

EDITOR'S PROFILE of this issue

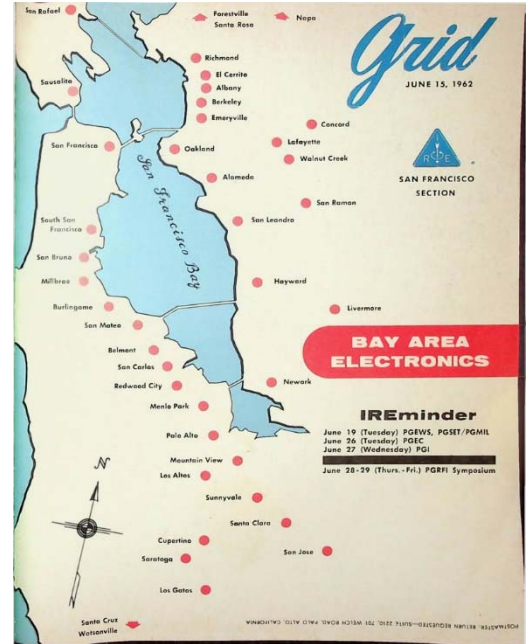
from a historical perspective ...

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

June 15, 1962:

Cover: The map shows locations of electronics companies around the Bay Area – what we now refer to as Silicon Valley. WEMA estimates that our companies already produce 25% of the U.S. total of \$13.2 billion in electronics sales in 1962, with growth of 11% expected this year. Western employment in our industry is up from 43,000 in 1961 to 47,000 this year. A listing of the Bay Area electronics companies starts on page 18.

p. 13: At the Engineering Management chapter meeting, the vice-president of General Telephone and Electronics Laboratories (GTEL) explains why GTE decided to locate the Labs in the Stanford Industrial Park after purchasing Sylvania. Following a 3-month survey, the Palo Alto area was chosen based on the growing electronics industry located here, and its proximity to Stanford and SRI; also, Lenkurt Electric (in San Carlos) was part of GTE. The new circular building is eye-catching in the Stanford park. Which brings on another story: When IBM decided in the early '50's that there might be a market for rotating magnetic storage (DASD), they asked Ray Johnson to scout out a West Coast location near one of their large customers – either Boeing in Seattle or the airframe companies in the Los Angeles area. But Ray preferred to locate it near Stanford; in addition, he could use the personnel and accounting functions at IBM's Hollerith-card facility, set up in the '40's in San Jose. So the new division set up shop at 99 Notre Dame Street in San Jose (where there's now an IEEE Milestone plaque commemorating the RAMAC - Random Access Method of Accounting and Control), later purchasing land on Cottle Road, shipping the first RAMAC 350 in 1957. This parallels the decision by Bill Shockley, at about the same time, to locate his semi-conductor company in Mountain View rather than in Culver City (part of Los Angeles) and hire top talent like Bob Noyce (from Philco, in Philadelphia), Gordon Moore (of "Moore's Law", commemorated by an IEEE Milestone plaque in Mountain View), Gene Kleiner (founded the VC company Kleiner Perkins), and Jean Hoerni (inventor of the planar process – an IEEE Milestone plaque, below, in Palo Alto commemorates this achievement). We can see the roots of what is termed "Silicon Valley" (in the early '70's) forming, to become the primary tech hub for the world. Somehow "Storage Valley" never took off.



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

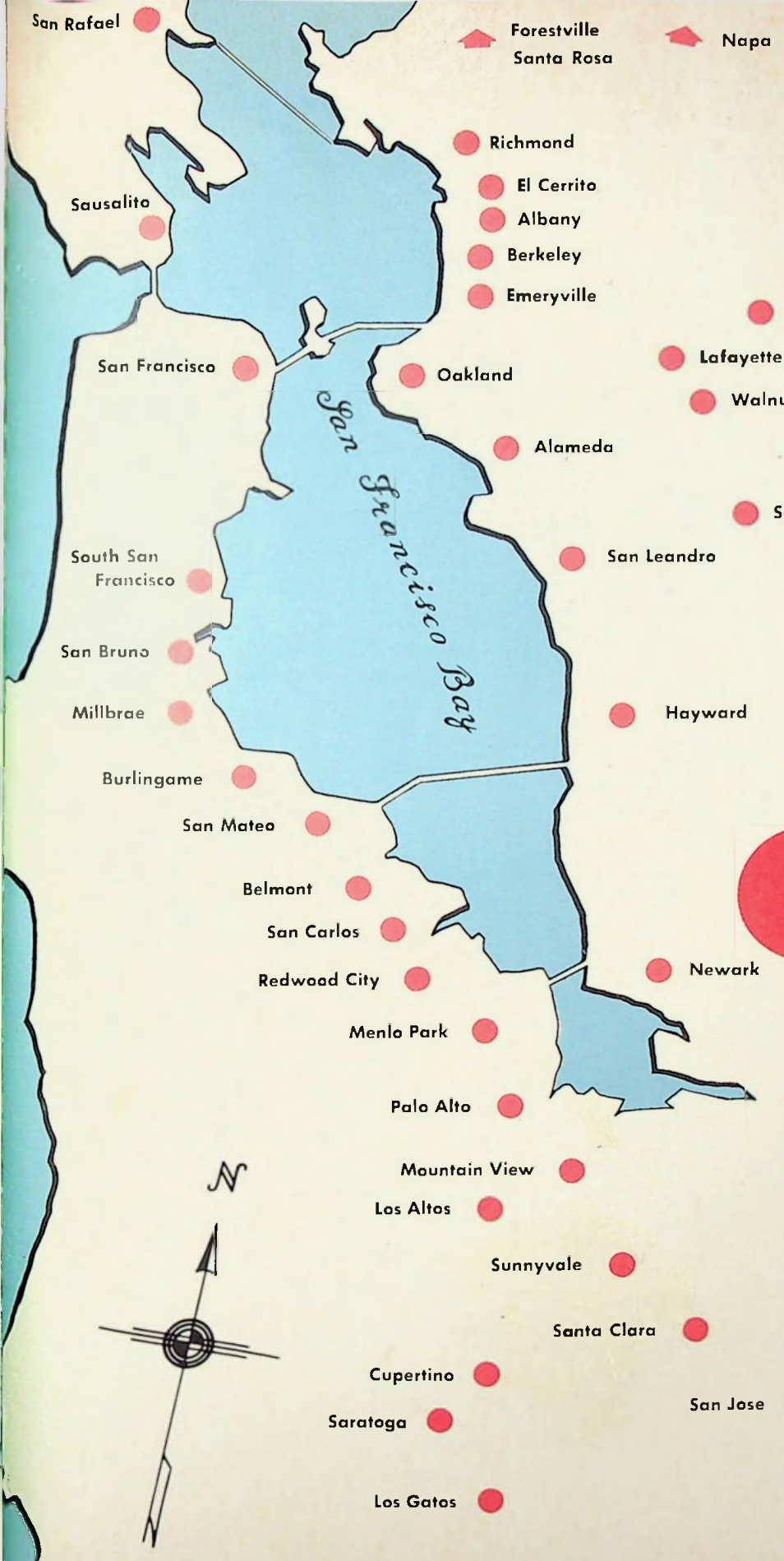
At time of scanning, the bound volumes are held by Paul Wesling. January, 2021 Contact p.wesling@ieee.org

