

EDITOR'S PROFILE of this issue

from a historical perspective ...

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

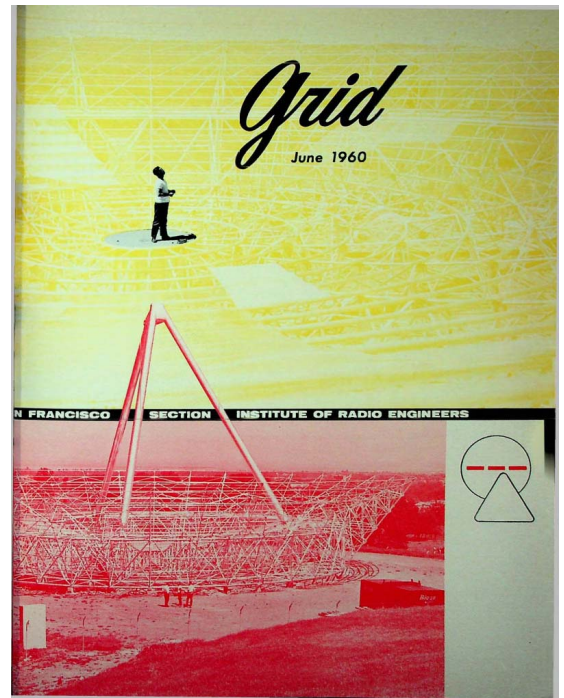
June, 1960:

Cover: Despite Stanford's ban on conspicuous structures in the hills behind the campus, the new radio telescope takes shape. "The Dish", being built by SRI, is 150 feet in diameter and weighs 155,000 pounds, at a cost of \$250,000. It is paired a high-powered transmitter, for studying the surface of the sun and other projects.

Page 18: There's a nice photo of Bernie Oliver, head of research at HP. Back in 1955, he came and sat on Bud Eldon's desk and said that "Bill" (Hewlett) wanted Bud to start a new IEEE Group on Production – which Bud quickly accomplished by gathering engineers from nearby companies. Bill was IRE president that year, and anything that Bill wanted was a high priority within HP. This grew into today's Electronics Packaging Society (see my introduction to the April 1961 issue of the GRID for more details).

Page 23: Charles De Gaulle, president of France, is shown through the HP plant by Bill Hewlett. Also on that page: visitors from Japan and England come to the Valley to see what's happening in electronics technology.

Page 36: IRE member Marcian (Ted) Hoff moves to the Valley. He is finishing up his PhD at Stanford, where he co-invented the LMS filter with Bernie Widrow. Joining Intel in 1968 (employee #12), he came up with the idea of a universal processor, to replace the burgeoning chip count of a project for a Japanese company; along with Stan Mazor, the Intel 4004 microprocessor was developed. I remember being in Ted's well-stocked basement some years back – rows of floor-to-ceiling shelving with many past IEEE journals, a complete machine shop, and several other rooms of equipment and parts. It was an engineer's dream.



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

https://ethw.org/IEEE_San_Francisco_Bay_Area_Council_History

At time of scanning, the bound volumes are held by Paul Wesling.

July, 2021

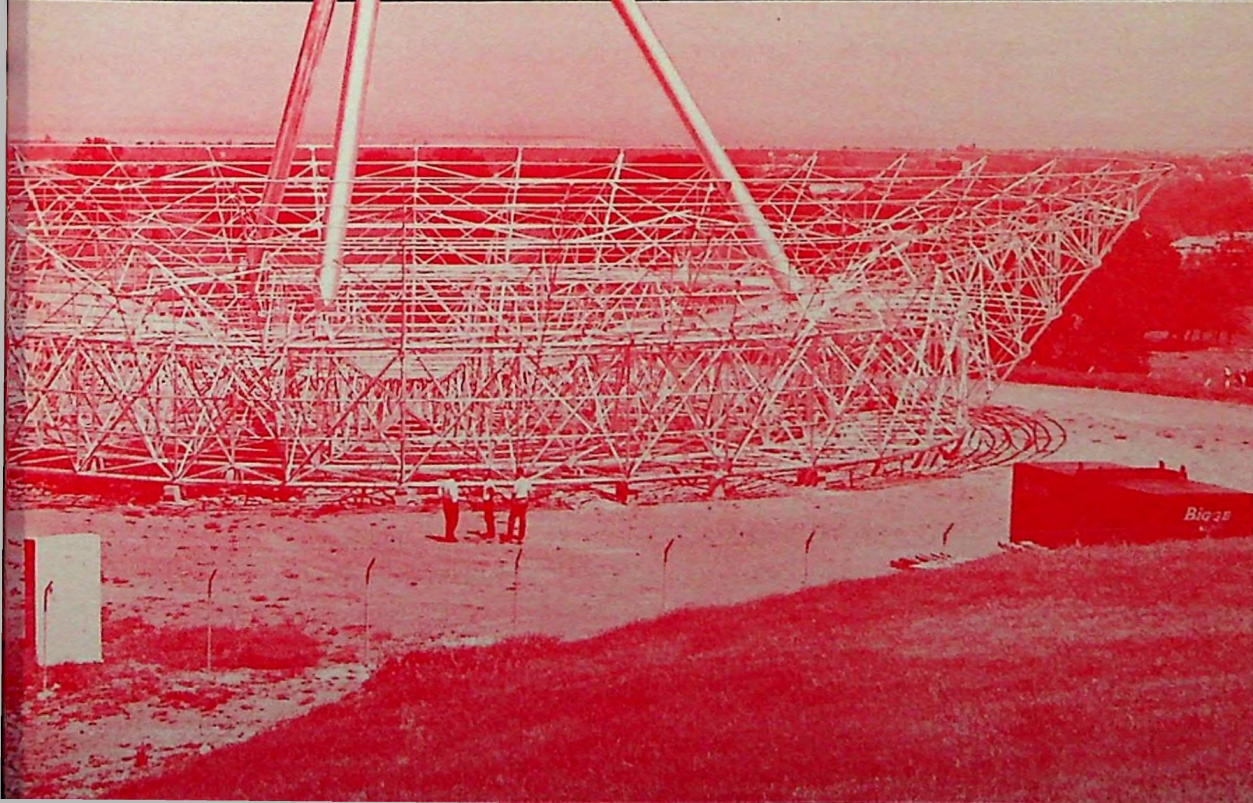
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Grid

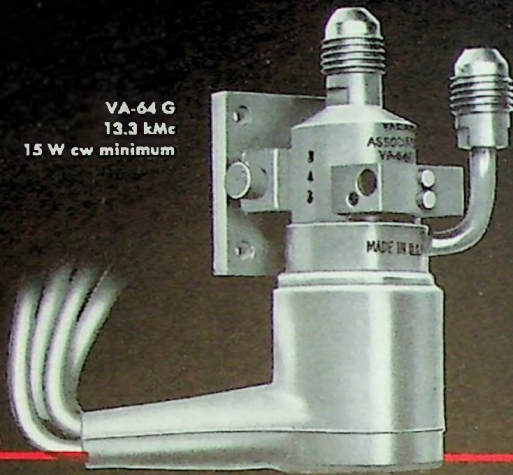
June 1960



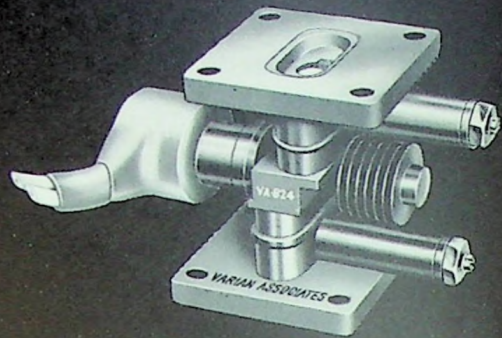
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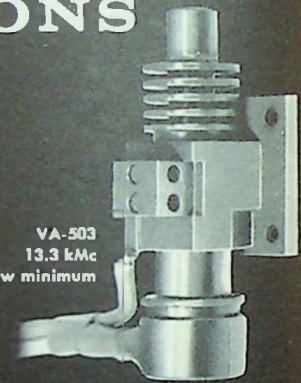


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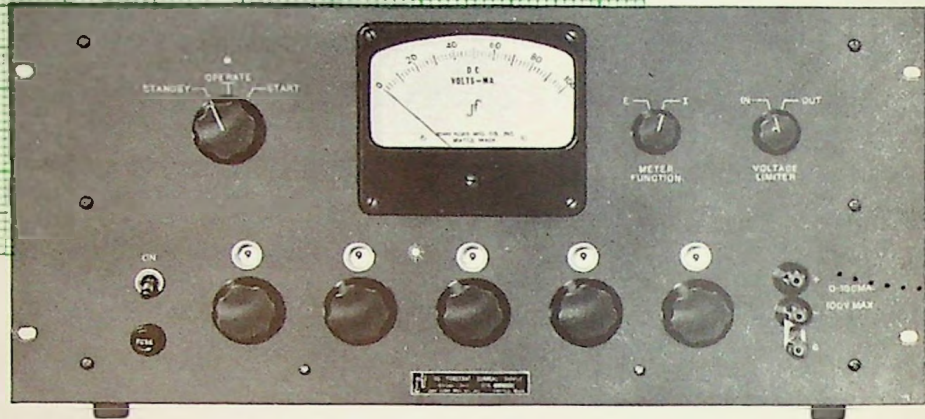
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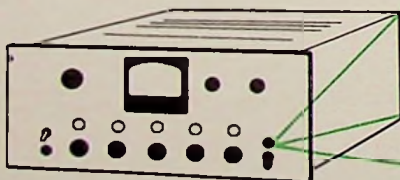
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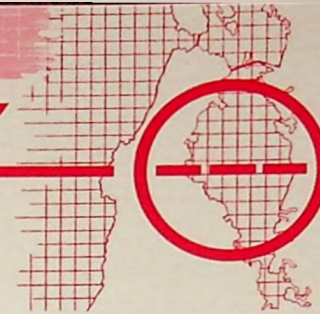
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VOLUME 6

JUNE 1960

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ABOUT THE COVER

Solar Radar

Cover illustrations are in the nature of a progress report on the new half-acre dish being built by SRI on the foothills of the Stanford Campus. Nearby, the Stanford radioscience laboratory is installing a high-power transmitter for the joint

project. Measuring 150 ft in diameter and weighing 115,000 lb, the parabola will cost about \$250,000. It will ultimately stand more than 150 ft high and be an exception to the University's ban on conspicuous structures behind the campus.

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Vic Corey

FROM
THE
CHAIR



The Backward Wave

Since its formation almost forty-four years ago, the San Francisco Section has become one of the largest and most active in the entire IRE organization. It is recognized both locally and nationally for its vigor and stature. But despite the maturity and stability which this status connotes, the component of outstanding consequence appears to me to be its ability to change. Not like a chameleon, but rather like a developing organism—following an evolving plan.

During the past year, your officers and directors have had a significant opportunity to observe the process of growth and change in the Section, and to contribute to it. Several such changes deserve individual mention. Large on the list is the implementation of the plan to form a small and efficient Operating Committee (OPCOM), compris-

ing the officers and directors of the Section, to represent the full Executive Committee in routine and non-controversial matters. Given official approval by EXCOM early in this operating year, OPCOM has already saved hundreds of man-hours in the transaction of normal Section business, without abridging the Executive Committee of its prerogatives.

As a parallel step to the formation of OPCOM, a new Professional Group Committee was originated within the membership of EXCOM, headed by the vice chairman of the Section. Formed with unique responsibilities toward the complex and expanding needs of our own professional group chapters, this committee has again functioned with focus and efficiency that the full Executive Committee could not maintain in any specialized area.

A number of other important changes must at least be mentioned, even if comment must be limited. The Section has now established a meaningful precedent in budget projection for general fiscal control of its overall operations, including the important constituent areas of the professional groups and the Publications Board. The Publications Board itself has cooperated with the Section in an intensive study of its own functions, organization, responsibilities, prerogatives, and interrelationships with the Section organization. Out of these efforts has come basic agreement which promises a functioning collaboration even more effective and mature than we have experienced in the past.

