGU, Study Group VII CCIR.

Secretary: **Tetsu Morita,** head of radiation systems group, electromagnetics laboratory, Stanford Research Institute. University of Nebraska, BSEE 1944; Harvard, MS communications engineering 1945, PhD engineering sciences 1949. Sylvania Electric Products Co., consultant 1953; Trans-Sonics Inc., consultant 1951-1953; Harvard, research

(Continued on page 32)

Fujii

Wilkins

MORE PGAP

fellow and head of antenna research group 1949-1953. PGMTT, APS, Sigma XI, Pi Mu Epsilon, RESA.

Professional Group on Audio

Chairman: **Wesley Mort Fujii,** manager, contract development section, Ampex Professional Products Co. Illinois Institute of Technology, BSEE 1952. RCA, broadcast equipment; Ampex, 1955. AES, Tau Beta Pi, Eta Kappa Nu.

Vice Chairman: **Charles Wilkins,** manager of circuit development, Ampex Professional Products Co. Georgia Institute of Technology, BA physics 1947; Emory University, MSEE 1948. Ampex, 1958; David Bogen Co., assistant chief engineer, Bogen-Presto; Techcraft Inc., chief editor; American Machine and Foundry Co. AES.

Secretary-Treasurer: **Stanley Oleson,** Stanford Research Institute.

Professional Group on Bio-Medical Electronics

Chairman: **Mark S. Blumberg,** M.D., head of health economics group, Stanford Research Institute. Johns Hopkins University and Harvard, pre-medical training; Harvard Medical School, M.D. 1950; Bellevue Hospital, interneship; Harvard School of Public Health, special student 1955. SRI, 1956; U. S. Public Health Service, acting chief of health conservation section, occupational health program; operations research office, operations analyst. Operations Research Society of America, American Statistical Association, Research Society of America, International Hospital Federation.

Blumberg

Vice Chairman: **Keith F. Killam, Jr.,** associate professor, department of pharmacology, Stanford University School of Medicine. Tufts College, BS biology and chemistry 1948; University of Illinois, MS pharmacology 1953, PhD in pharmacology 1954; Karr Fellowship from Smith, Klein and French; senior research fellowship, USPH; University of California Medical Center at Los Angeles-Public Health Service, National Institutes of Health, senior research fellow, research pharmacologist. Smith, Klein and French Laboratories, research pharmacologist; University of Illinois, research associate. American Society of Pharmacology and Experimental Therapeutics, AAAS, New York Academy of Science, Western Pharmacology Society, Psychopharmacology Study Section NIH, Editorial Board International Review of Neurobiology.

Secretary-Treasurer: **Kenneth W. Gardiner,** research engineer, control systems laboratory, Stanford Reseach Institute. CalTech, BA applied physics 1949; MIT, SM electical engineering 1954. SRI, 1954; MIT, research engineer; Motorola research laboratory, research engineer. PGAC, Sigma Xi, RESA.

Professional Group on Communications Systems

Chairman: **Kenneth P. Patterson,** senior development engineer, Sunnyvale Development Center, Sperry Gyroscope Co. University of California, Stanford

(Continued on page 34)

THE BALLOT BOX

Sampling Technique

Detailed returns provided by W. T. Selsted, Ampex Corporation, chairman of the tellers committee for the recent Section elections, revealed that the total number of ballots cast was 111. Of these, the largest number of votes recorded was, as it should have been, for the contested position of treasurer—105 votes.

Considering the 3892 then current members in the San Francisco Section, this amounts to 0.0285 per cent, an even smaller turnout than that ordinarily experienced in a normal, uncontroversial local election.

If the election did not set any records for ballot-box stuffing, however, it did provide an interesting sample of geographical activity. Of the 111 total, the East Bay provided 20, San Francisco proper—3, the area from San Mateo to Redwood City—7, Menlo Park to Los Altos (including Palo Alto)—63, Sunnyvale and south—9, and those whose post offices generate unintelligible postmarks—9.

MEETING REVIEW

What to Do When the Flash Comes

For its initial organizational meeting, the new San Francisco Chapter of PGI convened in the new Physics Hall in June. After the proposal of the slate of officers (since elected) by the local organizer of the group, H. A. Kazanjian, Peninsula Associates, they heard a paper by John M. Cage, director of development, Hewlett-Packard Co.

Cage spoke on the subject of, "Management for Creativity and Productivity in Electronic Instrumentation." According to Cage, the engineer must be able to work his way out of a problem.

He must know all available instruments which pertain to his problem and must keep in close contact with new instruments so that he may have the most advanced knowledge of what the field offers.

The engineer needs imagination; he needs to know how to follow through when flashes of intuition come after intensive work. He needs to have frank, understanding discussions with his superior.

The engineer should be flexible in his choice of components to do the best job. As an example, the new -hp- r-f voltmeter (411A) uses both vacuum tubes and semiconductors.

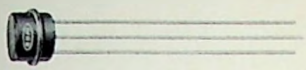
Problems of the future will probably involve photoconductors, tunnel diodes, new high-voltage diodes, new transistors, solid-state materials, phosphors, atomic frequency transducers, electron tubes, etc. New developments come constantly.

Cage gave a very warm and interesting lecture.

One of the needs of the new Group is the service of a photographer to cover meetings and other activities. Any present or prospective member of PGI with a hobby or interest in photography was asked to communicate with the Group reporter, the author of this review. Possession of a suitable camera will be helpful, but is not essential, since the **Grid** staff Speed Graphic is available as required.

—Les Burlingame

NEW PRODUCT CAPSULE ADVERTISEMENT



Silicon Trigistor

The SSPI Trigistor, available now in quantity for immediate delivery, is the first PNPN device designed specifically for logic circuitry at practical levels—in the 1-to-8-ma range. This device features complete on-off control at a single base terminal, with drive requirements on the micro-ampere level.

Since this single component will often replace two transistors, plus several associated capacitors and resistors, statistical reliability for a given system can be significantly improved. The number of required components can often be cut by as much as 50 per cent.

No mounting insulation is needed, since all active elements are isolated from the case. Complete MIL-S-19500 environmental capability has been incorporated.

Solid State Products, Inc., One Pingree Street, Salem, Massachusetts, Pioneer 5-2900.

MORE PGCS

University, University of Virginia. U. S. Army Signal Corps, development and systems-planning engineering. PGEM, PGMIL.