Grid

JUNE 15, 1962



SAN FRANCISCO SECTION



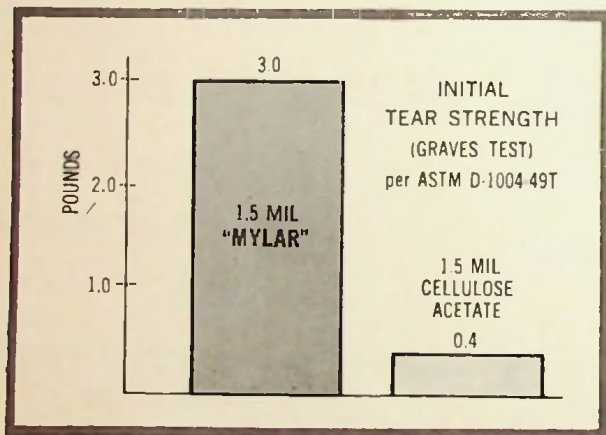
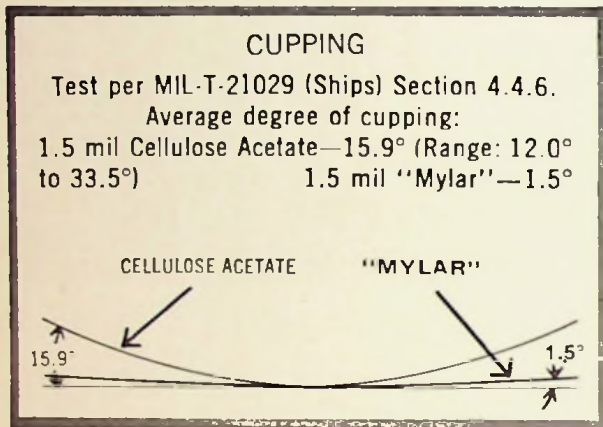
BAY AREA ELECTRONICS

IREminder

- June 19 (Tuesday) PGEWS, PGSET/PGMIL
- June 26 (Tuesday) PGEC
- June 27 (Wednesday) PGI
- June 28-29 (Thurs. - Fri.) PGRFI Symposium

Santa Cruz
Watsonville

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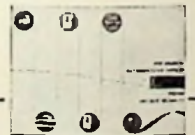
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




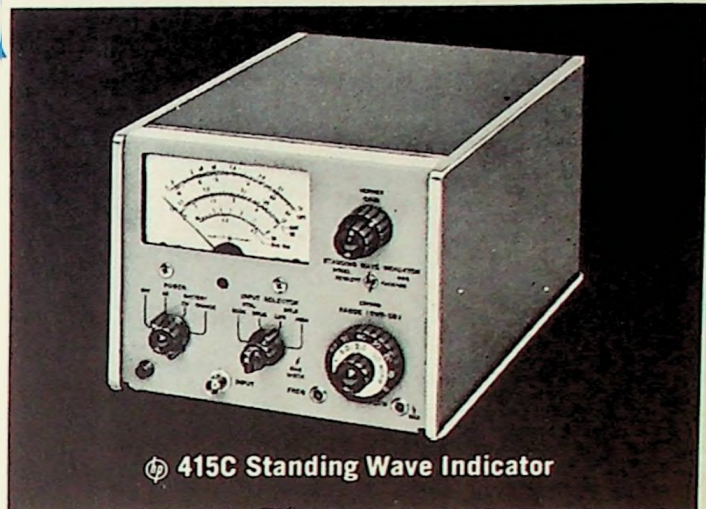
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
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



 415C Standing Wave Indicator

Model 415C Standing Wave Indicator is a new high-gain, low-noise solid state amplifier and voltmeter calibrated for square-law detectors to read directly in SWR or db. The amplifier is tunable, 950 to 1,050 cps, for matching source modulator or for optimizing several instruments in one system. Variable bandwidth (15 to 100 cps) permits both high sensitivity testing and swept-frequency work.

For highest resolution on precise attenuation measurements, you can expand to full scale each 2.5 db portion of any 10 db range with no "blind spots," and the reference is maintained automatically! This expansion gives you 24 calibrated ranges, 0-60 db, in 2.5 db steps. The 415C also reads directly in SWR; it is ideal for measuring reflection coefficient and extremely useful as a null indicator for audio-frequency bridges.

Two peak-limited bias currents, readable on the front-panel meter and adjustable $\pm 10\%$, prevent accidental bolometer burnout. Other inputs permit operation with crystals and as a null detector.