A major stride in Section history is represented by the generation of a comprehensive set of Bylaws, which extend and interpret the Constitution given to us from the National IRE organization. Formulated during the year by a special Bylaws Committee and reviewed meticulously by the full Executive Committee, the proposed Bylaws for the Section are now before the membership for approval.

As further evidences of Section growth, local chapters of two new professional groups have been approved during the year: the Professional Group on Circuit Theory (PGCT); and the Professional Group on Instrumentation (PGI). Meanwhile, Section membership has continued its climb at a steady 17 per cent per year to reach a grand total of 3892 at the end of May. With good reason, the IRE Office, moved during the year from San Mateo to new quarters on the Stanford Campus, is doing a land-office business in the growing multitude of services it offers to the Section and its professional groups.

The closing year has been indeed a year of progress. But let me acknowledge with my most sincere appreciation the team who made it so. I wish first to mention the Operating Committee,

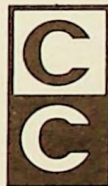
where so much of the routine but purposeful work of the Section was conducted. Special thanks are due Al Morris, John Granger, and Wes Carnahan for their faithful attendance with the officers of the Section, and for their consistently generous, able, and sympathetic counsel. Because of numerous and conflicting responsibilities, Sam Silver and Barney Oliver were rarely able to attend, but their participation is nonetheless appreciated. My sincere thanks go also to Don Pederson, chairman of the East Bay Subsection, for his consistently capable and cooperative work and to each of the chairmen of our fourteen professional group chapters for their excellent leadership within their groups and their full collaboration with the Section through EXCOM and the activities of the Professional Group Committee.

Further commendation is due Don Dunn for his organization and management of the Professional Group Committee, and for his arrangement of a series of **Grid** editorials from the professional groups and the Publications Board during the year. Stan Kaisel deserves recognition for special service on a number of committees, for service in Seventh Region affairs, and for outstanding assistance in the setting up and operation of the IRE Office. Likewise, Pete Lacy deserves tribute for his conscientious attention to the projected and operating budgets of the Section, the Publications Board, and the individual professional groups; and for his exceptional service as Chairman of the Bylaws Committee.

Throughout the year I have had occasion to rely on the experience and advice of Earl Goddard, junior past chairman of the Section. I wish to thank Earl for his counsel, and to express my appreciation to him and to Jerry Rosenberg as co-chairmen of the Historical Committee, for the fine and original work they have done. Another truly outstanding job has been done by Don Harris, chairman of the Awards Committee. Operating under the most grueling of handicaps Don has been, in large measure, personally responsible for the excellent standing of our Section in the winning of national awards.

Recognition and profuse thanks are certainly due Bob Rector and Howard Zeidler for their thorough and cooperative services in succession as chairmen of the Publications Board. Much more than routine commendation also goes to Hank Schroeder for his capable and dependable management of the many functions of the Arrangements Committee; to Peter Sherrill for his good work through the functions of his Public Relations Committee, now to be closely coordinated with the Publications Board;

(Continued on page 32)



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MEETING CALENDAR

PROFESSIONAL GROUPS

Antennas & Propagation

8:15 P.M. • Tuesday, June 21

(Joint with PGSET)—see below)

Audio

8:00 P.M. • Tuesday, June 28

(Joint with AES)

"Noise—Payment for Progress?"

Speaker: Vincent Salmon, manager sonic section, department of physics,
Stanford Research Institute, Menlo Park

Place: Conference Room B, new office building, Stanford Research Insti-
tute, Ravenswood Avenue, Menlo Park

Dinner: 6:30 P.M.; Happy Hour 6:00 P.M.; Ramor Oaks, 3435 El Camino
Real, Atherton

Reservations: Mrs. Bolla, DAvenport 6-6200, Ext. 3251

Communications Systems

8:00 P.M. • Wednesday, June 22

"International Standards for Data Transmission"

Speaker: Emil Hopner, International Business Machines, San Jose

Place: Physics Lecture Hall, Stanford University

Dinner: 6:00 P.M., Hal's Restaurant, 4085 El Camino Way, Palo Alto

Reservations: Mrs. Donna Jean Harapat, REgent 9-2344

Electronic Computers

8:00 P.M. • Thursday, June 23

"Sequential Machines: An Introduction"

Speaker: Dr. Don D. Aufenkamp, General Electric Computer Lab, Palo
Alto, and lecturer of electrical engineering, Stanford University

Place: Lockheed missiles and space division auditorium, Building 202,
3251 Hanover Street, Palo Alto

Dinner: 6:00 P.M., Hal's Restaurant, 4085 El Camino Way, Palo Alto

(Informal—no reservations required)

Space Electronics & Telemetry

8:15 P.M. • Tuesday, June 21

(Joint with PGAP)

"The Stanford Research Institute—Stanford University Radar Astronomy
Facility"

Speaker: George S. Parks, research engineer, Stanford Research Institute,
Menlo Park

Place: Lockheed missiles and space division auditorium, Building 202,
3251 Hanover Street, Palo Alto

Dinner: "Meet-the-speaker" dinner, 6:30 P.M.; Hal's Restaurant, 4085 El
Camino Way, Palo Alto

Reservations: Lois Reed, REgent 9-4321, Ext. 28150 or 26602 (before noon,
June 21)

CHRONOLOGICAL RECAP

June 21—Antennas & Propagation/Space Electronics & Telemetry

June 22—Communications Systems

June 23—Electronic Computers

June 28—Audio

FREE BOOKLET FROM DU PONT

HOW MAGNETIC INSTRUMENTATION TAPES OF **DU PONT MYLAR POLYESTER FILM** PROVIDE MAXIMUM RELIABILITY

LESS TRACK DISPLACEMENT The dimensional stability of Mylar prevents the stretching or shrinking of tapes which causes lateral shifting of tracks from recording and playback heads. (See Figure 3 & 4). Thus, it prevents or weak tracks or tracks formed from the starting point of

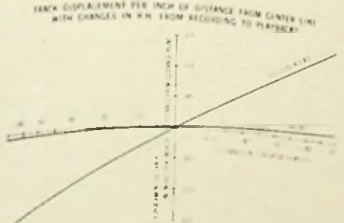
FIGURE 3
DISPLACEMENT OF CENTER LINE OF TRACK WITH CHANGE IN TEMPERATURE FROM EDGE TRACKS NUMBERED CONSECUTIVELY FROM RIGHT TO LEFT WITH 14 TRACKS

Track Spacing



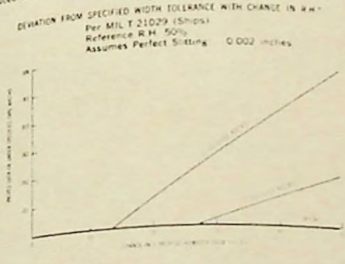
FEWER RUFFLED EDGES The dimensional stability of Mylar prevents tapes from swelling in excess of width tolerance. (See Figure 5). This means that all extruded tapes do not pull up on tape guides and produce ruffled edges which result in poor head contact. Ruffled edges are frequently produced in tapes on a less stable base by humidity changes during storage. Mylar eliminates this problem.

FIGURE 4
TRACK DISPLACEMENT PER INCH OF DISTANCE FROM CENTER LINE WITH CHANGES IN RH FROM RECORDING TO PLAYBACK



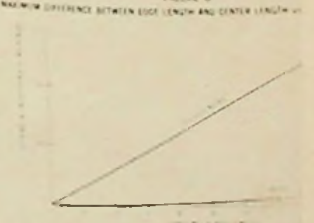
LESS TAPE WEAVE The dimensional stability of Mylar prevents tapes from stretching below width tolerance. (See Figure 5). This means there are no winding tapes to weave laterally over the head. The resulting problem of reduced signal strength is minimized.

FIGURE 5
DEVIATION FROM SPECIFIED WIDTH TOLERANCE WITH CHANGE IN RH PER MIL T 21029 (50psi) Reference RH: 50% Assumes Perfect Sizing 0.002 inches



POSITIVE REGISTRATION OF TIMING Because Mylar is symmetrical, there is no difference between the edges and the center of an area which causes the edges to be longer or shorter than the center in length causes poor registration between the timing tracks. Mylar eliminates the problem. (See Figure 6).

FIGURE 6
MAXIMUM DIFFERENCE BETWEEN EDGE LENGTH AND CENTER LENGTH



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Ronald L. McFarlan

EXCOM

Microminutes

On May 26, the Executive Committee of the San Francisco Section met with Dr. Ronald L. McFarlan, president of IRE, at the Villa Chartier in San Mateo. McFarlan's visit to our Section was one event of a busy week in which he also met with the executive committees of



President McFarlan speaking to the San Francisco Section Executive Committee
—David Haylock photo

the Seattle and Portland Sections and the Seventh Region.

After touching on the peripatetic aspects of the presidential chair, he presented a rundown on the national 1960 budget (income: \$3,600,000; outgo: \$3,500,000; result: happiness); described revisions which are being made in the honors structure of the Institute—including the initiation of a new category of professional group awards; and outlined a new plan for the promotion of education which has been put into effect in Region 1, and which results in papers by top students appearing in the regular lineup of technical sessions at NEREM.

Prior to the sessions with McFarlan, items of regular business were con-

ducted including the following:

Two for the Roster

Final approval from New York headquarters was announced for the new local chapters of the Professional Groups on Circuit Theory and Instrumentation, organized respectively by R. C. Keissling and H. A. Kazanjian.

Five for WESCON

Section participation in the Future Engineers event at WESCON was established, under the chairmanship of Tom Morrin, Stanford Research Institute. The top five winners at the Bay Area Science Fair and the teacher or sponsor of each are to be invited to Los Angeles by the Section and will be financed to the extent of \$100 each plus whatever transportation is required for exhibits.

Donald C. Shapero, Cubberley High School senior, Palo Alto, receives congratulations from Major General George E. Bush, U. S. Army. Donald was one of the eight winners selected for the top Army awards at the National Science Fair banquet in Indianapolis in May. Dr. Paul E. Siple, famed Arctic explorer and distinguished Army scientist, watches. Donald also won a national second award in the physical sciences division

—U. S. Army photo



WESCON - 1960

Activity Plans

Technical Program

A WESCON technical program that will contain sessions on as many as 10

Tom Morrin, SRI, and Stan Kaisel, Microwave Electronics Corp., examine Donald C. Shapero's proton free-precession magnetometry exhibit during IRE judging for WESCON



special subjects, including a whole series of meetings on "Man-Machine Systems," has been outlined by Richard G. Leitner, chairman.

Leitner, whose committee reviewed hundreds of technical papers in making their selections for the technical convention, said that these will be augmented by several sessions for which selected authors were invited to participate. Included in the group are such subjects as stereo-multiplexing methods, information theory and modulation methods, and sessions on the subjects of miniaturization, air traffic control, space science, and bio-instrumentation systems.

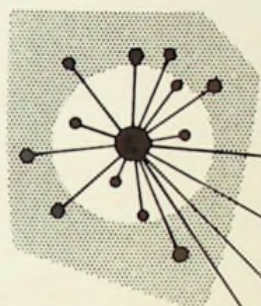
Format for these sessions will vary, including debates, colloquia, and more formal programs, Leitner said. He said that a number of sessions on man-machine systems, each independent of the others, will be held over a period of two or three days of WESCON.

For the first time, a women's session will be included, Leitner said, intended to examine some of the factors affecting the technical man "away from the job." The wife's role in understanding her engineer-husband's work better is

(Continued on page 12)

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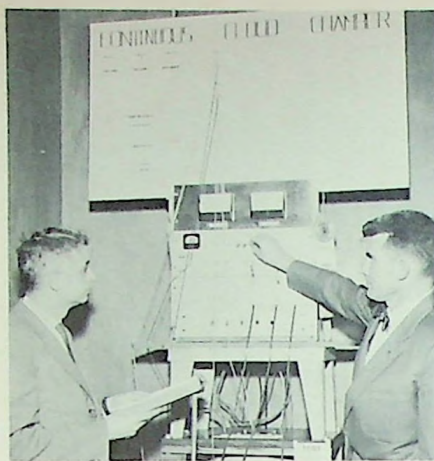
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A brochure more fully describing MITRE and its activities is available on request.



