

EDITOR'S PROFILE of this issue

from a historical perspective ...

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

September, 1969:

Cover: This issues contains the helpful directory for all of the SF Bay Area IEEE organization, including Council, Section and Sub-Section officers and Chapter leaders.

Page 12: Presidents of four key semiconductor companies get together to "Tell It Like It Is". They are Les Hogan (Fairchild, recently from Motorola), Bob Noyce (Intel), James Riley (Signetics), and Charlie Spork (National).



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.

April, 2025

Contact p.wesling@ieee.org

Grid

SAN FRANCISCO SECTION ♦ IEEE SEPTEMBER, 1969

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ON THE COVER

Artist Ted Martinez has designed the Grid Cover for the San Francisco Section Directory Issue. The center section of the magazine features the 1969-1970 Roster of Section Officers, Executive Committee, Standing Committees, Sub-Section Chairmen, Group Chapter Chairmen and Student Counselors.

Grid

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Vehicle Technology Program Plans

During the past year, approximately 30 percent of our 111 members attended our monthly meetings. This may be a good average, but we would like to do better. Our meeting topics included: Radio Common Carrier Systems and Regulation, Mobile Relay Systems, Vehicle Location Systems, Leased Line Services, A New Spectrum Analyzer, and Electrical Vehicle Propulsion. We need your suggestions for this year's programs.

Jim Corn, our retiring Chairman, made the following observation at our last meeting: "I must finish by saying that I believe we are failing the Vehicular Technology area of interest. We don't have the attendance of those who regularly work at planning, building, and operating vehicular communications systems. We don't have the working members that are willing to take on committee work to develop programs that will inspire more interested participants.

"There are many who feel we should join forces with the Communication Technology Group. Perhaps the fact that more and more vehicular systems are being designed and expanded that use fixed point-to-point facilities such as wire line and microwave and then may interface directly with computers for automated dispatching will force a re-examination of this possibility. — And

why not? We really are interested and involved in designing systems to solve communication problems. Whether it is partly mobile and partly fixed makes little difference as we communicate between men on foot to control centers as well as from vehicles. Even machine to machine communications are becoming more commonplace with secondary tone signaling and remote control.

"These are the challenges we face. With the guidance of our newly-elected officers and the dedicated and involved participation by the membership, we can and will grow and find the proper responses to these challenges."

Since we have thought of several excellent programs that will be interesting to both of our groups, and possibly the entire section, this is a good year to begin coordinating our programs. For example: "The SRI Report on Spectrum Utilization," "A Review of the President's Task Force Report on Communications," and "BART Train Systems Communications and Control" are some of the topics we are considering. But the kicker will be the wine-tasting and dinner at the Villa Montalvo on September 19, when Vehicular Technology and Communication Technology members and wives will enjoy the fine art, vintage wine and excellent food. See you there!

Al Isberg
VTG Chairman, 1969-1970

SUBSECTIONS AND CHAPTERS PROGRAM SCHEDULE

San Francisco Section, 1969-70

	Monday	Tuesday	Wednesday	Thursday	Saturday
SECOND		Instrumentation Measurements	Communication Technology	Antennas & Propagation	
		Magnetics	Engineering Management	Industry & General Applications	
		Power	Microwave Theory & Techniques	Reliability	
THIRD	Electromagnetic Compatibility	Automatic Control	Circuit Theory	Aerospace & Electronic Systems	
	Vehicular Technology	Engineering in Medicine & Biology	Santa Clara Valley Subsection	Audio & Electroacoustics Electron Devices Information Theory	
		Nuclear Science			
FOURTH	East Bay Subsection	Computer Parts, Materials & Packaging	Golden Gate Subsection	Systems Science & Cybernetics	Education

MEETING CALENDAR

ANTENNAS &
PROPAGATION
SEPT. 11

Story on
page 6

FREQUENCY INDEPENDENT ANTENNA ARRAYS AND THEIR APPLICATION TO PRECISION MONOPULSE DIRECTION FINDING SYSTEMS. George A. Hahn, Sylvania EDL, Mountain View.

SEPT. 11, Thursday, 8:00 PM, Lockheed Auditorium, Bldg. 202, 3251 Hanover St., Palo Alto. Dinner: 6:00 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. No reservations.

COMMUNICATION
TECHNOLOGY/
VEHICULAR
TECHNOLOGY
SEPT. 19

Story on
page 6

JOINT MEETING. WINE-TASTING DINNER AND KICK-OFF MEETING. Ladies and non-members invited.

SEPT. 19, Friday, 7:30 PM, Villa Montalvo, Saratoga. (Watch for signs on both sides of Highway No. 9 — Saratoga/Los Gatos Highway, ¼-mile west of main Saratoga intersection.) \$7.00 per person, payable in advance or at the Villa. Limited to 120 persons. Reservations: Milt Seymour, (415) 593-8491, Don Kidder (415) 591-8491, ext. 303, R. A. Isberg (415) 433-3800 or L. E. Best (408) 354-6267 by Sept. 17th.

COMPUTER
SEPT. 23

Story on
page 13

THREE-DIMENSIONAL COMPUTER GRAPHICS. Dr. Ivan E. Sutherland, President, Evans & Sutherland Computer Corp., Salt Lake City, Utah.

SEPT. 23, Tuesday, 8:00 PM, Room 134, McCullough Hall, Stanford. Dinner: 6:15 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Chef's Special Steak \$4.40 incl. tax & tip. Reservations: Salli Burns, 321-3300, ext. 258 by Sept. 22nd.