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SPECIFICATIONS

Frequency:	1,000 cps variable 5%, other frequencies between 400 and 1,500 cps available.
Sensitivity:	0.1 μ v rms at 30 cps bandwidth (lower sensitivity at 0° C).
Noise:	5 db below full scale with 0.1 μ v rms sensitivity and minimum bandwidth.
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Meter Scales:	SWR: 1-4; 3-10; EXPAND 1-1.3. DB: 0-10; EXPAND 0-2.5. Bolo Bias: 4.3 and 8.7 ma indicated.
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Input:	Bolo: 200 ohms, bias 8.7 or 4.3 ma; Crystal: 200 ohms, 200 K.
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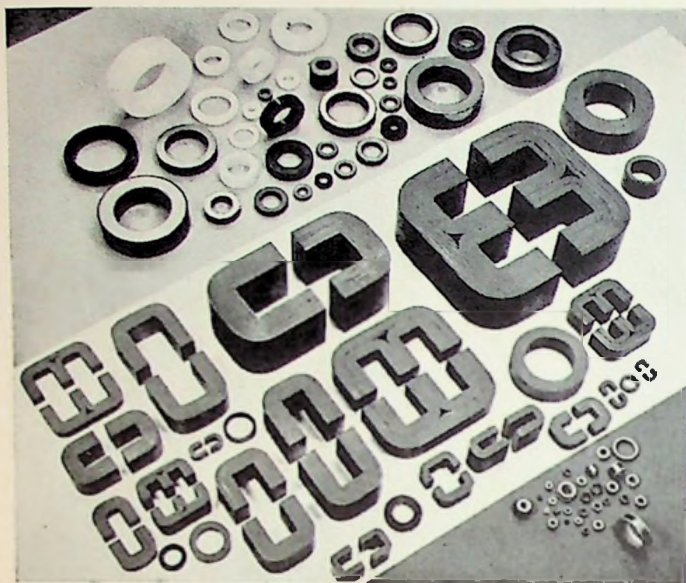
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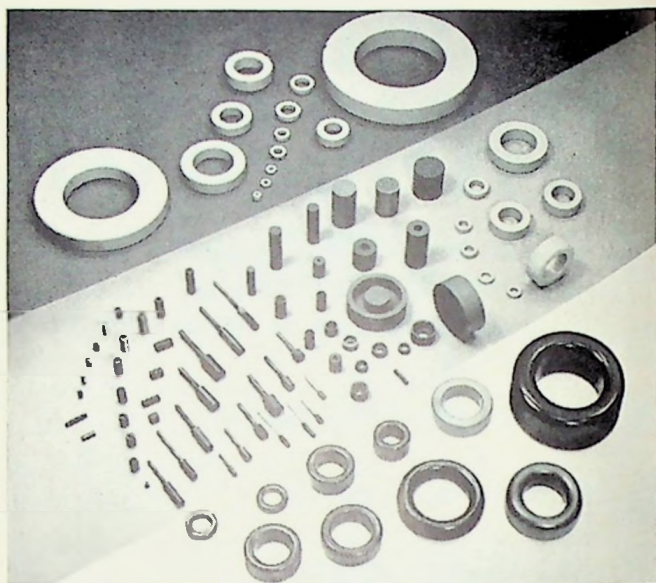
CONTACT OUR ENGINEERING REPRESENTATIVES, NEELY ENTERPRISES, FOR INFORMATION — Los Angeles, 3939 Lankershim Blvd., North H'wd., TR 7-1282 and PO 6-3811; San Carlos, 501 Laurel St., 591-7661; Sacramento, 1317 Fifteenth St., GI 2-8901; San Diego, 1055 Shafter St., AC 3-8103; Scottsdale, 771 S. Scottsdale Rd., 945-7601; Tucson, 232 So. Tucson Blvd., MA 3-2564; Albuquerque, 6501 Lomas Blvd., N.E., 255-5586; Las Cruces, 114 S. Water St., 526-2486.

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tric ceramics widely used in accelerometers, underwater signaling devices, microphones, and ultrasonic grinding and cleaning devices. For more data, write for Bulletin CM-116.



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Grid

June 15, 1962

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cover

The West is continuing to increase its share of the nation's total electronics output and this year will account for nearly \$3.3 billion in sales, according to the Western Electronic Manufacturers Association (WEMA), which prognosticated that western firms will produce 25 per cent of the estimated U. S. total of \$13.2 billion in electronic sales during 1962.

Electronic sales in the San Francisco Bay Area are expected to climb 11 per cent this year with 1962 factory sales of \$730 million. With 47,000 people now engaged in this industry, the San Francisco Bay Area is responsible for more than 20 per cent of the West's

electronic sales and employment.

Comparable 1961 figures for the Bay Area were \$655 million and 43,000 employees in 167 companies. The WEMA count shows 180 companies in 1962, but the **Grid's** own occasional summary of this situation—featured on the cover of this issue and tabulated on page 18—indicates about 340 listings. This is, at least partially, explained by the separate showing of various divisions of single companies.

For the compilation of this data, the **Grid** gratefully acknowledges the cooperation and assistance of San Mateo County Development Association and Western States Electronics Directory.

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California, HU 3-0537

MEETING CALENDAR

PROFESSIONAL GROUPS

Electronic Computers

8:00 P.M. • Tuesday, June 26

"Opto-Electronic Devices Applied to Data Processing System"
Speaker: Frank A. Litz, president, Opto-Electronic Devices, Inc.
Place: Lockheed Auditorium, 3251 Hanover Street, Palo Alto
Dinner: 6:00 P.M., the Red Shack Hofbrau, 4085 El Camino Way, Palo Alto
Reservations: None required

Engineering Writing & Speech

8:00 P.M. • Tuesday, June 19

Annual business meeting and election of officers
Place: Star Dust Motel, 4320 El Camino Real, Los Altos
Dinner: 7:00 P.M., Star Dust Motel
Reservations: Miss Mary Furio, DA 4-3311, Ext. 45614

Instrumentation

8:00 P.M. • Wednesday, June 27

Lecture No. 4
"The Application of Sophisticated Programming and Computing Techniques to the Systems Concept"
Speaker: Norman Dawirs, Astrodata, Inc.
Place: Hewlett-Packard Co., 1501 Page Mill Road, Palo Alto (main lobby)
Meet-the-Speaker Dinner: 6:00 P.M., L'Omelette Restaurant, 4170 El Camino Real, Palo Alto
Reservations: None required

Military Electronics

8:00 P.M. • Tuesday, June 19

(Joint meeting with PGSET, see below)

Space Electronics & Telemetry

8:00 P.M. • Tuesday, June 19

(Joint meeting with PGMIL)
"The Mariner R Telemetry System"
Speaker: Charles C. Kirsten, Jet Propulsion Laboratory, California Institute of Technology, Pasadena
Place: Lockheed Auditorium, 3251 Hanover Street, Palo Alto
Dinner: 6:30 P.M., Camino Bowl, 2025 El Camino Real, Mountain View
Reservations: Ardith Flyr, DA 6-4350, Ext. 5065

wescon news

ATT: DESIGNERS & SPEAKERS

Establishment of a Pacesetter Award for the outstanding product in the industrial design competition of the 1962 Wescon, August 21-24, in Los Angeles, has been announced by Richard L. Law-

rence, chairman of the industrial-design committee.