Earl Goddard, SRI, left picture, looks over another invited WESCON exhibit, one by David Hatfield of Concord, demonstrating measurements of projectile muzzle velocities. In right picture, two more IRE judges check the cloud chamber demonstration of Melvin Rosowski, Concord. Section members are Richard Mack, University of California, and John Corl, Beckman Instruments Inc.

MORE WESCON

one of several sub-topics to be presented by a panel of feminine speakers.

Field Trips

At the same time, Chairman Arthur N. Curtiss, RCA-Los Angeles, announced a schedule of seven field trips to sites of outstanding technical interest.

Materials concerning the operations of each of the installations to be visited will be distributed during the bus trips, and verbal briefings will be presented in advance, also during each journey.

Both research and manufacturing facilities will be covered in the four-day schedule of field-trip events, with strong attention given to operations that are unduplicated outside the southern California electronics complex.

The trip schedule includes: Jet Propulsion Laboratory; California Institute of Technology; Space Technology Laboratories; Packard-Bell Electronics; Telemeter Magnetics Corp.; System Development Corp.; Rocketdyne Division of North American Aviation Inc.; Radio Corp. of America; Thompson-Ramo Wooldridge; International Telephone and Telegraph; Librascope Division of General Precision; Computer Measurements; and Hughes Aircraft research laboratories.

Design Competition

Plans for the second Industrial Design Awards program of WESCON have been finalized and entrants have been officially invited, it has been announced by Kenneth J. Slee, chairman of the event.

The program, originated in 1959 as a part of WESCON, will be greatly expanded and diversified at Los Angeles, Slee predicted. "The importance of good appearance design in commercial and industrial electronics products has

become more and more evident to the industry," Slee said, "and the enthusiasm for this awards program appears to have grown proportionately."

Two kinds of awards are presented for winning designs during WESCON. The WESCON Award of Excellence will honor the product designs judged to be superior, and the Award of Merit will be given to all products selected for display in the exhibit. Purposes of the program are to encourage good design throughout the industry, to single out examples of outstanding design, and to point out corollaries between good design and successful products.

In order to qualify for entrance in the WESCON event, entries must be the product of a company which is a member of the Western Electronic Manufacturers Association, an exhibitor at WESCON, or the product of a company exhibiting in WESCON through an authorized exhibitor.

The product must be an industrial electronic product, an electronic component, instrument, or a complete system. The graphic design category has been added to cover two-dimensional entries, such as nameplates or labels. The product entry must have been in production prior to June 15, 1960, which is the deadline for the program.

In the case of entries on behalf of huge systems which could not be transported to Los Angeles for the show, Slee said, those accepted will be displayed through photos. Judging by a jury of nationally known designers will be accomplished from product photos after the June 15th deadline for entries.

Distributor-Rep Conference

WESCON's sixth annual Distributor-Representative Conference will attract more than 600 persons to the Ambassador Hotel, chairman W. Bert Knight predicted.

The conference, to be held on Monday, August 22—a day ahead of WESCON's official opening—will bring together distributors, factory sales managers, and sales representatives from throughout the West for a day-long series of bedrock business discussions.

Women's Affairs

Plans for "Hauoli Wahine Hou," which means "Happy Time for Women" in Hawaiian, have been announced by Mrs. Jeff Montgomery, chairman of women's activities.

Four days of special activity just for women-at-WESCON, all planned under a colorful Polynesian theme, will show off the attractions of southern California and entertain feminine visitors with a series of unusual social events.

As an added attraction and a "first" for WESCON, Mrs. Montgomery and her committee are cooperating with the

(Continued on page 14)

PROFESSIONAL GROUPS

New Officers

Audio

Nominees who will appear on the mail ballots (for installation at the June meeting) are: Mort Fujii, Ampex Professional Products Co., chairman; Charles Wilkins, Ampex Professional Products Co., vice chairman; and Stanley Oleson, SRI, secretary-treasurer.

Bio-Medical Electronics

Officers elected for the coming season are: Mark Blumberg, M.D., Stanford Research Institute, chairman; Keith F. Killam, Jr., department of pharmacology, Stanford University School of Medicine, vice chairman; and Ken Gardiner, Stanford Research Institute, secretary-treasurer.

Military Electronics


Results of elections for the 1960-61 term are as follows: Louis Gado, Wiancko Engineering Co., chairman; Walter Priese, Lockheed missiles and space division, vice chairman; Jerome J. Dover, Ampex Military Products Company, secretary; Boyd Norris, Lockheed missiles and space division, treasurer.

Microwave Theory & Techniques

Officers for the coming year will be as follows: E. M. T. Jones, Stanford Research Institute, chairman; Perry H. Vartanian, Jr., MELabs, vice chairman; and Peter Strum, Applied Technology, secretary-treasurer.

Production Techniques




Results of the election for the forthcoming year are as follows: Charles Eldon, Hewlett-Packard, chairman; George Reyling, Varian Associates, vice chairman; Olaf Landeck, Electro Engineering Works, secretary-treasurer; and Dale Fuller, Lockheed missiles and space division, program chairman.

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Vincent Salmon

MEETING AHEAD

Paying Through the Ears

The provocative title "Noise—Payment for Progress?" aptly describes the June 28 meeting topic for the Professional Group on Audio. See the Calendar for details. Vincent Salmon, manager of the sonic section in the department of physics at Stanford Research Institute will analyze the factors that control the damaging, annoying, distracting, and tension-producing noises of our modern environment. He will deal with both internally and externally generated noise, the differences between isolation and absorption and will describe the methods for noise measurement and control.

Salmon did his undergraduate work at Temple University, Philadelphia. He received his BA in 1934 and the MA in 1936, with a physics major and mathematics minor. From the Massachusetts Institute of Technology, where

he was a teaching fellow, he received his PhD in theoretical physics for research in acoustics.

In 1939 Salmon joined the Jensen Manufacturing Company, Chicago, as assistant physicist. In 1943 he was appointed senior physicist in charge of research and development. He specialized in horn theory, the generation of intense sound, and the development of loudspeakers for withstanding severe aerial and underwater shock waves. As an independent consulting physicist he also studied problems involving electro-mechanical transducers, varistors, thermoelectric sources, and thermodynam-

ics. Salmon joined SRI in 1949 to initiate research in acoustics. Much of his effort has gone into establishing a research program in industrial acoustics—the application of sonic and vibrational energy to industrial problems of testing, processing, and control. Other studies have been in shock-wave initiation, propagation, and utilization in air, water, and earth; development of modulation devices for producing high-intensity sound in air and water; noise and vibration control; and consultation on architectural acoustics problems.

Business Matters

The nominating committees for the PGA and AES will have submitted their recommendations to the membership in a mail ballot and the newly elected officers will assume control at the June meeting.

An interesting series of papers, programs, and field trips is being planned for the coming year, with responsibility for the programs alternating between the AES and PGA. In this manner, there will no longer be conflicts of meeting

topics and dates and the membership will benefit from a larger variety of meetings and greater participation in activities of common interest.

No meeting is planned for July, but on August 28 at 4:30 p.m., the groups and their families are urged to attend the Arthur Feidler concert with the San Francisco Symphony Orchestra in the Frost Amphitheatre at Stanford University, which is under the auspices of the Children's Health Council of Mid-Peninsula. A three-channel sound system will be provided by Harold Lindsay to reinforce the orchestra and following the performance Harold will show his equipment to those who are interested.



Heinz Von Foerster

1960—WJCC

Decade to Decade

San Francisco's inhabited juke box, the Jack Tar Hotel, was the scene of the 1960 Western Joint Computer Conference, just as we said it would be in the April *Grid*. It was a busy, successful affair with an attendance of 2200 and 95 exhibits, generally well filled with groups in animated discussion.

At the banquet, Professor Heinz Von Foerster, of the University of Illinois, presented a fabulous discussion on the subject of "Living Computers." Starting with the computational aspects of the praying mantis who can catch a fly without the bother of algebraic equations, he ranged through illustrative slides from snowflakes to spiral nebulae (not without the usual IRE difficulties in sound and projection equipment), to show the code of nature, which must be broken by an organism before it can succeed.

For the praying mantis, success lies in its ability to distinguish, without hesita-

(Continued on page 16)

MORE WESCON

convention's technical program committee in presenting a regular program session for women (and men as well) at the Statler-Hilton Hotel on opening day, August 23.

That will follow an "Enu Kopa" get-together earlier the same day in the Statler-Hilton's beautiful East Garden Room, which is to be recreated as an island retreat for WESCON women throughout their stay in Los Angeles.

The charming "island retreat" will also be the scene of an early-afternoon "Hoolaulea" punch party, scheduled to end in plenty of time for leisurely preparation for the important WESCON cocktail party a few miles to the West at the Ambassador Hotel.

On the second day of the program, visitors will have a choice of two exciting outings: a daylong trip to Walt Disney's fabulous kingdom of Disneyland, or a tour of outstanding South-

land homes and luncheon at the luxurious Santa Ynez Inn.

A highlight of the program, according to Mrs. Montgomery, will occur on Thursday, August 25, in one of southern California's most colorful restaurants. The Polynesian, a unique "islander" restaurant at the foot of the Palos Verdes hills near the Pacific, will be the scene of a tamaroo luncheon, featuring Cantonese and Polynesian delicacies. There will also be island entertainment and a fashion show featuring the designs of California fashion designers.

"In keeping with our Polynesian theme, we have planned our program to be leisurely and relaxed—and still to include the outstanding attractions of this area," Mrs. Montgomery explained.

At their registration in the Statler-Hilton, feminine guests will receive a specially prepared souvenir book, which will include the highlights—civic, cultural, and social—of southern California.

When crews of SAC's 1st Missile Division successfully launched the USAF ICBM Atlas from Vandenberg Air Force Base, September 9, 1959, the world became aware that the United States had brought into being a formidable retaliatory power for peace. Within four months after the first operational launch, the Air Force doubly underlined this missile's capability. On a single day, January 26, 1960, the 16th and 17th consecutive successful Atlases were fired intercontinental ranges to predetermined targets from both Atlantic and Pacific bases.

After only five years of intensive development, including concurrent research, testing and fabrication under this nation's top military priority, Atlas is extremely versatile as well as powerful. It was the Project Score satellite vehicle and is scheduled for use in Project Mercury, the Man in Space Program, and in other space exploration missions. Thus, used as a booster for space projects, Atlas provides the nation with a key capability in scientific as well as military applications.

Space Technology Laboratories provides the systems engineering and technical direction for the Atlas as well as other portions of the Air Force Ballistic Missile Program. Much of what was learned in building Atlas has helped cut the lead-time in the development of such other Air Force Ballistic Missiles as Thor, Titan and Minuteman.

Among the industrial organizations which have worked in concert in developing Atlas are such major contractors as: Convair, Division of General Dynamics Corp. for airframe, assembly and test; General Electric Co. and Burroughs Corp. for radio guidance; Arma, Division of American Bosch and Arma Corp. for inertial guidance; Rocketdyne Division of North American Aviation, Inc., for propulsion; General Electric Co. for re-entry vehicle; Acoustica Associates for propellant utilization.