Patterson

Vice Chairman: **R. A. Isberg,** senior engineer, contract-engineering section, Ampex Professional Products Co. Colorado State College, AB physical science 1935. California Research & Development Co., lead engineer in systems and controls section 1951-1952; KRON-TV and KRON-FM, chief engineer 1946-1951; past chairman SFS; San Francisco Engineering Council, vice chairman 1952; SMPTE, past chairman 1957.

Isberg

Vincent

Secretary-Treasurer: **W. R. Vincent,** head of communications and propagation laboratory, Stanford Research Institute. Michigan State College, BSEE 1947, MSEE 1951. SRI, 1955; Bell Aircraft Corp., unit leader in charge of missile-communications-equipment development 1948; Army Signal Corps, radio technician 1943-1946.

Professional Group on Electron Devices

Hull

Shaw

Chairman: **Joseph F. Hull,** director of research, Litton Industries. University of Wisconsin, BSEE 1943; Rutgers, MSEE 1951; Polytechnic Institute of Brooklyn, doctorate, electrical engineering 1958. Litton, 1955; Signal Corps, engineer in charge of microwave-tube research and development 1946-1955; Signal Corps, thermionics branch 1945; GE Research Laboratory, OSRD research. Tau Beta Pi; Eta Kappa Nu; Sigma Xi; B. J. Thompson papers award, IRE.

Vice Chairman: **H. John Shaw,** senior research associate, Hansen Laboratories, and research associate, physics department, Stanford University, University of Washington, BSEE 1941; Stanford, MAEE 1942; PhDEE 1948.

Secretary: **Jules Needle,** head of tube research and development branch, research and engineering department, Sylvania STO. University of Michigan, PhD in electrical engineering 1951. University of Michigan, instructor and assistant professor, department of electrical engineering 1942-1955; Northwestern University, associate professor in electrical engineering and head of electron tube laboratory. Sylvania Electric Products, consultant 1953-1954 and 1958. PGMTT, Sigma Xi, Phi Kappa Phi, Eta Kappa Nu.

Treasurer: **Murray Disman,** group leader, traveling-wave-tube development group, Eitel-McCullough, Inc. New York University, BSEE 1953; Stanford, MS 1955, PhD 1959. Eitel-McCullough, 1959. American Physical Society, Sigma Xi, Tau Beta Pi, Eta Kappa Nu.

Needle

Disman

PROFESSIONAL GROUPS

The PEP Boys

In the July issue of the Newsletter of The Professional Group on Production Techniques, there was announced an action which had been taken at the March 23 meeting, involving a title change for the organization. It was first established by a successful motion that the field of mechanical environmental electronics be regarded as within the scope of PGPT. Another motion, which was defeated, was to change the name to Professional Group on Product Engineering. Finally, a successful motion established the revised title at Professional Group on Product Engineering & Production, or PGPEP.

GRID RETURNS

Letters to the Editor

East Palo Alto, Calif.

Dear Sir:

The valuable suggestions of Messrs. Radius and Hendriks in the **Grid-Bulletin** (July, 1960, p. 26) are long overdue.

The IRE has chosen, perhaps wisely, to remain a purely technical society, and not to become involved in social, economic, legislative, and other nontechnical matters affecting engineers.

It would nevertheless be worthwhile for it to acknowledge and endorse officially the efforts of various other societies in these nontechnical areas.

The IRE cannot beneficially ignore the profound changes that are taking place in the engineering profession as a whole (involving some 700,000 engineers), particularly the widespread promotion of registration, the rapid growth of the NSPE, the significant contributions of the ECPD and the EJC, and the gradual implementation of the so-called Functional Plan as an additional step toward the long-sought unity of the entire engineering profession.

Nor can it prudently ignore the increasing danger of many young engineers naively choosing the short-range material objectives of "professional" unions in preference to the long-range ideals of a true profession.

The IRE's Constitution lists as one of its aims, "the maintenance of high professional standards among its members." But what is meant here by "professional standards" remains unspecified.

Technical proficiency and advancement alone do not make an engineer professional. They must be supplemented by recognition of the obligations of the engineer to his employer and employees, his colleagues, his profession, and the public at large; by awareness of the impact of technology on the vital affairs of mankind; by exemplary adherence to a code of ethics; and by commitment to the highest standards of technical performance and personal conduct.

The IRE need not, as an organization, commit itself on the many social, economic, and legislative questions that face the profession. But there is nothing in its Constitution to prevent it from encouraging its individual members to further their own professional development and help upbuild the profession, by active participation in some society whose activities do extend into these nontechnical areas.

Just as the IRE has declined to be-

come involved in nontechnical matters, the NSPE has declined to become involved in technical matters. But every alert NSPE member is familiar with that Society's Policy 51:

"The NSPE directs its efforts to those professional [nontechnical] matters of common interest to all professional engineers. In addition, membership and active participation in at least one of the technical societies representing his field of practice is recognized as essential for achieving full stature as a professional engineer. NSPE, therefore, recommends that each member join and support the work of the technical society which serves his particular field of practice."

Yours very truly,
Keith W. Henderson
Member, AIEE, IRE, NSPE

New York, N. Y.

Dear Sir:

The FCC has requested that JTAC stimulate the interest of active engineers in serving on FCC-sponsored Co-operative Interference Committees (CIC). These committees are doing excellent work as indicated in the attached proggress report list and case histories.

The JTAC now wishes to enlist your further co-operation in interesting your members in these committees.