Lawrence said a record number of more than 200 entries is expected for this year's Industrial Design Award competition, which features the theme, "Product Acceptance Through Industrial Design." He said the Pacesetter will be

June 15, 1962

Grid reporters

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PGBME: JAMES BLISS, STANFORD RESEARCH INSTITUTE
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PGCT: R. C. KIESSLING, ITT LABORATORIES
PGEC: DONALD L. EPLEY, ELECTRICAL ENGINEERING DEPT., STANFORD
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remarks from the chairs

HORIZONTAL MILITARY ELECTRONICS

Mankind's history can be divided into eras, each associated with its own stimulating motivation: the birth of great religions, the discoveries of new lands, and special economic conditions, all have left their marks and are now permanently associated with certain periods of history. The Crusades, the period of great discoveries, and the Industrial Revolution are some of the examples.

In recent American history, the early thirties wore the black mark of the great depression and were associated with efforts toward economic recovery. During World War II, the total capabilities of the nation were directed toward winning the global conflict. The lives of contemporaries during these periods were marked by the characteristics of the era.

Presently, our days are associated with great advances in science and engineering as well as with the problems in determent of potential aggression. This combination brings science and engineering into a direct relationship with the military, and at the same time sharpens the distinction between military and militaristic activity: The former being identifiable as a noble effort to keep the country out of war, as opposed to an aggressive chauvinism leading toward war.

Since defense preparedness affects the electronic industry to the extent of 75 per cent of its activities, the IRE has created the Professional Group on Military Electronics as a horizontal organization that can be expected to relate military needs to the particular skills found in essentially all of the other professional groups. This function would be a two-

way street since so many ideas and discoveries made in the defense field ultimately find their way to peaceful applications.

Section members who attended recent Bay Area briefings held by the Air Force Systems Command are aware of the large-scale efforts being made in the space and electronic fields. Over 1,000 did attend the two meetings held April 18 and 19.

In its publication activities, PGMIL will produce four quarterly transactions during 1962-63 devoted to the following: Automatic Testing Techniques, Low-Noise Receiver Techniques, Internal Guidance Techniques, and Bionics.

PGMIL holds two annual conventions. The Sixth National Convention will be held in Washington, D. C., June 25-26-27, and the Winter Convention traditionally takes place in Los Angeles in February of each year. Both are considered outstanding events and usually include a very few classified sessions.

As reports throughout the year in the Grid indicate, the San Francisco Chapter of PGMIL maintains a very active program in addition to sponsorship of joint meetings with other professional groups, and other technical societies as in the case of the recent Air Force meetings.

Non-members of PGMIL are cordially invited to join the group and help keep track of new ideas being developed in the military services as well as to form contacts with the many fine people already active in this area.



Walter Priese

—WALTER PRIESE
CHAIRMAN,
SAN FRANCISCO CHAPTER, PGMIL

awarded the product demonstrating the highest evidence of original industrial-design effort.

The competition, now in its fourth year, is open to Wescon exhibitors, member companies of the Western Electronic Manufacturers Association (WEMA), and firms exhibiting in booths

of their authorized representatives. Entry forms have been mailed to exhibitor companies and to the memberships of the American Society of Industrial Designers and Industrial Design Institute.

Lawrence said the instruments, systems, components, test equipment and other electronic products entered in the

competition will be judged on appropriateness of design in regard to ultimate usefulness and basic appeal. He said that five products named for a Certificate of Excellence award (one of which will be named for the Pacesetter) and some 20 Certificate of Merit win-

(Continued on page 8)



Dick Lawrence and Charles Agler, chairman and vice chairman of the Wescon industrial-design competition, expect 200 or more entries this year

MORE WESCON

ners will be displayed at the Industrial Design Exhibit at the Los Angeles Sports Arena.

To be eligible for the competition, a product must have been marketed prior to June 15, 1962, the deadline for filing entries, and must not have been entered in any previous year's competition. Additional information can be obtained from Lawrence at Hughes Semiconductor Division, 500 Superior Avenue, Newport Beach, Calif.

Winners of the Awards of Excellence in the 1961 competition held at San Francisco were Collins Radio Co., Hewlett-Packard Co., Kaar Engineering Corp., Precision Instrument Co., and Tektronix, Inc.

As an aid to technical program participants, Wescon has published a new edition of *Techniques for Better Talks*, a 12-page booklet designed to liven up presentations at the show.

Noting the margin for poor attention by audiences subjected to long, overly detailed, and dull presentations, *Techniques* presents a list of do's and don'ts intended to help speakers win audience friends and influence colleagues.

Typical don'ts include the rote reading of long technical papers (which are available in preprint form at Wescon anyway) and the presentation of sales talks on behalf of a company's products. They also cover the use of unreadable slides, blackboard scrawls, and complex formulas except where really needed.

Do's include talking about the paper's content instead of reading it; employing an informal, conversational delivery; and providing meaningful, easily understood illustrations.

meeting ahead

7-BIT WORDS FROM SPACE

Space Electronics & Telemetry and Military Electronics Group members will gather jointly this week to hear Charles C. Kirsten, group engineering supervisor for telecommunication ground systems of the jet-propulsion laboratory at California Institute of Technology, Pasadena, speak on the Mariner R Telemetry System. Full particulars are in the Calendar, page 8.

Kirsten is a graduate of UCLA in electrical engineering, a member of Tau Beta Pi and IRE. He has been with Cal Tech for nine years, prior to which he was a research engineer at Beckman Instruments, and an electronic technician in the Navy during World War II. He has worked on missile inertial-guidance systems, flight instrumentation, data encoding and decoding, and spacecraft telemetry. He was cognizant engineer during design and early test phases of the Ranger I and Ranger II spacecrafts, and the Mariner telecommunication systems to fly late in 1962.

The Mariner R Telemetry System is a dual-subcarrier channel system phase modulating a 960-mc transmitter. One of the two subcarrier channels is for synchronization only and the use of pseudo-noise coding techniques requires only 5 per cent of the usable sideband energy to provide data bit and word synchronization down to threshold signal to noise. The second subcarrier channel carries bi-phase-modulated binary-coded information.