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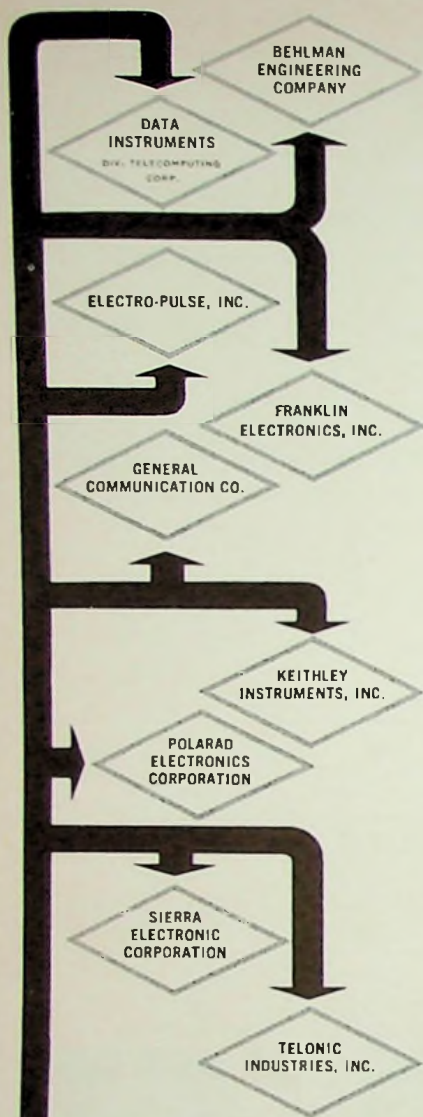
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William Bain, of the host company, speaks to the Friden tourists before the April 26 safari

MEETING REVIEW Calculating Tour

"Do it yourself" on a grand scale is the motto of Friden Calculator Co. In 500,000 sq ft of floor space they manufacture all the big parts as well as the bits and pieces required for their product line.

Forty-seven people heard William Bain, assistant to the factory manager, outline the scope of Friden's operations prior to the plant tour. Bain was introduced by Estrada Fanjul, chairman of PGPT.

Following this brief meeting and talk, the members broke up into small groups and viewed Friden's operations.

Because of the small size of the parts, Friden has grouped equipment in a departmentalized layout rather than including them in their product flow.

The first area visited was the machine shop. Here all the screw machines,

punch presses and drill presses were grouped by type of machine. The parts flowed from the machine shop to deburring operations, which were again departmentalized, then to plating and hardening operations as required.

One of the interesting operations was plastic injection molding. The equipment allows the use of two-color molding on one part so that all numerals on the keys are molded in and cannot wear off. Similarly the outer coating on a two-color key is molded in depth. Metal and plastic parts are also molded into a unit including two-color molding for numerals, etc.

The plating shop included several automatic plating machines set in a modern layout with grating-type flooring and a wet sub-floor.

The painting operation employed electrostatic attraction to increase the efficiency of use of the paint which was

(Continued on page 18)

MORE WJCC

tion, between a real fly and a man-made imitation so good that humans can't tell them apart.

Ten years from now, he predicted, you will be able to see a truly living computer at WJCC. If you go up to one and say, "Are you a truly living computer?" it will reply, "Yes, I am a truly living computer!" You then approach another, which is not a truly living computer but has faulty construction and gives false answers, and say, "Are you a truly living computer?" It says, "Yes, I am a truly living computer!"

The challenge of the decade will be finding out how to tell the one from the other.

From various other vantage points during the conference, Grid reporters heard the following comments of possible interest:

"You can choose between taking yourself or your work seriously but the

two are incompatible"—Jackson Granholm, "Computing News."

"I see a whole new generation of tense young men in horn-rimmed glasses"—Karl Spangenberg, Stanford University.

"Successful? This is at least a 50-beard conference!"—Herb Grosch.

—George Spelvin



At the WJCC cocktail party, Mary Haylock of the Grid chats with Lou Fein, consultant and conference session chairman

SPACE AGE TV— WITH EIMAC CERAMIC TUBES

Lockheed's new miniature TV transmitter and camera have special significance for a spacecurious world. They may one day help unravel some of the mysteries of the unknown as they soar through the outer reaches of space in a sophisticated satellite.

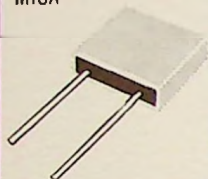
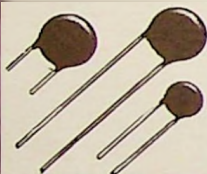
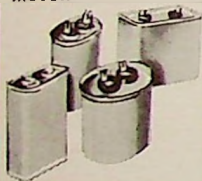
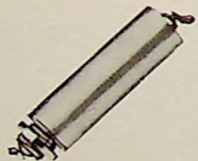
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MORE FRIDEN TOUR

applied by means of a rotating slinger rather than the conventional air-operated spray guns.

Following parts-manufacturing operations, computers are assembled on a line which is fed by conveyors starting from the sub-assembly operations. The conveyors are also used as an overhead storage rack and circulate continuously so that sub-assemblies can be picked off or added to the line as desired.

The actual assembly line is a wide belt-type unit. Several different types of computers are assembled in random order and all operators on the line are versatile enough to work on any type of computer which comes before them.

There is also a similar operation for assembling adding machines. The basic adding machine is available in several models and is also incorporated into more complex gear which requires an adding machine as a component.

Finally, the visitors were able to view an automated computer which was tied into a billing machine unit electrically. (Friden uses mechanical principles and straight electrical circuitry rather than solid state and electronic types of equipment.)

A comment by one of the "tourists" as we left to drive home in the pouring rain—"I didn't know that anything that only involved simple arithmetic and no electronics could be so interesting."

—George Reyling

MEETING REVIEW**Dog-Leg Communications**

Members of the Professional Group on Communications Systems heard an interesting presentation given by Russell Wolfram of SRI on Non-Great Circle Communications at the April meeting.

The talk was concerned principally with back-scatter propagation between Bozeman, Montana, and Palo Alto. Wolfram noted that scientists and experimenters have long been aware of radio propagation over paths other than the great circle paths between stations.

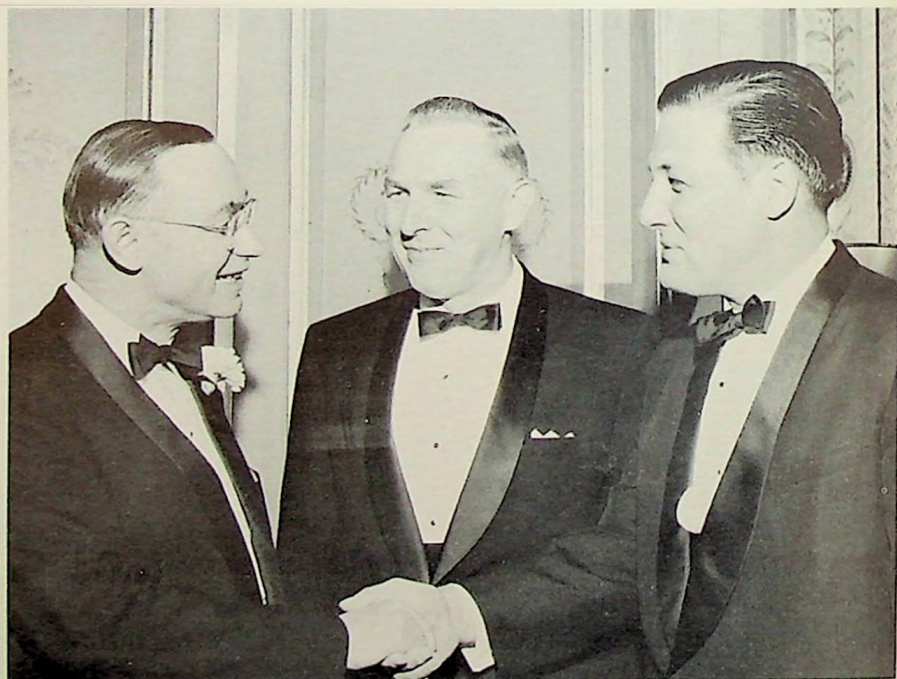
As early as 1935, by using MUSA antennas, it was noted that 5- to 15-mc signals arrived as far away as 80 degrees from the great-circle path. At the time, this unusual action was attributed to ionospheric storms.

In 1939 back-scatter effects resulting in non-great-circle propagation were noted on a Nova Scotia to London circuit operating at 10 to 20 mc.

By the 1940s and 50s evidence piled up which indicated back-scatter effects, instead of E-region anomalies, as the explanation of many non-great-circle paths.

The recent experiments by SRI were planned to obtain qualitative information on (1) the extent to which signal bearings may deviate from the great-circle path, (2) on signal strengths, and (3) on relationships with the time of day.

(Continued on page 20)



This has taken a little time but we are now able to show you Barney Oliver, right, research and development vice president, Hewlett-Packard, during the March IRE show in New York. Oliver, who served as toastmaster at the international banquet, is shaking hands with Eric A. Walker, president of Pennsylvania State University, who was spokesman for the IRE Fellows. Between them is H. I. Romnes, president of Western Electric Company, who was guest speaker at the banquet

SILICON-STEEL LAMINATIONS

For Audio Transformers

Power Transformers

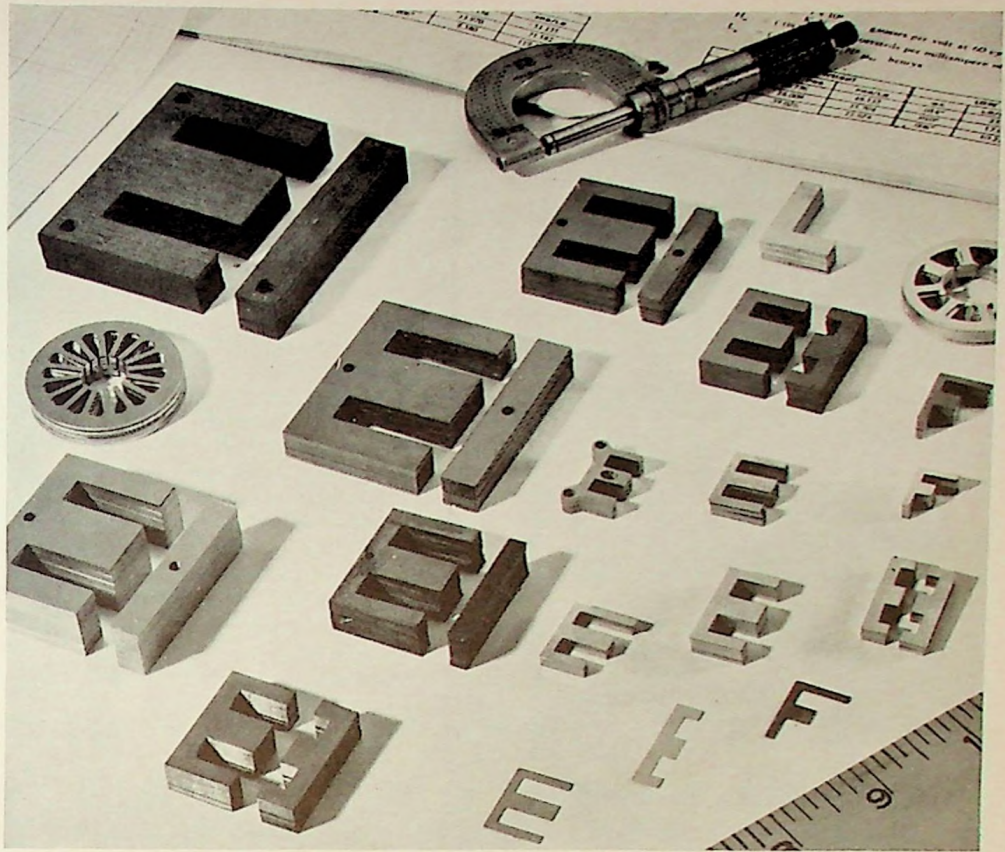
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MORE COMMUNICATIONS

Operating on a 1250-km path with a transmitting station at Bozeman and a receiving station at Palo Alto—each station with rotating antennas—the experimenters programmed the antennas to cover all possible paths in five-minute periods at thirty-minute intervals. The Bozeman antenna rotated at 0.2 rpm and the SRI antenna at 2 rpm. The carrier was 33 mc and frequency modulated with a 500-cps tone. Generally, the frequency was above the muf for the point-to-point path.