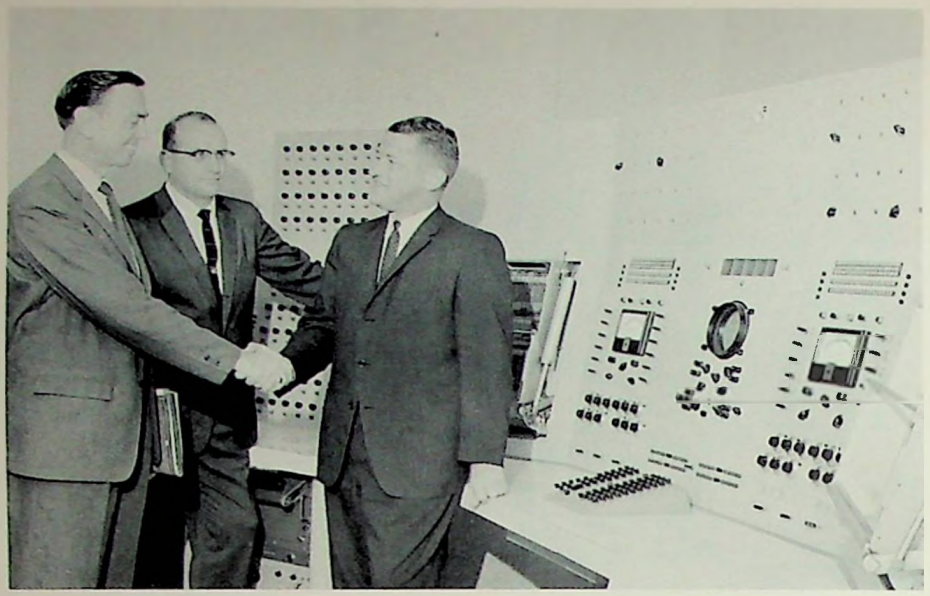
Sincerely yours,
L. G. Cumming,
Secretary, JTAC

Members of the San Francisco Section! Arise! You have nothing to lose but rfi. Case histories are on file at the Grid office. Contact Chairman Dunn if you are interested in this type of committee activity.—Ed.

EDUCATION

Back to School

Engineering and Sciences Extension of the University of California has published a fall catalog containing listings of all offerings, including a new course, Creativity and Inventive Design, to be given at Livermore. Also available for bulletin-board posting is a listing of Peninsula courses, including two to be given at Stanford Research Institute, Menlo Park; thirteen to be given at Mountain View Union High School; and seven to be given at Sequoia Union High School, Redwood City; as well as two evening lecture series on Micro-Electronic Engineering and Materials for Missiles and Spacecraft, both at Menlo Park.



During the Summer, Stanford Engineering Dean Joseph M. Pettit and Professor Allen M. Peterson received the gift of this large general-purpose analog computer from Karl A. Gardner, vice president, engineering, for Yuba Consolidatd Industries. Machine has 120 operational amplifiers

GRID SWINGS

It Is Reported:

Over the summer, some of the business aspects of electronics in the Bay Area have included the following: an Air Force contract for $4,601,518 to **Litton Industries,** San Carlos, for klystrons; a sales increase of 23 per cent to $34,038,525, an earnings rise of 18 per cent, and an all-time record backlog of $27,590,999 for the first three quarters of **Varian Associates'** 1960 fiscal year; construction well under way on two new buildings of 63,000 sq ft and costing over $1 million for **Eitel-McCulluogh, Inc.,** San Carlos; new orders booked during the month of June of more than $1,100,000, a record, for **Systron-Donner Corp., Concord;** and a vote by **Hewlett-Packard** shareholders to increase the number of authorized shares of the company from five to 15 million, preparatory to a three-for-one stock split to be accomplished by a 200-per-cent stock dividend; establishment of a basic research facility in England by **Ampex Corporation** at its British manufacturing subsidiary, Ampex Electronics Ltd., Reading, Berkshire; acquisition by **Fairchild Semiconductor Corporation** of a one-third interest in SGS, a Milan, Italy, semiconductor producer, for the overseas marketing and manufacturing of Fairchild's products; and completion of negotiations by officers of **Varian Asociates** and **Semicon Associates** for the acquisition of the latter by the former. Semicon has plants at Watsonville, California, and Lexington, Kentucky.

Colleagues congratulate R. E. Lawhead, IBM, second from left, on 25 years of service: J. J. Kenney, vice president and special assistant to the president; G. A. Cullen, general manager, general products division plant; and R. B. Johnson, advanced systems development division manager

E. Finley Carter, first and present president of **Stanford Research Institute,** appears on a current national IRE ballot as one of four candidates running for the board of directors — two to be elected. Carter has been with SRI since 1954 when he became manager of research operations. He became director and member of the board of directors in 1956, advancing to his present post in 1959. Native of Elgin, Texas, he holds a BSEE from Rice Institute.

Other business affiliations have included Sylvania, United Research Corp., and GE. Always interested in human relations, he held the positions of vice president for industrial relations and for engineering in two successive years at Sylvania.

Carter *Ogilvie*

Allan R. Ogilvie has assumed new duties as vice president in charge of marketing at **Secode Corporation,** San Francisco. Ogilvie, who has been with Secode since 1957 as chief engineer, was formerly with Western Electric and RCA.

International Business Machines has announced the following personnel activities: appointment of **W. D. Bolton** to managership of the general-products-division development laboratory, from manager of machine technology in the general-products division at White Plains, New York; promotion of **Peter F. Jenks** to technical program manager of storage-file development in the general-products-division development laboratory; completion of 25 years of service by **R. E. Lawhead,** assistant manager of the advanced-systems-development laboratory; advancement of **Trigg Noyes** to managership of product testing for the electric typewriter division at Lexington, Kentucky, from technical program manager of storage-file development; advancement of **N. A. Vogel** to the position of senior engineer at the advanced-systems-development division

Bolton *Vogel*

laboratory; and assignment of **Victor R. Witt** to a special program of random-access-memory development from managership of the general-products-division development laboratory, San Jose.

Long & Associates, Inc., Redwood City manufacturers' representatives, has appointed **Howard Gordon** as sales application engineer and **Vern Harding** as application engineer. Gordon has been with Kleinschmidt Laboratories and Smith-Corona. Harding was formerly a development engineer at Ampex Corp.

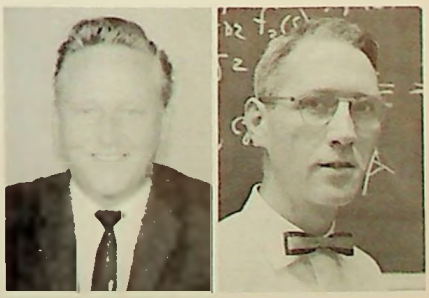
Gordon *Harding*

Dr. **Oscar Buneman,** plasma and electron-dynamics specialist from Cambridge University, has joined the **Stanford Electronics Laboratories** as senior research associate and lecturer in electrical engineering. In addition to teaching, Buneman joins Dr. **Donald A. Dunn** and Dr. **Heinrich Derfler** in research directed toward a basic understanding of limitations on current flow in plasmas. Buneman studied mathematics and physics at Hamburg University and received undergraduate and graduate degrees from Manchester University.