The total communication system is capable of a range of 10^7 miles with lower than 10^{-5} bit error probability using just 3 watts of r-f. The antenna gains for this performance are approximately 18 db and 45 db, respectively, for the spacecraft antenna and the deep-space net antenna. Maser operation of the ground system is employed with an input effective noise temperature of as low as 78 K. Time-sequential multiplexing is employed on the single-data subcarrier channel and digitalization to 7-bit binary words is standard



Kirsten

for almost all engineering data. Science data is transmitted in variable word lengths and in variable sequences by stored programs.

meeting ahead

INSTRUMENTS WIND UP

As outlined in the Calendar, page 8, PGI will conclude their current series by presenting Lecture No. 4 late in June. Including the topic of programming with a summary of the series, the speaker will be Norman Dawirs.

He will discuss the relative advantages in the application of sophisticated programming and/or computing techniques to the systems concept. While emphasis will be on the programming and computing functions, there will be a necessarily redundant treatment of the major blocks of the generalized instrumentation system.

Use of the computer for data reduction will be covered as well as the specific case of a computer used in an information-transmittal link for the control of a satellite-tracking telescope.

Norman L. Dawirs, the speaker, executed early engineering assignments involving designs for a transducer metering and monitoring system for wind-tunnel instrumentation while at the Beckman Instruments systems division. While at Convair, he designed automatic-checkout equipment for the Series D Atlas missile.

At Hughes Aircraft he did extensive logical and system design for general-purpose digital computers, plus research in computer-management processes and large-memory information-retrieval systems.

Since joining Astrodata, Dawirs has been active in the integration of general-purpose, stored-program digital computers within automatic-data-acquisition systems, with particular attention to the development of on-line data-acquisition systems.

He completed undergraduate work at California State Polytechnic College and holds a BSEE.



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June 15, 1962

grid-9



David K. Davis, Varian metallurgist, speaking at May PGPEP meeting
—Harmon R. Traver photo

meeting review

GETTING ALONG WITH METALS

The May meeting of PGPEP featured a discussion of brazing problems encountered in vacuum-tube manufacturing. David K. Davis, metallurgist of Varian Associates, was the speaker and a plant tour of the Western Gold and Platinum Company at Belmont closed the program.

After quickly mentioning some of the good factors concerning brazing, such as strength, oxidation resistance, flowability, melting, and remeltability, Davis concentrated on the pitfalls encountered. All his remarks concerned furnace or atmosphere brazing for the electronic industry, where vacuum-tight joints are required on such metals as ofhc copper, Kovar, and stainless steel.

Pitfall No. 1

The first pitfall is that of dilution of the base metal by the brazing alloy. While the three factors of time, temperature, and amount of braze alloy are related to each other, one of the chief causes for excessive dilution of the base metal is the use of too much brazing alloy.

Photomicrographs projected on a screen were used to show the audience two examples encountered by the speaker. The first was the joint between a metallized ceramic window and a 0.030-in.-thick ofhc copper sleeve. The braze material had penetrated the copper to within a few thousands of the side opposite the joined surfaces.

In the other example, excessive braze alloy on an ofhc copper tubing almost completely penetrated the walls and produced large voids that might easily provide a leak path through the dendritic structure.

Pitfall No. 2

The second pitfall is diffusion of the molten braze alloy into the base metal either with or without stress being pres-

ent at the time of brazing. Here the important factor is brazing time. Examples showing the diffusion for one, three, and eight minutes were used to illustrate the point.

A mesh of the base metal can be used along with the brazing alloy being considered to check this type of diffusion. If, after bringing the two materials to brazing temperature, the mesh is evenly coated and still open, there will be little difficulty experienced. If, on the other hand, a hole develops in the mesh, diffusion will be apt to take place when such a combination of solid base metal and brazing alloy is used.

Pitfall No. 3

The third pitfall is that of intergranular corrosion, which is really diffusion of the molten braze alloy into the base metal with stress present. The stress may be caused by the jiggling used to hold the parts being joined or the braze alloy becoming molten before the base metal is annealed.

The stresses of one example shown were caused by improper jiggling and the other by stresses in a stamped part that had not been annealed prior to brazing. Stainless steel, Kovar, and Monel are all subject to stress corrosion.

Pitfall No. 4

The fourth pitfall discussed was that of diffusion of the braze alloy into the base metal after it has solidified. The diffusion occurs as the part is heated when used following the brazing operation.

The example shown was that of a nickel-base brazing alloy used on Inconel parts. The braze was made at the normal brazing temperature and then the parts maintained at temperatures somewhat below that of solidification for many hours. The line of the braze joint had almost completely disappeared. This particular characteristic might not always be detrimental as it can be used to make ornamental parts that show no joining line.

Davis received his BS degree in metallurgical engineering from Alabama in 1952. He worked at the Pratt and Whitney aircraft nuclear engine laboratory in Connecticut for the next four years and then spent one year on assignment for Pratt and Whitney at the



Walter Hack, right, president of Wesgo and host to the PGPEP May meeting, conducts a group on the plant tour
—Harmon R. Traver photo

Oak Ridge National Laboratory in Tennessee. For the last three years he has been with Varian Associates as a metallurgist.

Plant Tour

The president of WESGO, Walter Hack, gave the group a short discussion of the company products before the start of a most interesting plant tour. These products fall into three categories. The first is that of low-vapor-pressure brazing alloys. The next consists of super-refractory boats, slabs, crucibles and special fixtures for brazing, sintering, melting, and heat-treating applications. The third category is that of high-temperature high-strength alumina ceramics. In common, all these products have the need for carefully controlled raw materials and processes. Cleanliness and control of processing temperatures are especially important for the production of a quality product. Some of the materials used to produce brazing alloys include palladium, gold, cobalt, nickel, indium, copper, and silver. In order to obtain the purity required in metals such as silver it is necessary to refine so-called treasury silver electrolytically to eliminate even trace amounts of high-vapor-pressure zinc, cadmium, and lead.

During the tour the processing of the various brazing alloys was witnessed. These alloys ranged from 705 to 1240
(Continued on page 12)

meeting review

GROUP-CODE ECONOMY

Bernard Elspas and William English, speaking to PGEC in May, discussed error-correcting codes and an all-magnetic logic computer, which could be used to implement sophisticated error-correcting schemes.