Wolfram presented many slides of the resulting polar patterns made by displaying signal strength on the radius. Analysis of the patterns, the propagation predictions for the time of day, and the geographical relationship led to the conclusion that generally the best signal was obtained by a one-hop 2500-km path to a distant back-scattering point and back another one-hop 2500 km to the receiving station. One of the back-scatter areas is in the Pacific Ocean and, oddly, there was no appreciable difference between ground and ocean scatter.

In using such dog-leg paths, one might say it is best to communicate with a friend by not looking at him.

—Ken Patterson

MEETING REVIEW

Books & Authors

The featured speakers at the May 17th meeting of PGews in the Lenkurt Electric Co. conference room in San Carlos were Lloyd G. Lyman, assistant director of the University of California Press, and Dr. Karl R. Spangenberg, professor of electrical engineering at Stanford University. Lyman described the policy of manuscript selection at the University of California Press, the program and the composition of the list of publications, the criteria for types of publications, and the procedure for the submission of manuscripts. Spangenberg, author of "Vacuum Tubes" and other engineering text books, discussed the problems involved in the writing of technical text books. He also described the recommended procedure for starting and completing a manuscript and the steps involved in securing publication.

—Douglas Dupen

MEETING REVIEW

Unidimensional MMZ

The monthly meeting of the Professional Group on Electronic Computers was held in the LMSD auditorium at Palo Alto on May 24. Dr. Hewitt D. Crane of Stanford Research Institute spoke on "The Neuristor, a Novel Device



Hewitt D. Crane, SRI, was speaker at the May meeting of PGEC

—Keith W. Henderson photo

and System Concept for Digital Computer Applications."

Crane received his PhD in electrical engineering at Stanford this June. The topic of his talk was on the research that he performed for this degree. The Neuristor, as Crane describes it, is a homogeneous, distributed, active-passive structure in the form of a one-dimensional fiber.

The very active interest today in micro-miniaturization triggered the investigation into this new and novel device and system concept. In making circuits or systems smaller and smaller almost everything can be scaled down in some degree with the exception of the number of connections. Interconnecting wires can be made as small as several microns but then they become important passive elements. In an attempt to define the properties of interconnecting elements, Crane came upon the necessary properties of his Neuristor. The blocks that initially were to be connected are unnecessary and all that was necessary were the interconnecting elements. The four necessary properties are: 1. A uniform velocity of propagation, 2. No attenuation of propagation, 3. A stimulation threshold, and 4. A refractory period.

With these four basic properties and two types of junctions, namely T and S for trigger and storage, the realization of any digital computer in a single plane is possible. The T-junction is a junction of three or more fibers, where, if a pulse enters the junction on one leg, equal pulses will leave the junction on the remaining legs. The S-junction is a junction of two continuous fibers where a pulse in one fiber plus its refractory period following the pulse will annihilate a pulse on the other

MORE MMZ

fiber. A network made of these T and S junctions can perform all the functions of a digital computer.

The concept of realizing functions with these unidimensional fibers was most interesting. The next step is physically to realize the structures and their networks electronically.

—J. A. Boysen

MEETING REVIEW

Electronic Chicanery

After trudging through endless miles of deserted corridors in the new Stanford Medical Center, trying to follow the Grid's own directions to the May meeting of the Professional Group on Bio-Medical Electronics, this footsore reporter finally sank into one of the comfortable seats in Room M-112. From here, he listened to a fascinating presentation by Dr. Ralph Weilerstein of the U.S. Food & Drug Administration, who addressed himself to the topic, "Electrical Devices and Medical Quackery."

In this discourse, Weilerstein referred constantly to the copious quantity of examples which he had brought with him, not only of apparatus but of sales literature, operating instructions, etc., as well.

(Continued on page 22)

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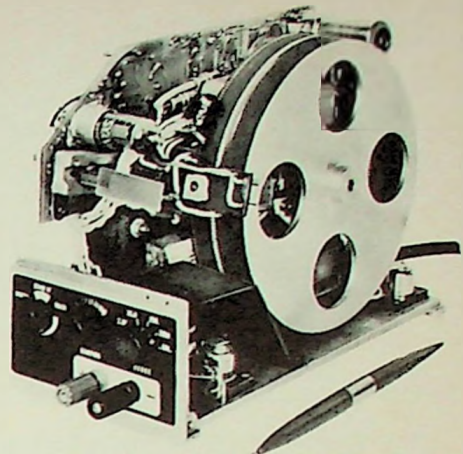
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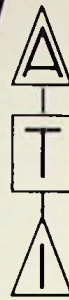
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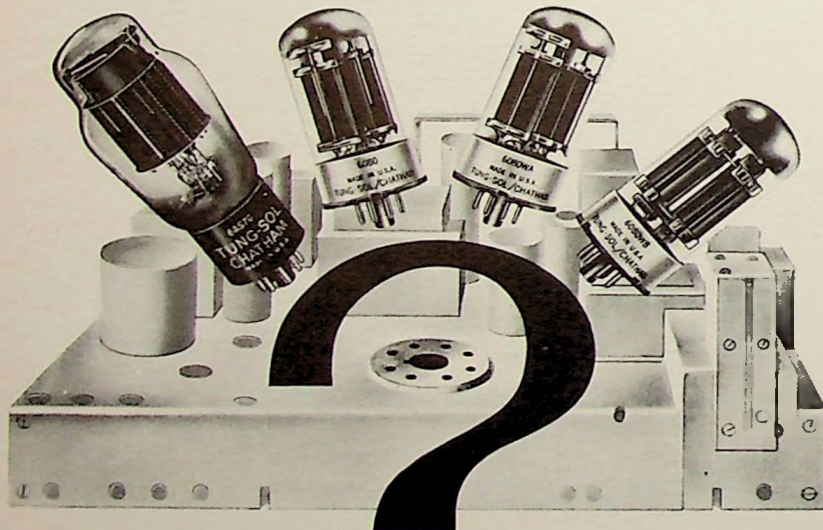


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MORE CHICANERY

As he pointed out, equipment of this type is seized by the Food & Drug Administration under existing legislation covering interstate shipments. Much equipment of this type is actually in current use within the state of California where, if it originated here, it is beyond their grasp.

While it was suggested that electronic chicanery of this sort in the past might have had some connection with the medical profession's cautious attitude toward new equipment; the point was also made that the PGBME has a potentiality for screening out such items.

Unfettered imagination could be seen to have played a leading role, not only in the design of much of the apparatus but also in such names as the Short Wave Oscilloclast, the Magnetic Pendul Affinitizer, the Diamagnetometer, and the Atomotrone, a device for producing E-irradiated and T-irradiated water by the action of a floodlamp shining through panels of colored glass. The two liquids were to be imbibed respectively for different lists of ailments.

—George Spelvin

SEMINAR SUMMARY

It Happened in Monterey

San Francisco members and friends of the PGRQC met at the U.S. Naval Postgraduate School on May 6 and 7, 1960, for the Second Annual Bay Area Reliability Seminar.

The theme of the Seminar was "Policies for Reliability" and papers were presented by leaders in the field from all over the country. (See program in April Grid.)

On Saturday morning two debates were held as announced, "Reliability Should Be Achieved by Component Development" versus "Insurance Is the Best Way." Julian Hilman of Fairchild Semiconductor Corporation and George Jacob of Armour Research Foundation presented arguments in favor of component development while Lou Fein, Palo Alto consultant and Bob Davis of Philco WDL presented arguments in favor of insurance or redundancy as the best way to achieve higher reliability.

The second debate, "There Should Be a Separate Reliability Organization" versus "Reliability Is Everybody's Business" found Chet Bartholomew of Boeing Airplane Company and Robert Benware of Philco WDL arguing in favor of the separate organization while V. E. James and J. D. Ashby of Automatic Electric Company, Division of General Telephone, argued in favor of the policy "Reliability Is Everybody's Business."

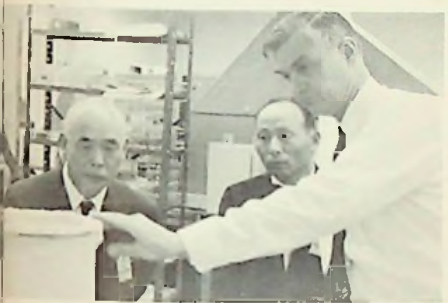
Proceedings of the Seminar will be available from Mr. John Hall, IBM, 3221 Stevens Creek Road, San Jose, at \$3.00 per copy.

—Bruce Clark

PALO ALTO: CROSSROADS



One of a series of visitors from abroad who have recently passed along the electronic byways of the San Francisco Peninsula, Charles De Gaulle, president of France, is shown through the Hewlett-Packard plant by Bill Hewlett, executive vice president



Meanwhile, over at Varian Associates, Ted Moreno, right, vice president of the company's tube division, guides T. Nara, Toshibaide Watanabe, and Kobeiji Toyama, all of Nippon Electric Co., Tokyo, through the microwave-tube laboratory



Varian was also host to a group of Britons and still another vice president, Emmett Cameron of the company's microwave tube group, talks with the Rt. Hon. Reginald Maundling, president of the British Board of Trade; Sir Cecil Weir, chairman of International Computers and Tabulators Ltd.; and Lord Rootes, chairman of Rootes Motors Ltd.



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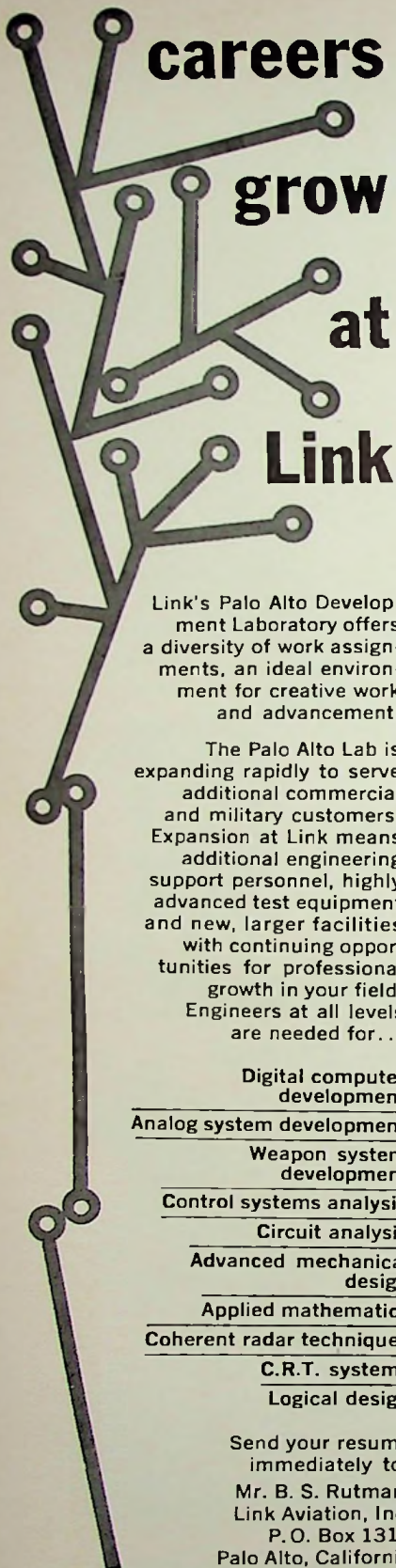
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OPINION

New Academy?

America's stride into a decade of swift-paced technological advances may be hampered by a popular misconception of the proper roles of science and engineering, according to Dr. J. Herbert Hollomon, general manager of General Electric's general engineering laboratory.

The impact of science has been so great in recent years, explains Dr. Hollomon, that scientific discoveries have been dramatically applied to solving the world's technological problems.

This has given the appearance that the problems of engineering are less important, less demanding and less challenging than science, he said. It has also eclipsed engineering's true role and has had the effect of making the profession less attractive to potential engineering talent.

Science is also the loser, said Dr. Hollomon, because insistence that it provide practical applications has obscured its proper goal—the search for basic understanding and knowledge. Engineering, on the other hand, he said, is the "application of this knowledge for the purpose of filling human needs. This is a social responsibility which the individual engineer must accept."