Western Electronic Manufacturers Association has announced the affiliation of eleven new members. Three of these are in the Bay Area; **Advanced Technology Laboratories,** Mountain View, space-vehicle instrumentation, **John A. McEnroe,** WEMA representative; **Components for Research Inc.,** Palo Alto, high-voltage epoxy-resin insulators, **Joseph D. Bianco,** WEMA representative; and **Delcon Corporation,** Palo Alto, communications and navigational equipment, **Alan B. Simpkins,** WEMA representative.

Appointment of **Richard H. Muenzer** as sales engineer for **Cerruti and Associates** has been announced.

Muenzer joins Cerruti & Associates after several years with Philco Corporation at its western defense laboratory in Palo Alto, where he held positions as reliability test engineer, test design group manager, and project leader of the Courier satellite solar cell fabrication. Previous to his employment at Philco, he served as a research engineer for Eitel-McCullough, Inc.



Muenzer *Corcoran*

In the research & development division of **Beckman & Whitley,** San Carlos, manufacturer of photo instrumentation, meteorological systems, and missile components, **John W. Corcoran** becomes chief scientist.

In Palo Alto, **A. B. Dick Company** has established a new research and devel-

(Continued on page 40)

New A. B. Dick research and development laboratory, Palo Alto

MORE SWINGS

opment laboratory at 3950 Fabian Way. It will concentrate on research in the electronic information field, including the development of high-speed display systems to be used with computer-generated information. Engineering manager of the new laboratory has been announced as **William E. Evans, Jr.**, who was in charge of television and related video systems research at Stanford Research Institute from 1949 to 1959, the time of his joining the Dick Company.

John S. McCullough has been appointed director of marketing for **Litton Industries** electron tube division. McCullough, a past chairman of the San Francisco Section, has been associated with the electron tube division since 1959 as assistant to the general manager in charge of new-product planning. Prior to joining Litton, he was director of research and engineering at Eitel-McCullough, Inc., San Carlos, where he was employed for 13 years.

Berkley J. Baker has become advertising manager for the division. Baker is filling a new position created in the marketing department.

For the past 10 years Baker has been associated with Eitel-McCullough, Inc., as advertising and public relations manager. He is a 1950 graduate of San Jose State College.

General Telephone & Electronics Corporation personnel activities in the Bay Area have recently included the election of **F. B. Bramhall,** Lenkurt engineering consultant, to the post of technical vice president of AIEE to direct and coordinate technical activities of its communications division; the appointment of **Thomas A. Combellick,** formerly Lenkurt chief engineer for military products development, to the position of Lenkurt government marketing manager; the promotion of **James J. Epis** from advanced development engineer to engineering specialist in Sylvania EDL; the promotion of **Norman N. Epstein** from project manager in the military engineering group to chief engineer for military development at Lenkurt; the appointment of **LeRoy W. Evans** to managership of the signal-processing department at Sylvania EDL; the election of **N. J. Gamara,** head of antenna research and development at Sylvania EDL, to membership in the national administrative committee for IRE-PGAP; the promotion of **W. J. Gemulla** to engineering specialist from advanced research engineer at Sylvania EDL; the advancement of Dr. **William J. Perry** from head of the advanced analysis department to manager of the newly created advanced systems laboratory of Sylvania EDL; and the appointment of Dr. **Vladimir Vodicka** as manager of the newly formed advanced development group at Lenkurt. Vodicka joined Lenkurt in 1958 as a senior staff scientist with the applied research group.

Entry of **Noller Associates Inc.**, Berkeley, into the field of industrial control and communications is announced by **Walter E. Noller,** president, a former member of the board of directors of WESCON. Noller was most recently associated with Lynch Carrier Systems, holding the position of director of planning. Past business affiliations include Bell Telephone Laboratories and Pacific Telephone and Telegraph Co. He is a graduate of the University of California, being awarded his MS degree in 1939.

R. Stuart McKay, associate clinical professor of experimental radiology and associate research physicist at the University of California Medical Center, San Francisco, has been elected to the national administrative committee of the Professional Group on Bio-Medical Electronics.

Fairchild Semiconductor Corporation, Mountain View, has named **David F. Allison** to head the newly formed transistor-development section in its research and development laboratories. Formerly senior member of the device-development section, Allison joined Fairchild in 1957, leaving Shockley Semiconductor Laboratories. Dr. **Harry Sello,** formerly head of the preproduction engineering section, has been named head of a newly organized process-engineering department, and **Charles T. Plough,** a device engineer in the preproduction engineering section, has become its head.

Moses C. Long, who has been associated with microwave tube development and applications for the last 15 years, has joined **Microwave Electronics Corporation** as assistant to the president. Long will be concerned primarily with sales and marketing but will also participate in the development of traveling-wave tubes. He was formerly with Hughes Aircraft Co. He joined Hughes research laboratories as a member of the technical staff and later held a key position in the microwave tube division

Bramhall

Combellick

Epis

with responsibilities in technical coordination and marketing.

Also, **Fred M. Schumacher** has been advanced to chief engineer from assistant technical director. A specialist in traveling-wave-tube development, Schumacher was formerly with General Electric microwave laboratories, Palo Alto, and a research assistant at Stanford Electronics Laboratories.

Long *Ginsburg*

Recent appointments within **Ampex Corporation** include the following: **Charles P. Ginsburg,** who led the development of the Videotape television recorder, has been elected vice president of the Corporation and manager of advanced video development; **Philip L. Gundy,** former vice president and manager of Ampex international division, becomes a senior vice president responsible for Ampex International, Ampex Professional Products, and Ampex Audio; **Robert L. Pappas,** manager of Ampex Military Products Co., has been elected a vice president of the Corporation; **Robert Sackman,** formerly vice president and general manager, becomes executive vice president and chief operating officer of the Corporation; **Thomas L. Taggart,** former vice president, becomes senior vice president responsible for Ampex Data Products Co., Ampex Military Products Co., and Orr Industries Co.