Dr. Elspas briefly presented some of the basic elements of the theory of error-correcting codes. Hamming error-correcting codes and parity checks were discussed. The basic concepts of group error-correcting codes were presented. Elspas pointed out that until recently error-correcting codes were used infrequently because of the high cost of implementation. Recent advances in coding theory, especially the discovery of group codes, has greatly reduced these costs.

In the second part of the meeting, English described an all-magnetic-logic computer that was developed at Stanford Research Institute to implement error-correcting codes. The magnetic-logic circuitry was briefly described and then the capabilities of the computer were demonstrated.

—W. H. DAVIDOW



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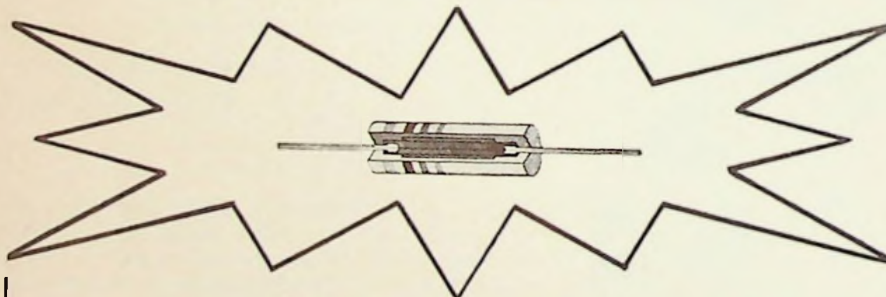
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9360-06	10.0 ± 10%	40	3.5		70	1.80	600	PHENOLIC
9360-07	15.0 ± 10%	40	3.0		55	3.00	500	PHENOLIC
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MORE METALS

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The intense interest in the subject under discussion and the processes observed resulted in one of the largest PGPEP meetings of the current year which ended with the May meeting. The group appreciates the cooperation of Hack and his employees for remaining on the job after the close of their normal shift so that all the various processes could be seen in operation.


—HARMON R. TRAVER

meeting review

RESEARCH IN THE ROUND

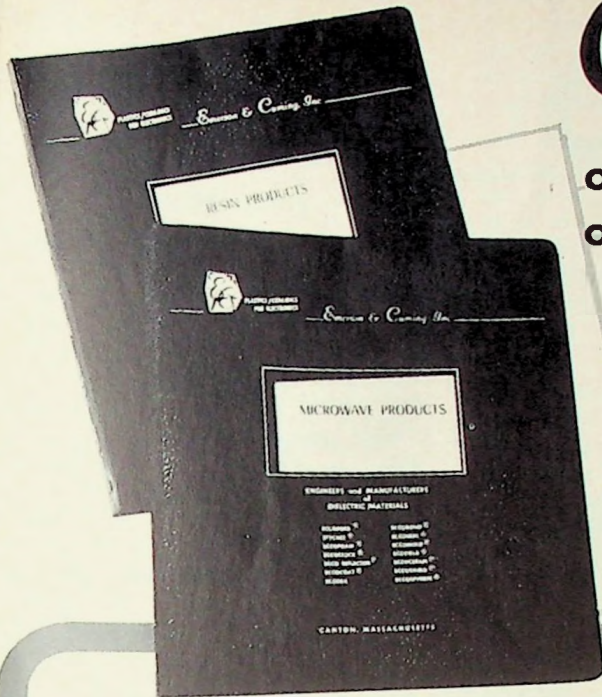
In early May, Lt. Gen. James D. O'Connell, U. S. Army (Ret.) spoke to the San Francisco Chapter of PGEM, substituting for Dr. Herbert Trotter, who was listed in the **Grid** as speaker. O'Connell is vice president of General Telephone and Electronics Laboratories, Inc. He discussed some of the background of organization within the General system that led to the formation of GT&E. He pointed out that GT&E decided to combine its basic research activities in one organization shortly after the purchase of Sylvania by General Telephone. At that time the policy was established that GT&E Laboratories would carry on basic research, leaving applied research and development in the hands of the manufacturing divisions of the company in order that they could remain closely associated with the several product lines. He emphasized that GT&E's objective is to engage itself in all aspects of the electrical communication business.

(Continued on page 14)

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A. S. Brown; Gen. J. D. O'Connell; and W. D. McGuigan, PGEM chairman, at the May meeting of the Group Chapter
—L. M. Jeffers photo

MORE GTEL

Upon his retirement from the Army, O'Connell joined GT&E at about the time the merger with Sylvania took place. He and Trotter, who was named president of GTEL, made a three-month survey during which time they visited possible locations for a new branch. The Palo Alto area was chosen based on such important factors as the Peninsula's rapidly growing electronics industry and its proximity to Stanford University and Stanford Research Institute. The Palo Alto laboratory has been established with emphasis on theoretical, experimental, and advanced de-

velopment in communication. The Bayside (Long Island) Laboratories are engaged in chemistry, metallurgy, and other materials research and development. Research and development in electronic and communication components and subsystems is also one of the missions of the Bayside Laboratories.

O'Connell pointed out that the total GTEL effort is not intended to parallel all the research at Bell Telephone Laboratories, and that selectivity of its research programs is a key factor in its management. Other basic differences exist; for example, General has a greater proportion of rural customers than does Bell.

He said that one of the chief problems of R&D management is the transfer of ideas between divisions of the corporation as well as between the centralized laboratories and the manufacturing divisions, thus confirming that the communication problem is no stranger to an organization specializing in communications.

O'Connell concluded his talk with a review of the planning and architectural-design background for the Palo Alto laboratories and showed several slides illustrating the steps in architectural design and the reasons for the

choice of the circular plan which was finally adopted. He left with his audience the clear impression that the structures will blend well with the terrain and will also offer good functional flexibility to meet changing requirements.

—LEONARD JEFFERS

meeting review

DON'T ASK WHY

The annual dinner meeting of PGIT was held on May 10 at the Caravan Inn, Mountain View, with over 30 members present for the dinner. A guest lecture by Dr. Louis Fein of Palo Alto on the subject, "Mind, Machine, & Soul" drew a total attendance of about 60.

Fein addressed himself to the basic questions revolving around the nature of the human mind or psyche. Are such things inherently unknowable? If knowable, what form might their explication take? Fein elaborated by describing the format and form of the future books that will contain our complete knowledge of man.