Dr. Hollomon suggests the establishment of a National Academy of Engineering to promote and to strengthen the engineers' contribution to society.

Noting that American engineers number about a million, Dr. Hollomon urged that Congress set up an academy on a par with the National Academy of Sciences that would help establish the importance of engineers as people and the importance of engineering to our country.

The proposed National Academy of Engineering would investigate, examine, experiment, and report on any subject of engineering called for by any department of the government, Dr. Hollomon said.

As the Academy's right arm, Dr. Hollomon suggested a National Engineering Council. This agency would not be a central control group, but would have the responsibility to make available to the highest levels of government the most outstanding engineering stature, prestige, and advice.

Dr. Hollomon asserted that the problems attendant to underdeveloped countries, the dwindling of our natural resources, the effects of foreign competition, and the problems of urbanization need a vigorous and unified approach if they are to be resolved.

Pointing out that the U. S. is spending 41 million dollars a day on research and development, Dr. Hollomon predicted that the upcoming, swift-paced

GRID SWINGS

It Is Reported:



Harold Lindsay, shown making measurements on the original Ampex Model 200 recorder

—Don Shapero photo

Harold W. Lindsay has been appointed technical assistant to **Alexander M. Poniatoff**, founder and chairman of the board of the **Ampex Corp.**

Lindsay, who was formerly manager of the industrial design department of the Ampex Professional Products Co., will work on special assignments for Poniatoff and will also give technical assistance to engineering groups within the corporation.

He joined Ampex shortly after the company was founded in 1946 and was project engineer responsible for the development of the first professional quality audio recorder, the historic Model 200 introduced in 1948.

Professor **Samuel Silver**, director of the space sciences laboratory at the University of California, has received a Guggenheim Foundation fellowship for study in the field of upper-atmosphere physics. Dr. **Harry Suhl**, a member of the Bell Telephone Laboratories staff, has been appointed a lecturer in physics on the Berkeley campus. Dean **J. R. Whinnery** has been appointed a consultant to the Advisory Group on Electron Tubes, serving the research and engineering division of the Department of Defense.

(Continued on page 26)

years will bring ultra-refined computers that will approach the human brain in mental capacity, and a host of air, sea, and land vehicles beyond the expectations of even the science fictionist.

Besides sparking these developments, said Dr. Hollomon, the concerted energy of the engineer should be directed at maintaining a technological growth that will keep pace with the demands of our expanding world population and allow our country to take the leadership in helping other countries. The imaginative vision that will help meet this challenge, he said, can be provided by a National Academy of Engineering.

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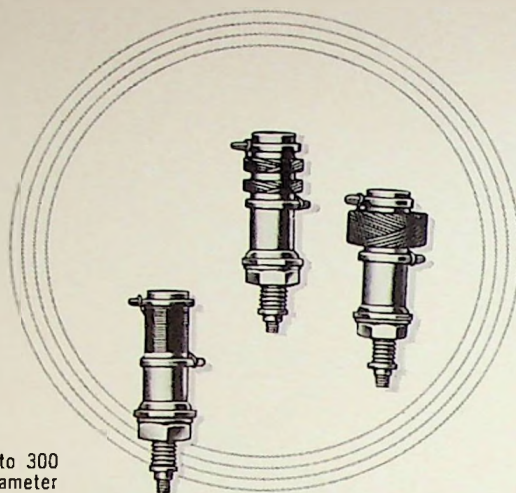
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MORE SWINGS

News from **Varian Associates** includes the following: **H. Myrl Stearns**, president, will receive an honorary doctor of science degree at the 65th commencement exercises of the University of Idaho, Moscow. It was here that he received his bachelor of science degree in 1937. Dr. **Harry E. Weaver**, of Varian's instrument division research staff, who has been at the University of Zurich during the past year on a Varian advanced-study-program grant, will be assigned to the applications laboratory of the firm's wholly owned Swiss subsidiary, Varian A.G. He will assist with nuclear-magnetic-resonance and electron-paramagnetic-resonance spectroscopy research. **Paul M. Sturm** is supervising a pilot manufacturing plant at the Zurich facilities.

The Varian board of directors has authorized an offering of additional shares of capital stock to shareholders of record at the close of business on a date which is expected to be July 14, 1960.

Announcement has also been made of a sales increase of 27 per cent and an earnings rise of 25 per cent for the first half of fiscal 1960 over the same period in 1959. Sales figures were \$22,022,715 compared with \$17,378,142 and net income was \$1,398,605 or 45 cents per share.



Stearns

Bruns

Systron Corporation, recently renamed **Systron-Donner Corporation**, has, through an exchange of stock, acquired **Donner Scientific Company** as a wholly owned subsidiary. The transaction culminated five months of negotiation. **G. H. Bruns, Jr.**, will be president and chief executive officer of Systron-Donner Corporation.

Four papers co-authored by engineers from the **Litton Industries** electron tube division were scheduled for presentation at the International Tube Conference held in June at Munich, Germany. Representing Litton Industries were Dr. **Norman H. Moore**, vice president of Litton Industries and general manager of the electron tube division, and Dr. **Joseph F. Hull**, manager of the division's research laboratory.

Litton's sales volume for the first 9 months of the current fiscal year, end-
(Continued on page 28)

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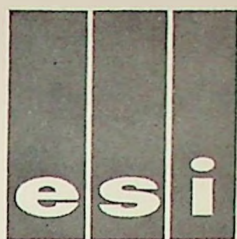
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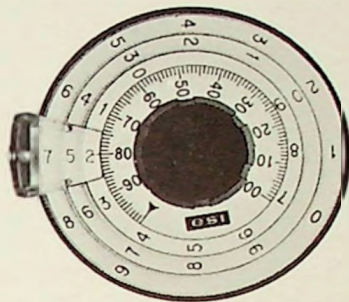
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MORE SWINGS

ing April 30, totaled \$134,459,000, compared with sales of \$89,191,000 for the same period last year. Earnings before taxes for the 9 months totaled \$10,873,000, and net earnings from operations after federal and foreign income taxes amounted to \$5,441,000, as compared to last year's 9-months earnings from operations of \$3,526,000.

With the appointment of **Joseph D. Bianco** to the newly created post of sales manager, **Components for Research, Inc.**, Palo Alto, marks the completion of four years of activity in the potting and encapsulation of electronic assemblies. The appointment is part of a major expansion program which will provide a broad line of specialty epoxy-resin components for ultra-high-voltage application.

Bianco leaves Hughes Aircraft Company's Vacuum Tube Products division in Oceanside, Calif., where he was plant manager, to accept this post. Prior to Hughes, he was in the research and development laboratories of Eitel-McCullough, Inc.



Bianco



Scott

Tung-Sol Electric Inc. announces the appointment of **Neill Scott** as sales engineer for this area. Scott was formerly an applications engineer with Berkeley division of Beckman Instruments, Inc.

Printronic Corp. has announced the promotion of **Richard C. Landis** to chief engineer and quality-control manager. Landis joined Printronics last year.

Lockheed Electronics Company, Los Angeles, has announced the appointment of **Cerruti & Associates**, Redwood City, as sales-engineering representatives. Lockheed Electronics Company manufactures specialized components, particularly electronic ceramics.

A & P Electronic Sales is a new manufacturing representative organization at 420 Market Street, San Francisco, handling mainly components. **W. A. Patterson** is president, and **Jim Goodrich**, sales engineer.

Charles P. Ginsburg, who led the development of the Videotape television recorder, has been appointed manager of advanced video development for

Ampex Professional Products Company.

Ginsburg, who joined Ampex in 1952 to head the Videotape recorder project, moves into his new position after having served as manager of video engineering since March 1959.

Lawrence (Larry) Weiland has been named manager of video engineering for **Ampex Professional Products Company**. Formerly manager of advanced planning for engineering at NBC in New York, Weiland joined Ampex April 1. While supervising NBC's engineering projects in tv tape operations, he served as a member of the original industry committee which established tv tape recording standards.

Promotion of **Dr. Daniel H. Goodman** to manager of the Mountain View components laboratory, a facility of special tube operations of **Sylvania Electric Products Inc.**, has been announced. Goodman succeeds **Dr. R. G. E. Hutter** who will now direct the activities of the microwave physics laboratory.

Philips Electronic Instruments, Mount Vernon, N. Y., recently opened a new office at 1299 Bayshore Highway, Burlingame, California. Staff includes **Don Rodgers**, **Alexander Gobus**, and **Juan Pradenas**.

Delcon Corporation has been formed in Palo Alto to manufacture electronic communication and navigational aids for commercial and government use, according to **Alan B. Simpkins**, president, former chief engineer for Kaar Engineering Corp.

Delcon has leased 7,000 sq ft of space at 943 Industrial Avenue for offices and engineering and manufacturing facilities. **Clyde R. Stewart** is vice president.

At the May meeting of the **Women's Association of the Electronic Industry**, held at the Philco western development laboratory, the following slate of officers was unanimously elected: **Marion Cellar**, MELabs, president; **Rita Baumgardner**, Jennings Radio, vice president; **Mae Chambers**, Lockheed, recording secretary; **Vickie Johnson**, IBM, corresponding secretary; **Elizabeth Campbell**, Transiron, treasurer; **Maryanna Bowers**, Hewlett-Packard, auditor; and **Bea Doebler** and **Ruth Soderberg**, SRI, nominating committee. Installation will occur at the June 20 meeting to be held at the Gold Platter in San Carlos.

An extremely interesting plant tour of Philco WDL was preceded by an excellent dinner served in the Philco cafeteria.

At **Eitel-McCullough, Inc.**, **George M. W. Badger** has been appointed to the newly created position of product manager for power klystrons, **John H.**

(Continued on page 30)

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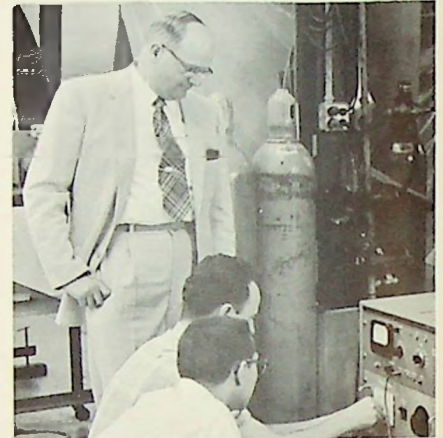
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MORE SWINGS

Hutchings has been named to the board of directors, and William I. Orr, W6SAI, has been appointed manager of the amateur service department.

Badger joined Eimac in 1953 as a research engineer. He was project engineer on early development of the company's power klystrons and later was in charge of Eimac's color-television laboratory. Before his present appointment he was manager of research and development.



Van Zandvoord

Facilities for a new consulting service on high-speed photo instrumentation have been established by Beckman & Whitley, Inc., San Carlos. The new activity, within the camera products department, will be headed by Peter J. Van Zandvoord, formerly of the Wollensak Optical Company, Rochester, New York, where he has been, for the past twelve years, active in this work.

Van Zandvoord, a native of Rochester, New York, studied at the University of Rochester and Rochester Institute of Technology. He is a member of the Society of Motion Picture & Television Engineers and the Society of Photographic Scientists and Engineers.

Dr. James T. Smith, now head of the electrical engineering department at San Jose State College, returns to the IBM general products division development laboratory as advanced technology manager. He replaces Dr. Byron J. Bennett, who will go to Montana State College, Bozeman, to become head of the electrical engineering department. Smith assumed his academic post after spending four years at IBM, and has continued as an academic associate of the laboratory.

IBM will start construction immediately on a 42,000-sq-ft office and laboratory complex near the junction of Monterey and Edenvale Roads in San Jose. The general products division development laboratory will occupy 30,000 sq ft of the new buildings. The advanced systems development division laboratory will occupy the remainder.