Personnel appointments at **Varian Associates** include the appointment of **Alfred Barrington** to the managership of advanced development in the vacuum products division; the appointment of **Art Capron** to the supervisorship of research and development design in the tube division; the appointment of **Herbert Dwight** to research and development field engineering in the instrument division; the appointment of **Herbert A. Finke** to a new position as director of long-range product planning (Finke was formerly vice president and general manager of Polytechnic Research and Development Corp.); and the appointment to managership of the manufacturing division of the instrument and equipment group of **Paul Sultzbach** (Sulzbach was formerly production manager of the electronics division of Stromberg Carlson).

EVENTS OF INTEREST

Meetings Summary

September 19-20—**International Symposium on Data Transmission.** Delft, Netherlands. Dr. H. C. A. Van Duuren, Postbus 174, Den Haag, Nederland.

September 19-22—**National Symposium on Space Electronics & Telemetry.** Shoreham Hotel, Washington, D. C. Henry W. Royce, Martin Company, Mail Stop H-2035, Baltimore, Md. (Local participant: Session Chairman Dr. W. E. Frye, Lockheed MSD, Palo Alto.)

September 21-22 — **Industrial Electronics Symposium.** Manger Hotel. Cleveland, Ohio. G. E. Hindley, Reliance Electric & Engineering, 24701 Euclid Avenue, Cleveland 17, Ohio.

September 23-24 — **Tenth Annual Broadcast Symposium.** Willard Hotel, Washington, D.C. R. F. Guy, 264 Franklin St., Haworth, New Jersey.

September 27-30—**Space Power Systems Conference.** Miramar Hotel, Santa Monica, California.

October 3-5—**Sixth National Communications Symposium.** Utica, New York. B. H. Baldridge, 25 Bolton Road, New Hartford, N. Y. (Local participants: Harold A. Kelley, James T. Nawrocki, and Jerome M. Rosenberg, Philco WDL; and Jack F. Cline, SRI.)

October 3-5—**Seventh Annual Professional Group on Nuclear Science Meeting.** Gatlinburg, Tennessee. H. E. Banta, Oak Ridge National Laboratory, P.O. Box X, Oak Ridge, Tennessee.

October 4-6 — **Sixth Conference on Radio Interference Reduction.** Chicago Illinois, S. I. Cohn, Armour Research Foundation, 10 West 35 Street, Chicago.

October 10-12—**National Electronics Conference.** Hotel Sherman, Chicago, Ill. Dr. T. F. Jones, Jr., School of Electrical Engineering, Purdue University, Lafayette, Indiana.

October 10-15—**Southwest Area IRE/ASQC Reliability Training Conference.** Lake Texoma Lodge, near Kingston, Oklahoma. Harry Shifflett, Texas Instruments, S/C Division, Dallas, Texas.

October 13-14—**Engineering Writing & Speech Symposium.** Bismarck Hotel, Chicago, Ill. Melvin Whitmer, Admiral Corp., 3800 W. Cortland St., Chicago.

October 17-19—**Symposium on Adaptive Control Systems.** Garden City, L. I., New York. H. Levenstein, W. L. Maxson Corp., 460 W. 34 Street, New York, N. Y.

October 19-21—**Symposium on Space Navigation.** Columbus, Ohio. Prof. J. D. Kraus, Ohio State University Radio Observatory, 2024 Neil Avenue, Columbus 10, Ohio.

October 24-26—**East Coast Conference on Aeronautical & Navigational Electronics.** Lord Baltimore Hotel, Baltimore, Maryland. S. Hershfield, Mail #G-3143, Martin Company, Baltimore 3, Maryland. (Local participant: Glenn H. Keitel, Philco Corp.)

Papers Calls

October 1—Complete manuscripts for the 5th Midwest Symposium on Circuit Theory (University of Illinois, May 7, 8, 1961). Send to: Professor M. E. Van Valkenburg, Department of Electrical Engineering, University of Illinois, Urbana, Illinois.

October, 1960—Manuscripts for the IRE Transactions on Human Factors in Electronics, "Automation of Human Functions," (March 1961 issue). Send to: Dr. Thomas Marill, Bolt Beranek and Newman, Inc., 50 Moulton Street, Cambridge 38, Mass.

October 14—300 to 500-word abstracts plus 50-word summary for the 1961 International Solid-State Circuits Conference (Philadelphia, Pa., Feb. 15-17, 1961). Send to: Jerome J. Suran, Bldg. 3, Room 115, General Electric Company, Electronics Park, Syracuse, New York.

October 21—100-word abstracts and 500-word summary, both in triplicate, for 1961 IRE International Convention (New York, March 20-23, 1961). Send to: Dr. Gordon K. Teal, chairman, 1961 Technical Program Committee, The Institute of Radio Engineers, Inc., 1 East 79 Street, New York 21, N. Y.

November 1—500-word abstracts, including an original and four copies, for the 1961 7th Regional IRE Technical Conference & Electronic Exhibit (Phoenix, Ariz., April 26-28, 1961). Send to: H. W. Welch, Jr., Motorola, Inc., P.O. Box 1417, Scottsdale, Arizona.

November 15—100-word abstracts and 500-word summaries for the Winter Convention on Military Electronics (Los Angeles, Calif., Feb. 1-3, 1961). Send to: Dr. John J. Myers, Hoffman Electronics Corp., Military Products Div., 3717 S. Grand Ave., Los Angeles, Calif.