This ambitious project was introduced by first sketching the format and form for a similar encyclopedic description

(Continued on page 16)

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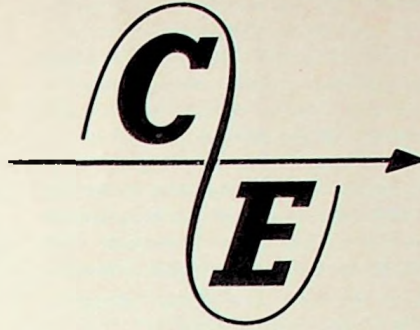


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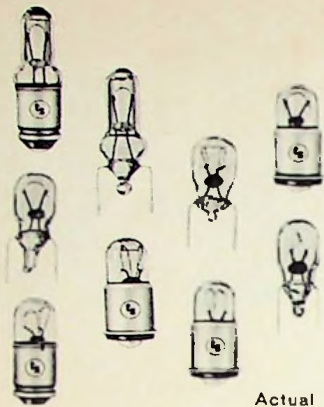
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MORE PGIT

of computers. For example, the structure of an electronic stored-program computer (or, in fact, any structure whatever) can be described as a selection of part types, particular models of each part type with appropriate parameter values, a spatial configuration of the selected parts, and a support environment. What makes a total structure an electronic stored-program computer rather than a telephone exchange or a cash register, is the set of functions it performs, and the time schedule on which these functions are performed.

Fein's first postulate reads: "Structure and function are concomitant." Thus to any structure there correspond certain functions, and to any function there correspond certain structures capable of performing it.

The speaker rejected any implication that the designers of a structure must understand why certain functions belong to certain structures. They need merely know, by accident or otherwise, that there is the correspondence. The typical empirical inventor (e.g., Edison) searching for a suitable material, and even the designers of perceptron-like devices, were cited as examples.

One statement made by Fein, which generated some controversy, was, "There are two ways in which one can learn of a particular structure-function concomitance, . . . by guessing or by dumb luck, sometimes called respec-

tively, intuition and creativity." Apparently some members of the audience felt that this view put creative insight into a rather derogatory light.

Fein next took up the concepts of program and task. A program was defined as a particular time schedule of functions. A second postulate: "Program and task are concomitant," was stated. The interpretations of this postulate are quite analogous to those of the structure-function concomitance.

Another important section of the envisioned volumes would concern itself with what was termed the genealogy of error. It would contain information about reliability, maintenance, and the occurrence, prediction, and correction of errors in the equipment and program.

The question of unknowables was next considered. The speaker pointed out that such principles as Heisenberg's uncertainty principle, Bohr's complementarity, Godel's incompleteness theorem, Turing calculability, and Church decidability, all demonstrate in one way or another that there are things that are unknowable in principle. Besides the unknowables-in-principle there are the unknowables-in-practice (owing to present limitations in speed, capacity, instrumentation, and so forth). Presumably the contents of this latter list would dwindle with time.

The second half of the talk was directed to outlining the form and giving a few samples of the content of the



On his way to the 7th Region Conference, IRE President Patrick Haggerty stopped off to attend a special OPCOM meeting in Menlo Park, was photographed as above with Section Chairman Kaisel. Haggerty reported that the integration balloting had already reached 48 per cent of membership on May 25—leading him to predict over 65 per cent final. In-favor ballots were running 85 per cent

—Carl Oliver photo from P.A. Times

future set of volumes embracing our knowledge of man. Fein's thesis was that all meaningful questions and all knowledge about a structure (in this case, man) can be stated in terms of the structure itself, its concomitant functions, the subjects of these functions, its programs and concomitant tasks, the laws of these concomitances, and the interfering physical and signal environment.

With considerable persuasiveness the speaker described what the above concepts, relations, etc., mean in human terms, by drawing heavily on the computer analogy. Naturally, some questions can today be answered only sketchily, if at all. For example, "Why, how, and under what conditions do men love, fear, hate, or empathize?" Fein did not attempt to answer such

questions in detail, but suggested the form of the answer for this and other similar psychological questions. He suggested that it will take an extension of our present instrumentation and mental capacity (including that of man-machine systems) to answer them in detail.

Fein's comments on the list of unknowables should perhaps be quoted: "I haven't said anything about the impossibles. The reason is simple. I don't of my own knowledge know that they apply or, if they apply—to what! I think that there will be many items on the lists which we will never ascertain because of the list of impossibles. But I will be neither pleased nor displeased about this eventuality. I will not feel that the dignity and uniqueness of man will thereby have been saved.

"Such an eventuality will not be cru-

cial to my self-esteem. I will be satisfied to know what I cannot know and why. And I will not be embarrassed that fortunately I do not need two sets of principles; one to understand man; another to understand everything else."

The address stimulated a wide range of discussion during the question-and-answer period. Such matters as esp, creativity, intuition, evolution, and learning processes came in for considerable attention by the audience.

The business portion of the meeting was concerned with introducing to the Chapter members the nominees for chapter offices for the coming year. They are: Charles H. Dawson, for chairman; Bernard Elspas, for vice chairman; Nelson M. Blachman, and James J. Spilker, Jr., for secretary-treasurer.

—BERNARD ELSPAS



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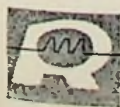
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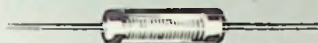
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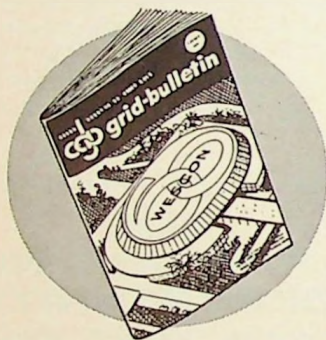
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events of interest

IN THE AREA

June 20-22—**Printed Circuit Symposium**, California Circuits Association and Stanford University. Dinkelspiel Auditorium, Stanford. Exhibits: Bill McGuire, Systron-Donner Corp., Concord, Calif. Tickets: \$5 per session, \$10 all three sessions, order from California Circuits Assoc., P.O. Box 1412, Palo Alto, Calif.

June 27-28—**Interdisc** (Interdisciplinary Communications on the Air) presents a taped-interview broadcast of the hallway-discussion aspects of the PGRFI Symposium, taking place in San Francisco June 28 and 29.

June 28-29—**Fourth National Symposium on Radio Frequency Interference**. Del Webb Town House, San Francisco. No exhibits. Program: R. G. Davis, Dept. 58-25, Lockheed Missiles & Space Co., P.O. Box 504, Sunnyvale, Calif. Digest: order from IRE Headquarters after conference.