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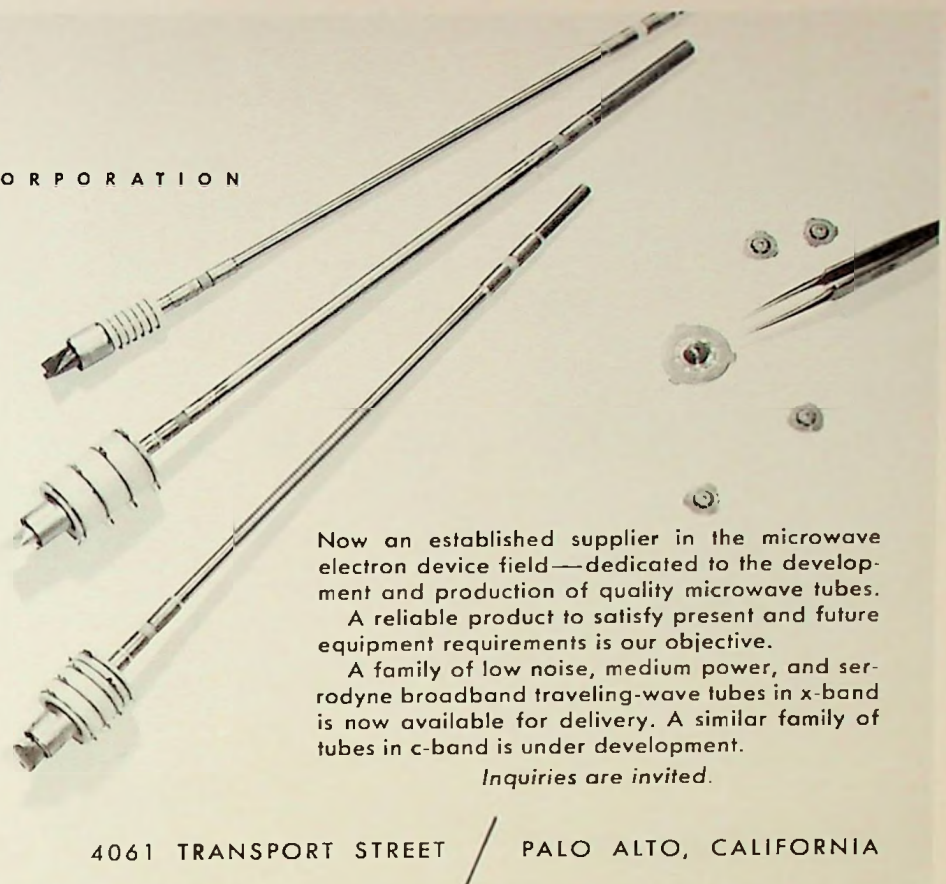
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MORE SWINGS

Berkley L. Fuller and R. Ray Sedillo will serve as manager and assistant manager, respectively, of the Kittleston Company's Palo Alto branch office. Fuller will be in charge of engineering field sales and contract negotiations. Prior to his appointment, Fuller served as manager of the Palo Alto sales and field engineering office of the Wiancko Engineering Co.

Sedillo joins the Kittleston organization after serving as electronic engineer for Lockheed's missile and space division, Sunnyvale. Previously he was affiliated with International Business Machines Corp., San Jose, in their development and product engineering departments.

Rheem Manufacturing Company has formed a subsidiary to design and build automatic machines for electronics and other industries that fabricate and assemble precise small parts. Rhebo Corporation, 2000 El Camino Real, Mountain View, is engaged in automation projects for several electronics firms in the San Francisco Peninsula area. Dr. Richard S. Bower, owner of a minority interest in Rhebo, is president and general manager.

Robert L. Trent has been appointed manager of the newly formed design

engineering department by Fairchild Semiconductor Corporation. He goes to Fairchild from Texas Instruments where he has been manager of germanium development.

Clifford A. Lionbarger was recently appointed manager of quality assurance for the Fairchild diode facility in San Rafael. Lionbarger was in charge of the diode-manufacturing quality-control program at Hughes Products Co. until he joined the Fairchild organization.

Progress of the Lockheed missiles and space division's satellite systems programs has dictated changes from a technical-management to an operational-management approach involving the following personnel shifts:

Daniel J. Gribbon, formerly director of operations, has been named manager of the satellite systems organization; Roy Smelt, who has headed the satellite systems organization, has been appointed the missile and space division's chief scientist; Don J. Murphy, former satellite systems assistant manager, has been named director of operations; Fred O'Green, who has been satellite systems technical director, now becomes assistant manager; Bruno Augenstein, a member of the chief scientist's staff, is named scientific advisor to the satellite systems manager; and

(Continued on page 32)

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MORE SWINGS

Robert W. Pearson will head modification and checkout and the Santa Cruz test-base satellite operations.

Vega Electronics Corporation, Cupertino, has announced the appointment to marketing manager of C. Arthur Foy, former president of Magnetic Recording Company and former executive of Ampex. Additional key employees of Vega Electronics are Robert Z. Langevin, Francis A. Dicus, Ralph L. Brown, Roger S. French, and William E. Magnie.

Walter C. Hironimus is vice president and chief engineer. He was formerly chief engineer of Wilcox-Gay and long-time engineering executive at Ampex Corporation.

Precision Instrument Company, San Carlos, has announced the addition of new staff members to its application engineering and administrative departments. James A. Koch joins Precision as a senior applications engineer, specializing in foreign market development, and Mortimer Fleishhacker III has assumed duties as assistant to the controller. Before coming to Precision, Koch held the position of project leader with Philco Western Development Laboratories, in automatic collection and read-out of data for space satellite systems.

TO BIBLIOPHILES

About Periodicals

Some months ago the Grid ran a piece about excess supplies of journals available for the taking away. This turned out to be a good test of readership, at least among publication-starved librarians, because the office was shortly cleared of the entire supply and a substantial number of later inquirers had to be told that all bets were off.

Some of these had specific needs in mind, and it appeared possible that the Grid could render an additional useful service in the Section by putting the "haves" and the "have-nots" in touch with each other.

To begin with, we are informed by the Lawrence Radiation Laboratory that their librarian in Livermore, Glenn Maynard, is in search of the following professional group transactions. If you have any of these and are willing to part with them, please contact him.

PGANE 1-7, 1951-53	PGEC 2, no. 1, 3, Mar., Sept. 1953
PGAP 1-3, 1952	PGEC 3, no. 2, June 1954
PGA 1-9, 1951-52	PGIT 1-2, Feb.-Nov. '53
PGA AU-1, no. 1, Jan./Feb. 1953	PGI 1-2, May 1952-June 1953
PGBTR 1-3, 6, 1952-54	PGME 1, Nov. 1953
PGCT 2, Dec. 1953	PGMTT 1, no. 1, Mar. 1953
PGCS 1, no. 1, July '53	PGNS 3, no. 1, Feb. '56
PGCP 1, Mar. 1954	PGVC 1-4, Feb. 1953-June 1954
PGE 1, no. 1, Mar. 1958	
PGED 1-4, Nov. 1952-Dec. 1953	
PGEC 1, Dec. 1952	

MORE BACKWARD WAVE

(From page 6)

to Frank Brierly for his activities and planning in behalf of the Membership Committee; and to Dick Davies for his thoughtful and careful attention to the needs of the Education Committee.

My thanks are extended as well to Frank Mansur for his activities as professional group coordinator, in collaboration with the Professional Group Committee; and to Howard Hansen and Harry Smith for effectively representing the interests of the Section in the San Francisco Engineer and the San Francisco Engineering Council, respectively; and to Miss Grace Pacak, IRE office manager, for her initiative and capable aid in a thousand ways. Finally, I am glad to express my thanks to Frank Haylock for his participation in numerous Section affairs—and for the patience and accommodation he has consistently shown in the face of publication deadlines.

It has been a busy and demanding, yet enjoyable year, full of stimulating and rewarding interrelationships. Progressive change has been characteristic of our San Francisco Section. But the job isn't finished. There's plenty left to do. With a touch of nostalgia and with full confidence, I take pleasure in handing the gavel to my successor.

—Victor B. Corey, chairman, SFS

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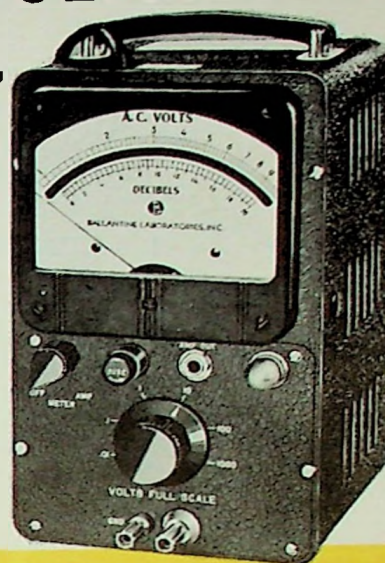
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300-D Voltmeter	10 CPS-250 KC	1 MV-1000 V	2 meg shunted by 15 or 25 pf, depending on voltage range	2%	General purpose, precision laboratory AC VTVM, a product improvement on the Model 300.	\$255
300-E Voltmeter	30 CPS-100 KC	300 μ V-300 V	2 meg shunted by 20 or 30 pf, depending on voltage range	2%	For mounting on 9/16 inch relay rack. Rear connections for input, power, and decade switching.	\$255
300-G Voltmeter	10 CPS-250 KC	1 MV-1000 V	2 meg shunted by 15 or 25 pf, depending on voltage range	1% 20 CPS-100 KC, 1 MV-250 V; 2% elsewhere	General purpose, precision laboratory AC VTVM, the most precise instrument in the Ballantine line.	\$315
302-C Voltmeter, Battery Operated	2 CPS-150 KC	100 μ V-1000 V	2 meg shunted by 10 or 25 pf, depending on voltage range	3% 5 CPS-100 KC, 5% elsewhere	Portable, battery-operated; no hum, with gain to 60 db. May be used on ungrounded or symmetrical circuits.	\$255
305-A Voltmeter Peak Reading	5 CPS-500 KC, sine waves. Pulses, 0.5 μ s up and 5 PPS up	1 MV-1000 V Peak or Peak-to-Peak	2 meg shunted by 10 or 25 pf, depending on voltage range	2% sine waves 20 CPS to 200 KC; 4% elsewhere. 3% pulses above 3 μ s and 100 PPS, and up to 5% other conditions	Measures Peak or Peak-to-Peak value of any repetitive waveform, distorted or undistorted sinewaves, or pulses. Its operating mode can be selected to respond to a peak to peak and positive or negative peak of the waveform.	\$395
310-A Voltmeter	10 CPS-2 MC or 5 CPS-4 MC as a null detector	100 μ V-100 V (Down to 40 μ V at reduced accuracy)	2 meg shunted by 9 or 19 pf, depending on voltage range	3% 15 CPS-1 MC; 5% elsewhere	Multi-purpose broadband VTVM for measurements such as low and high-level acoustics, low-level vibration, carrier telephone transmission, ultrasonic, and rf measurements. For use as an extremely sensitive null detector for signals as low as 10 microvolts.	\$250
314 Voltmeter Wide Band	15 CPS-6 MC	1 MV-1000 V (100 μ V-1 MV without probe)	11 meg shunted by 8 pf with probe, or 1 meg shunted by 25 pf without probe	3% 15 CPS-3 MC; 5% elsewhere	Wide-range unit of great sensitivity to facilitate development and servicing of equipment in video applications, and R.F. heating, vibration, ultrasonics, piezo-electricity, etc.	\$300
316 Voltmeter Very Low Frequency	0.05 CPS-30 KC	0.02 V-200 V Peak-to-Peak	10 meg shunted by 17 or 40 pf, depending on voltage range	3%	For development, design and routine testing of automatic control systems involving low frequency servomechanisms and where sub-audio frequencies down to 0.01 cps are encountered. Minimum pointer "flutter" down to 0.05 cps.	\$330
320 Voltmeter True RMS	5 CPS-500 KC	100 μ V-320 V	10 meg shunted by 8 or 18 pf, depending on voltage range	3% 15 CPS-150 KC; 5% elsewhere	Determines true root-mean-square magnitudes of periodic complex waves or voice potentials. Built-in calibrator. Crest factor range at full scale is 4.5 for high voltage scale and 15 for low voltage scale. Immune to severe overload.	\$445
220-C Decade Amplifier, Battery Operated	10 CPS-150 KC	Amplifies precisely 10 times or 100 times, as selected	5 meg shunted by 15 pf	2%	To increase sensitivity of Model 300 to 20 μ V. Provides no-hum pre-amplifier of accurate gain over wide band. Output source impedance less than 900 ohms in series with 2 μ f for 10 x gain, and less than 7000 ohms in series with 2 μ f for 100 x gain.	\$110

420 DC and AC Precision Calibrator

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520 Direct Reading Capacitance Meter

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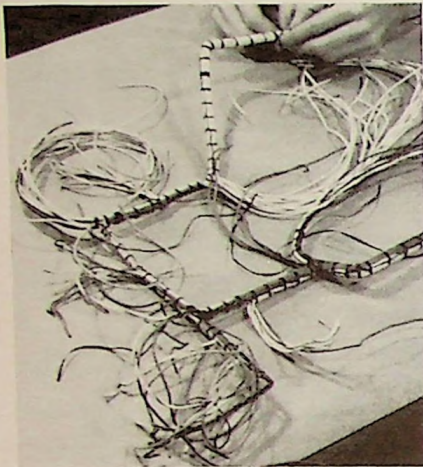
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EVENTS OF INTEREST

Meetings Summary

June 22-24—1960 Conference on Standards and Electronic Measurements co-sponsored by the IRE Professional Group on Instrumentation, the Radio Standards Laboratory of the National Bureau of Standards, and the AIEE Instrumentation Division. NBS Boulder Laboratories, Boulder, Colorado. George E. Schafer, National Bureau of Standards, Boulder, Colo.