THE SECTION

Membership Status

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

Milton F. Adam
B. Eugene Applegate
Jack M. Baldwin
Joseph L. Barton
Peter W. Bauer
Gordon K. Blanz
Lee C. Bodenhamer
Merlin J. Bowen
James R. Boytz
J. J. Bradley
Franklyn H. Brady
William E. Brandt
Charles F. Brown
Jackie E. Brown
John K. Campbell
Bernard F. Cassidy
Thomas P. Chelboun
Warren L. Clark
Brian K. Conant
George J. Correlli
Kenneth H. Crandall, Jr.
William W. Dawes
Jordan J. Dobrikin
Boyd C. Fair, Jr.
Curtis Franklin, Jr.
William C. Fredrick
Eugene A. Fucci
Warren Geller
Richard G. Geiger
John E. Gerling
Shelby D. Givens
Irwin Goldman
Robert O. Gosswiller
Kenneth A. Green
Phillip S. Green
Donald W. Griswold
John P. Hammel
Vernon C. Harding
Aubrey Harris
Boyd M. Hartle
Le Grande O. Hatfield
Roger L. Housvick
Kenneth V. Hayes
Mitsuo Higuchi
Gary Holt
Walter O. Huffman, Jr.
Paul E. T. Jensen
Ralph H. Jensen
Max L. Jones, Jr.
Paul H. Kane
Brown L. Kendrick
John Koerner
Alan E. Kushnick
Richard U. Laine
De Witt Landis, Jr.
Delano R. Lawin
Joseph R. Lewis
James M. Lomasney
James R. Long
Moses C. Long
Charles E. Lowman
Raul C. Lucero
Paul M. Lufkin
Maurice B. McKeehan
Fred J. MacKenzie
Frederick M. Magness
Thomas W. Mancebo
Rudolph Maravich
Joseph Marino
Darrell L. McClure
Robert W. Martin
Glenn O. Martinson
Joseph L. Masi
Alex Mayer
F. Dan Meadows
Edward M.Miller
Paul M. Miller
James M. Moore
Lewis M. Mozzini
John F. Mullen
Colbert K. Nataka
J. Norman Nelson
William P. Nilsson
George A. Ohlmann
Sidney Owen
Donald L. Parker
Kennethh G. Pauwels
Robert E. Pechacek
Hyman Plutchok
William D. Rausch
Donald A. Redman
R. C. Retherford
Sam F. Rich
Robert G. Rickey
Grant C. Riddle
John W. Riggen
Craig G. Roberts
Robert R. Rogers
David F. Rollins
Russell A. Rowley
Daniel A. Ruskin
Jack L. Ryman
Kenneth A. Saunders
Henry K. Seaman
Arthur F. Seaton
Edwin M. Seeley
Martin Seldon
Wayne C. Seppeler
Elmer B. Shapiro
James S. Sherwin
Richard C. Silver
John D. Snavely
David R. Steenhausen
James S. Stimson
R. A. Stonesifer
Gene F. Straube
Wilfred A. Sutton
Grayson K. Sweeley
Gordon E. Talmage
Duncan N. Tanner
James H. Taraldson
Phelps K. Ter Huen
Robert E. Thompson
Roy M. Tidwell
Donald E. Tolmie
William E. Tutt
I. M. Vann, Jr.
Douglas F. Walsh
Robert M. Wert
Leonard B. Wilker
Charles A. Williamson
Fred R. Wolfe, Jr.
Masami Yoneji
Donald E. Yost
Robert H. Youden
John R. Zetkov

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

Richard P. Adam
Paul J. Ahren
Richard A. Aldrich
Lloyd W. Allen
Albert Ando
Austin P. Ardoin

Wilfred T. Asado
Henry J. Becker
Willard V. Bolt
Rodney D. Bowes
Dale L. Breit
Richard E. Brubaker
Lewis Bruser
E. Capiello-Llamozas
Jesus Ceniceros
Rollo C. Chapman
William Chow
Robert L. Cougoule
Kenneth K. Davis, Jr.
Ivan C. De La Rocha
John K. Draper
Peter F. Dunne
Douglas W. Dupen
Donald D. Farnstrom
Johhn D. Fernlund
William R. Fowler
Harley L. Halverson
Albert A. Harmon
George L. Heiter
Charles T. Hopper
John M. Huish
Roy B. Hurlbut
Michael G. Hurley
James P. Jacques
Lyle Jon
Seymour Jeffery
Peter D. Jurgensen
Spyros Kagarakis
Juris V. Kanbergs
Thomas J. Kendrew
Harry Kim
Norman W. Kimmy
Robert J. Knipping
Richard Kohler, Jr.
Raymond S.Kong
Ben O. Lange
Otho Lawrence
John P. Leach
Charles E. Leake
Yook B. Lee
Kenneth A. Lund
George A. McAlpine
Bing Hong Mah
Robert J. Marks
James E. Mills
Gil W. Mock
Michael J. Moore
David R. Moyer
Delis Negron, Jr.
Lennart Nylander
Alfred R. Perry
WiWlliam A. Peterson
Robert L. Pflieger
James Platts
Richard T. Quast
Josef Raviv
Francis J. Riley
Lloyd Scherbinske
Arthur R. Schmidt
Donald N. Scott
Jess J. Silva
Robert W. Skyles
Frank D. Stanghellini
Roy E. Steffen
William J. Sternberg
Jan J. Suchoparek
Merle K. Swanson
William L. Sweet
Marvin J. Tarlow
Roy P. Tenold
Hans W. Toensfeldt
Constantine C. Tolkach
Samson K. K. Toy
William H. Vickers
Samuel E. Wauchope, Jr.
Richard E. Weilacker
Ralph L. Westerman
Stuart G. Whittelsey, Jr.
Irwin R. Wolfe
Edwin L. Wood
John Woods
Jerome C. Woodard
Herbert M. P. Wu
Yasuo J. Yoshino

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

SENIOR MEMBER

John B. Damonte
Myron A. Huehler
Gene F. Franklin

MEMBER

Woody L. Archer
Glen L. Armann
Anastasio Baiz
Beverly C. Barr
David S. Colburn
Carter C. Collins
John S. Constantinides
Earl L. Cummins
Thomas G. Ellestad
Walton C. Ferris, Jr.
John F. Fitzgerald
Gin K. Fong
John W. Gallant
Allen A. Ginsling
Norman A. Greco
Everett E. Guthrie
Peter E. Hamm
J. Paul Heinzinger
Eric R. Isacson
Hartley J. Jensen
Robert C. Jones
Joseph Klimberg
Paul A. Lux
John P. McGuire
Nicholas Mitrofanoff
Robert F. Mlodnosky
Ronald H. Ohlfs
George K. Ozaki
Jesse L. Peeler
Jesse C. Richards
Cleaborn C. Riggins
Antonio Rader
William S. Simons
Richard W. Soshea
William P. Steed
Donald A. Stoye
Robert J. Tockey
Claude Tucker, Jr.
William F. Vogelzong
Paul K. C. Wang
Robert E. Werner
Don R. Willett, Jr.
Lawrence H. Wilson