August 13-16—**Pacific Energy Conversion Conference**. Fairmont Hotel, San Francisco. Exhibits: W. F. Poynter, c/o Federal Pacific Electric Co., 1872 Rollins Rd., Burlingame, Calif. Registration: Wendell B. Freeman, c/o General Electric Co., 235 Montgomery St., San Francisco 4.

NON-LOCAL

June 25-27—**6th National Convention on Military Electronics**. Shoreham Hotel, Washington, D. C. Exhibits: L. D. Whitlock, 5614 Greentree Rd., Bethesda 14, Md. Program: John J. Slattery, Martin Co., Baltimore 3, Md. Proceedings: \$5, order from IRE Headquarters.

June 25-30—**Symposium on Electromagnetic Theory and Antennas**. Technical University of Denmark, Copenhagen. No exhibits. Program: H. Lottrup Knudsen, Oster Volgade 10 G, Copenhagen, K, Denmark. Proceedings: Contact Pergamon Press, Oxford, England.

June 27-29—**Joint Automatic Control Conference**. New York University, New

York, N. Y. No exhibits. Program: H. J. Hornfeck, Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10. Proceedings: order from AIEE, 345 E. 47 St., N. Y. 17.

July 17-18 — **Data Acquisition and Processing in Medicine and Biology**. Whipple Auditorium, Strong Memorial Hospital, Rochester, N. Y. No exhibits. Program: Kurt Enslin, Brooks Research Inc., P.O. Box 271, E. Rochester 20, N.Y.

Aug. 21-24—**Wescon**. Statler Hilton & Sports Arena, Los Angeles. Exhibits: Wescon, 1435 So. La Cienega Blvd., Los Angeles. Program: David Langmuir, c/o Wescon, same as above.

PAPERS CALLS

July 1—100-word abstract for the Symposium on Space Phenomena and Measurements (Detroit, Oct. 15-18). Send to: Michael Ihnat, AVCO Corp., 201 Lowell St., Wilmington, Mass.

July 15 — 100-word abstract for Broadcast Engineers Fall Symposium (Washington, D. C., Sept. 28-29). Send to: Wm. L. Hughes, Oklahoma State University, Stillwater, Oklahoma.

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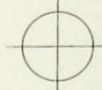
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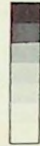
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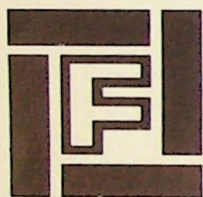
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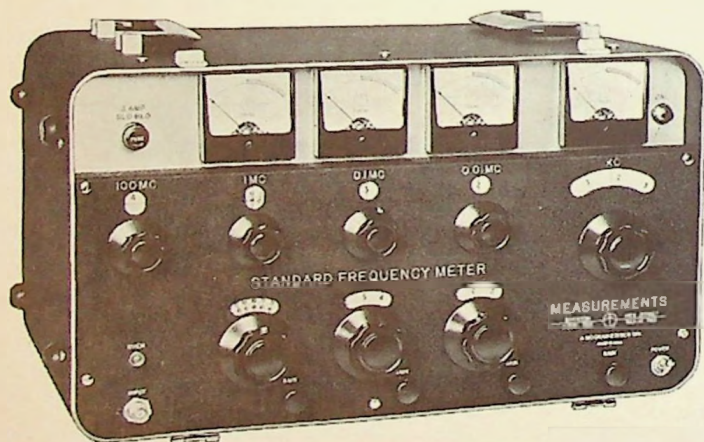
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the section

MEMBERSHIP

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John C. Barnard	J. R. Horvat
R. C. Becklund	J. L. Hyde
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P. R. Erdmann	H. L. Roberts
L. L. Evans	O. S. Saffir
S.H. Forry	B. K. Secor
O. Funch	R. G. Shelton
P. C. Georgallis	W. J. Shewaga
J. C. Gingerich	A. E. Sowers
T. C. Griskey	J. L. Sullivan
	H. G. Yerondopoulos

D. A. Talbert

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

L. F. Anderson	J. E. Marford
R. L. Auer	J. A. MacIntosh
P. D. C. Barnhouse	T. Pavlidis
J. P. Bartelme	F. J. Perez
N. N. Berger	Floyd B. Peterson
D. L. Bolton	L. B. Phillips
A. C. Busath	J. G. Sanford
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C. J. Christensen	L. Schuchman
D. M. Collins	R. A. Stubbe
A. G. Craig	J. C. Wang
D. H. Hastings	J. E. Westberg
J. E. Keegan	C. C. Wang
M. D. Matthews, Jr.	C. E. Wood

H. G. Yerondopoulos

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

SENIOR MEMBER

R. L. Bell	E. P. George
	A. E. Pound

MEMBER

P. Dore	R. E. McCormick
A. J. Domenico	J. Nishikawa
W. J. Fowski	W. A. Pollard
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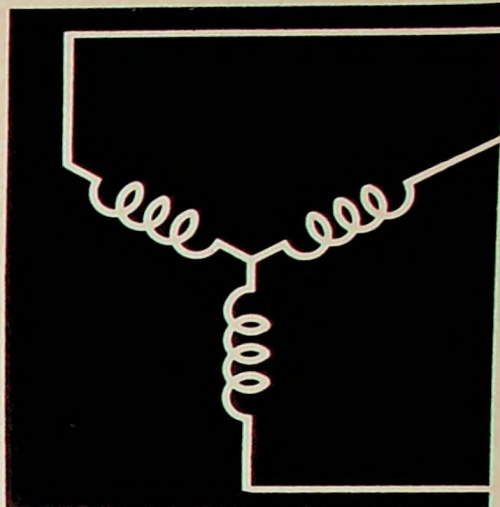
among the students

ELECTION NOTES

Following is a list of the officers of the IRE Student Branch at Heald College: German Gonzalez, chairman; Robert Leong, vice chairman; Colman Daniel, secretary; Douglas Black, treasurer; and Steve Malmstrom, membership chairman.

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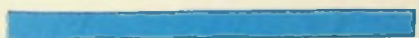
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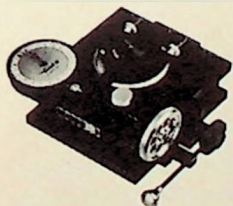


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