June 23-24—Workshop on Solid-State Electronics. Joint sponsorship of the IRE Professional Group on Education and the Electrical Engineering Division of ASEE. Purdue University, Lafayette, Ind.

June 27-29—Fourth National Convention on Military Electronics. Sheraton Park Hotel, Washington, D.C. Dr. Craig Crenshaw, Dept. of the Army, Office of the Chief Signal Officer, SIGRD-2, Washington 25, D. C.

June 25-July 9—First Congress International Federation of Automatic Control. Moscow, USSR. Eugene Grabbe, P.O. Box 45067, Airport Station, Los Angeles 45, Calif.

Papers Calls

July 1—Titles and abstracts for Ninth Annual Industrial Electronics Symposium (Cleveland, Ohio, September 21-22) sponsored by IRE Professional Group on Industrial Electronics and the AIEE. Papers to relate to industrial applications of electronics stressing application and use of new products and ideas rather than basic research. Send to: G. E. Hindley, chairman, Paper Procurement Committee, Ninth Annual Industrial Electronics Symposium, Reliance Electric and Engineering Co., 24701 Euclid Avenue, Cleveland 17, Ohio.

July 1—200-500-word abstracts for Annual Conference on Electrical Techniques in Medicine and Biology representing the IRE, AIEE, and ISA (Washington, D. C., October 31, November 1-2). Send to: George N. Webb, Room 547-CSB, Johns Hopkins Hospital, Baltimore 5, Md.

July 15—Complete papers or 400-500-word abstracts in triplicate, plus 50-word summaries for presentation at the 1960 Northeast Electronics Research and Engineering Meeting (NEREM) (Boston, Mass., November 15-17). Send to: J. H. Mulligan, Jr., Department of Electrical Engineering, New York University, New York 53, N. Y.

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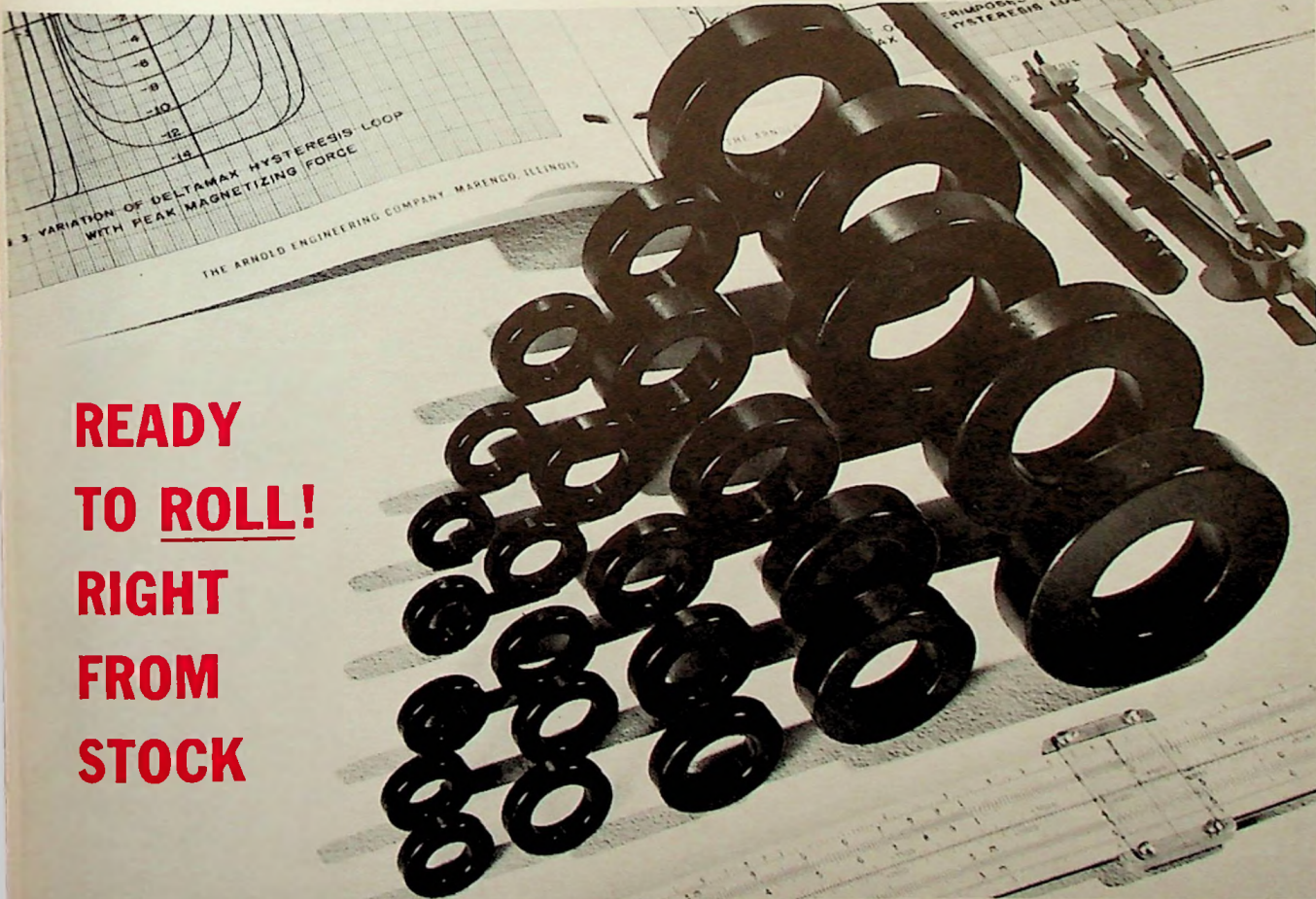
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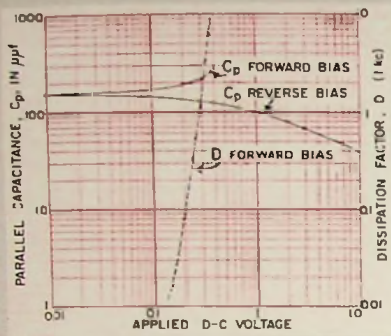
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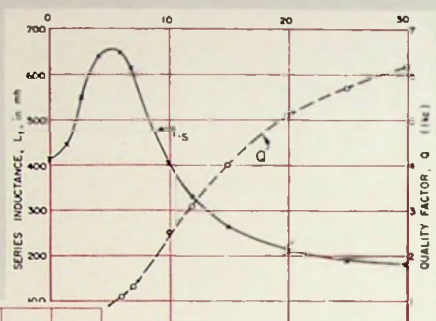
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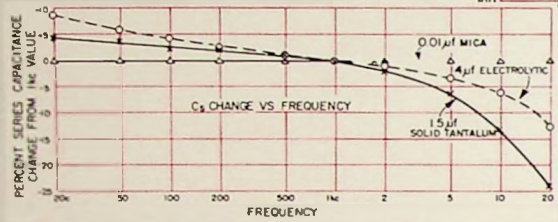
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Characteristics of a variable-capacitance diode at 1 kc with forward and reverse biasing.

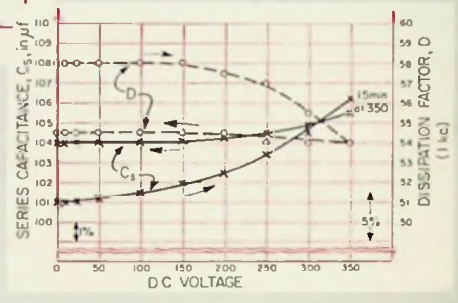


Behavior of an iron-core inductor at various d-c levels. Measurements made with the Bridge in its "Orthonull" position to eliminate sliding balances which occur when making low-Q measurements.

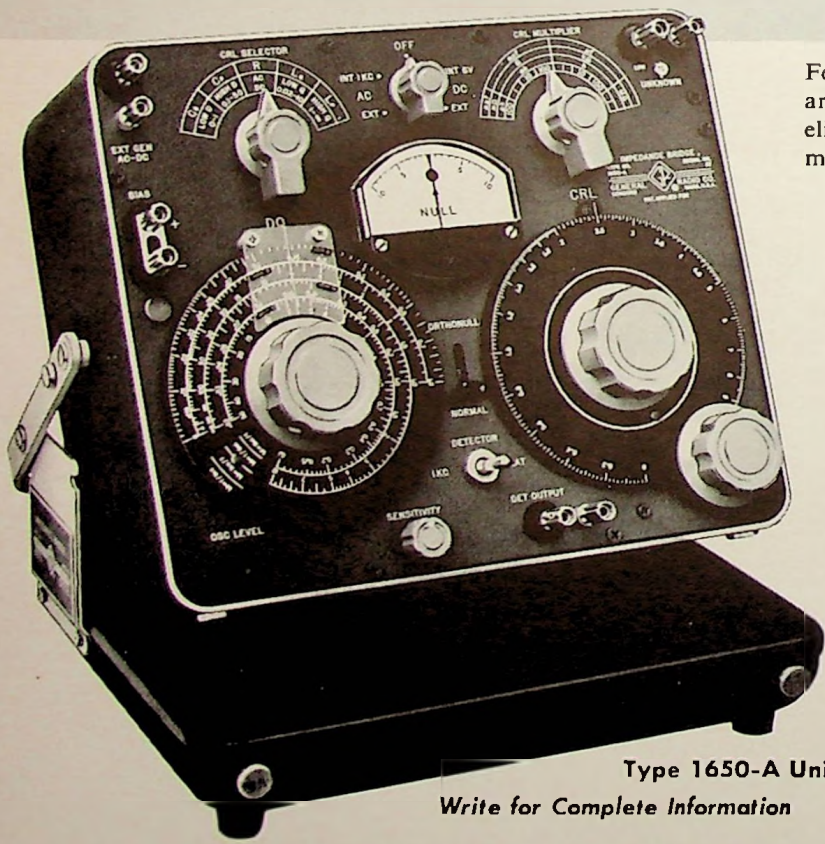


Plot of capacitance change vs frequency for three types of capacitors. External generator used is a G-R Type 1210-C Unit R-C Oscillator.

Variation of capacitance and dissipation factor of an unformed electrolytic as a function of d-c voltage as it is varied to rated voltage and then returned to zero.



These Measurements show why it's called a **Universal IMPEDANCE BRIDGE**



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