ASSOCIATE MEMBER

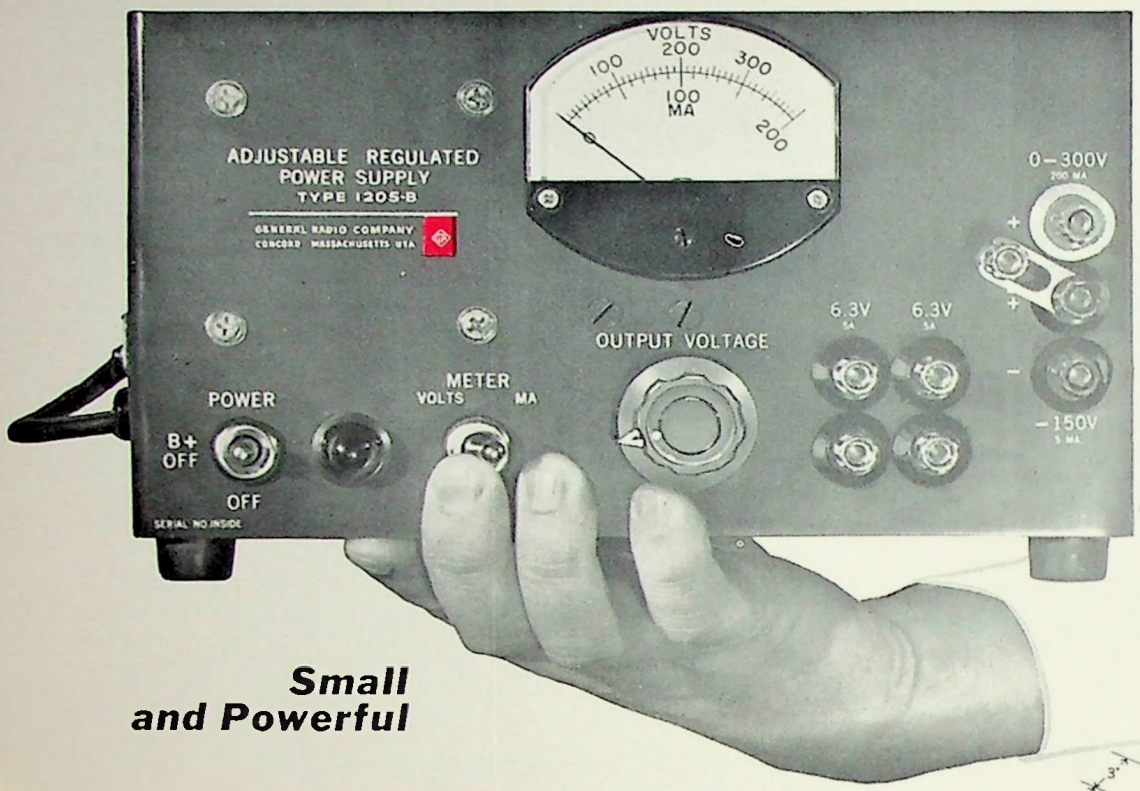
Paul G. Banchero
James L. Palmer
Forrest L. Rutledge
Raman Sarda
William D. Whitney

MANUFACTURERS INDEX

Manufacturer	Representative
Ace Engineering & Mch. Co.	Premmco, Inc.
Accurate Instrument Co.	Jay Stone & Assoc.
Acton Laboratories	White and Co.
Adage, Inc.	J. T. Hill Co.
Airflow Company	Premmco, Inc.
Ameray-Nuclear Shielding Prod. Div.	White & Co.
American Mach. & Fdry.	McCarthy Assoc.
Analab Instrument Corp.	V. T. Rupp Co.
Antlab, Inc.	Jay Stone & Assoc.
Baldwin-Lima-Hamilton Corp.	Neely Ent.
Beckman/Berkeley Division	V. T. Rupp Co.
Behlman Engineering Co.	T. Louis Snitzer Co.
Bogart Microwave	Jay Stone & Assoc.
Bomac Laboratories, Inc.	Neely Ent.
Boonton Electronic Products, Inc.	O'Halloran Assoc.
Consolidated Electrodynamics Corp.	Jack Kaufman
Data Instr., Tele.	T. Louis Snitzer Co.
Daytronic Corp.	McCarthy Associates
Di/An Controls, Inc.	Jay Stone & Assoc.
DuMont Labs, Tubes & Instruments	J. T. Hill Co.
Dynamics Instrumentation Co.	J. T. Hill Co.
Dymec, Div. Hewlett-Packard Co.	Neely Ent.
E-H Research Laboratories	J. T. Hill Co.
Edgerton, Germeshausen & Grier, Inc.	J. T. Hill Co.
Electro-Pulse, Inc.	T. Louis Snitzer Co.
Electro Switch Corp.	Jack Kaufman
Electronic Associates	O'Halloran Assoc.
Electronic Measurements Co.	O'Halloran Assoc.
Electronic Mechanics Inc.	Jack Kaufman
Emerson & Cuming	McCarthy Assoc.
EMI-Electronics, Ltd.	White & Company
Empire Devices Products	White and Company
ERA Engineering, Inc.	Premmco, Inc.
John Fluke Mfg. Co.	McCarthy Assoc.
Franklin Electronics, Inc.	T. Louis Snitzer Co.
General Communication	T. Louis Snitzer Co.
Gladding McBean & Co.	Jack Kaufman
Glass-Tite Industries	Jay Stone & Assoc.
Guardian Electric Mfg. Co.	Jack Kaufman
Hewlett-Packard Company	Neely Enterprises
Heli-Coil Corp.	Premmco, Inc.
Houston Instrument Corp.	McCarthy Associates
Huggins Labs., Inc.	O'Halloran Assoc.
Hughes Products Co.	McCarthy Assoc.
Jerrold Electronics	Instruments for Measurements
Impact-O-Graph Corp.	White and Co.
Kauke and Co., Inc.	Jay Stone & Assoc.
Keithley Instruments	T. Louis Snitzer Co.
Kepco, Inc.	V. T. Rupp Co.
Kin Tel	Neely Enterprises
Lawrence Manufacturing Corp.	Premmco, Inc.
Levinthal Electronic Nuclear Div.	White and Co.
Levinthal Electronic Equip. Div.	O'Halloran Assoc.
Lindsay Structures	Premmco, Inc.
Massa Div., Cohu Electronics	McCarthy Assoc.
Menlo Park Engineering	O'Halloran Assoc.
Microwave Electronics Corp.	Jay Stone & Assoc.
Millivac Instrument Div., Cohu	McCarthy Assoc.
Narda Microwave Corp.	O'Halloran Assoc.
Norwood Unit-Detroit Controls	J. T. Hill Co.
Optimized Devices	O'Halloran Associates
Oregon Electronic Mfg.	White and Company
Peerless Elec. Prod. (Altec Lansing)	Jack Kaufman
Polarad Electronics	T. Louis Snitzer Co.
Radiation Counter Labs	White and Company
Resdel Engineering Corp.	V. T. Rupp Co.
Sanborn Company	Neely Enterprises
Sanders Electronics, Ltd.	White and Co.
Scientific-Atlanta, Inc.	J. T. Hill Co.
Sensitive Research Instrument	McCarthy Assoc.
Sierra Electronic Corp.	T. Louis Snitzer Co.
Sorensen & Co.	McCarthy Assoc.
Sperry Microwave Electronics Co.	J. T. Hill Co.
Technibilt Corp.	J. T. Hill Co.
Telonic Industries	T. Louis Snitzer Co.
Ultrasonic Corp. of America	Premmco, Inc.
Vac. Tube Prod. Div. (Hughes Aircraft)	Jack Kaufman
Varian Associates	Neely Enterprises
Waters Manufacturing, Inc.	J. T. Hill Co.
Wayne Kerr Corp.	McCarthy Associates
Weinschel Engineering	O'Halloran Assoc.
Wiancko Engineering Co.	V. T. Rupp Co.
Wincharger Corp. (Zenith Radio Corp.)	Premmco, Inc.

INDEX TO ADVERTISERS

Arnold Engineering Co. 7
Ballantine Laboratories 43
Beckman & Whitley, Inc. 43
Columbia Technical Corp. 41
DeMornay-Bonardi 44
E. I. Dupont de Nemours & Co. (Inc.) 19
Eitel-McCullough, Inc. 29
Electro-Mechanical Research, Inc. 34
Electro-Scientific Industries, Inc. 31
Elmar Electronics, Inc. 21
Food Machinery & Chemical Corp. 41
General Radio Co. 48
Gertsch Products, Inc. 47
Gray Company, Hugh 40
Gudebrod Bros. Silk Co. 27
Hewlett-Packard Co. 17
Hill Company, J. T., 1682 Laurel St., San Carlos; LYtell 3-7693 46
Hughes Co., Inc., R. S. 33
Hughes Aircraft Co. 13
Jet Propulsion Laboratory 39
Kaufman, Jack, 126 25th Avenue, San Mateo; FIreside 1-4942 ..... 35, 46
Kay Electric Co. 42
Litton Industries, Electronic Equipments Div. 11
Luscombe Engineering Co. 43
McCarthy Assoc.; 635 Oak Grove, Menlo Park; DAvenport 6-7937 ..... 33, 46
Measurements Corp. 36
Micromega Corp. 36
National Union Electric Corp. 44
Neely Enterprises, 501 Laurel, San Carlos; LYtell 1-2626 1317 15th St., Sacramento; GL 2-8901 ..... 4, 46
O'Halloran, John Francis & Associates, 825 San Antonio, Palo Alto; DAvenport 6-1493 ..... 45, 46
Perkin Engineering Corp. 3
Permanent Employment Agency 41
Premmco, Inc., P.O. Box 412, Alameda; LAndscape 3-9495 46
Rupp Co., V. T.; 1182 Los Altos Ave., Los Altos; WHitecliff 8-1483 46
Snitzer Co., T. L., 510 So. Mathilda Ave., Sunnyvale; REgent 6-6733 ..... 35, 46
Solid State Products, Inc. 33
Space Technology Laboratories 15
Stone & Associates, Jay; Box 583, Sunnyvale; YOrkshire 8-2770 46
Tech-Ser, Inc. 31, 35
Tektronix, Inc. 45
Tung-Sol Electric Inc. 18
Van Groos Co. 37
Varian Associates 2
White & Company, 788 Mayview, Palo Alto; DAvenport 1-3350 46



Small and Powerful

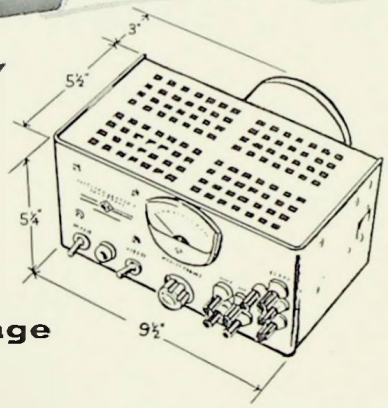
REGULATED POWER SUPPLY

Continuously Adjustable 0 to 300v, dc, at 200 ma *

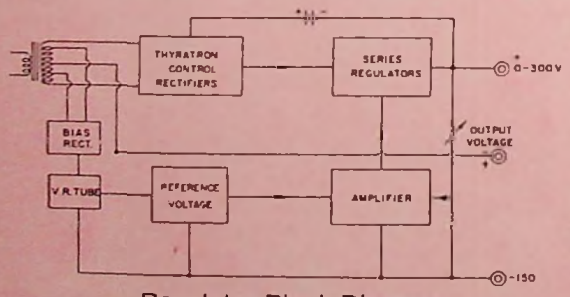
plus . . . -150v, dc, at 5 ma

. . . two 6.3v, ac, unregulated outputs at 5a each
(may be connected in series or parallel)

. . . all from a compact package



120 Watts in 0.2 Cubic-Foot Package . . . Excellent performance is obtained by using two regulator circuits. A high-efficiency controlled rectifier maintains the optimum operating voltage for a series regulator, regardless of line-voltage changes, load changes, or changes in output voltage setting. Wide-band regulator circuits and high-frequency by-passing of the output make for low output impedance over a wide frequency range. A large capacity fan provides cooling without dependence on convection, permitting the stacking of any number of units.



Regulator Block Diagram

* **Ripple:** less than 1 mv (120c)
Regulation: 0.75v for ±10% line change: 0.1v from no load to full load
Output Impedance: Approximately 0.3Ω plus 10 μh

Type 1205-B Adjustable Regulated Power Supply.....$290

Write For Complete Information

GENERAL RADIO COMPANY

WEST CONCORD, MASSACHUSETTS

Branch Engineering Office in SAN FRANCISCO
1186 Los Altos Avenue, Los Altos, California
James G. Hussey • Donald M. Vagelaar
Tel. WHitecliff 8-8233