EAST BAY SUB-
SECTION/GOLDEN GATE
SUBSECTION/SAN
FRANCISCO SECTION
SEPT. 22

Story on
page 14

JOINT MEETING. STORY OF APOLLO 11, with pictures and films taken by the "MEN ON THE MOON." Bradford A. Evans, Public Affairs Officer, NASA.

SEPT. 22, Monday, 8:00 PM, Engineers Club of San Francisco, 160 Sansome St., San Francisco. Cocktails: 6:00 PM, dinner: 7:00 PM. Reservations: Mary Vilter, 399-4974 or the Section Office, 327-6622 by Sept. 18th.

ELECTRON
DEVICES
SEPT. 22

Story on
page 12

SEMICONDUCTOR INDUSTRY — FOUR PRESIDENTS "TELL IT LIKE IT IS." Panel discussion by C. Lester Hogan, Pres. Fairchild Camera & Instrument Co., R. N. Noyce, Pres. Intel Corp., James Riley, Pres. Signetics Corp. and Charles Sporck, Pres. National Semiconductor.

SEPT. 22, Monday, 8:30 PM, Bold Knight, 769 No. Mathilda, Sunnyvale. Cocktails: 6:00 PM, dinner: 7:30 PM. Reservations: Section Office, 327-6622 by Sept. 18th.

ENGINEERING IN
MEDICINE &
BIOLOGY
SEPT. 16

Story on
page 15

IMPLANTABLE BIOTELEMETRY SYSTEMS. Thomas Fryer, Assistant Chief, Electronics Research Branch, NASA.

SEPT. 16, Tuesday, 8:00 PM, NASA-Ames Research Center, Room 261 of Bldg. 213. No dinner.

MICROWAVE THEORY
& TECHNIQUES
SEPT. 10

Story on
page 15

RECENT DEVELOPMENTS IN THE ANTENNA BREAKDOWN PROBLEM. William C. Taylor, Stanford Research Institute.

SEPT. 10, Wednesday, 8:00 PM, Hewlett-Packard Bldg. 5M, 1501 Page Mill Road, Palo Alto. No dinner.

SYSTEMS SCIENCE
& CYBERNETICS
SEPT. 25

Story on
page 15

ANALYZING THE URBAN EDUCATION SYSTEM. Dr. Thomas C. Thomas, Stanford Research Institute.

SEPT. 25, Thursday, 8:00 PM, Stanford Res. Inst., Main Conference Room B, 333 Ravenswood Ave., Menlo Park. Dinner: Coach and Six, 1906 El Camino, Menlo Park at 6:00 PM. Reservations: Carolyn Smith, 326-6200, ext. 2312 by Sept. 24th.



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section chairman's message

July marks the beginning of the Section year in San Francisco. My first few weeks as your Chairman have been spent finalizing our plans for the coming year and selecting Chairmen to head the various Standing Committees of the Section. These men have agreed to serve the Section in various capacities and they will need your help as active volunteers on their committees if we are to operate successfully as the largest IEEE Section in the world! In the past you may have felt that this or that committee was

not performing as well as you thought it should. Rather than sit back and continue complaining, I invite you personally to take part in at least one activity that is of interest to you. This will give you the satisfaction of knowing that you helped to improve our operation and it will give you an opportunity to meet some talented and very interesting IEEE associates. You may volunteer your services by calling the Chairmen listed in this Directory Issue or the Section office.

The past several years have been eventful and successful due to the skillful leadership of Jack Barkle, Fred MacKenzie and our other past Chairmen. I plan to continue the programs that they have initiated. My contribution for this year will be more a matter of emphasis than of innovation. Four areas have been identified for special attention.

The bulk of the meetings held in the Section are organized by the Group Chapters. These are technical meetings that span the spectrum of interest represented by our 23 Groups. Most of these groups have been very successful but several have failed to come up to our expectations. With a new corps of officers and with our enthusiastic Group Chapters Coordinator, Ed Jackson, we hope to revitalize these groups and to encourage the other groups to even greater achievements.

There are nine student branches within the Section. During the past several years the Section Executive Committee has held informal meetings with the Student Branch officers and Counselors to develop ideas and plans for closer contact between the Branches and the Section. The students are eager for joint meetings and the opportunity to discuss "what becomes



Outgoing Chairman Jack Barkle turns the gavel over to John Damonte, new Section Chairman, at the Annual Dinner in June.

of an engineer after graduation" with practicing engineers. In order to provide these students with a forum we will endeavor to organize at least one joint meeting with each of the Student Branches during the coming year.

At the beginning of 1969 the membership of the San Francisco Section was 7938 members consisting of 182 Fellows, 1176 Senior Members, 5291 Members, 519 Associates and 770 Students. There are at least 10,000 electrical and electronics engineers in the San

Francisco Section who are not members of IEEE. The reasons for this situation are many and varied. In most cases I believe the reason is that no one took the time to personally invite the young engineer to join IEEE and then see to it that he took part in the activities of the Section. I have appointed our General Director, Jeremy Schloss, Chairman of the Membership and Transfers Committee. He will be contacting you in the next few months to help him identify and approach prospective new members. While he is at it, he will probably persuade you to transfer to a higher grade of membership.

Within the confines of the San Francisco Section reside some of the finest people it has been my privilege to meet. Why then, do we limit our contacts to an occasional technical meeting or a business encounter? During the past year the Section held a Wine Tasting and Barbecue and an Annual Dinner Dance as purely social affairs. With the assistance of the subsections we also sponsored a NASA presentation of the Apollo 10 Flight. These meetings brought out the ladies and I must say that they did much to liven our meetings. We promise you more of these meetings during the coming year and we hope that you and your lady will join the party.

It's going to be a busy year and we trust that it will be an enjoyable and fruitful year for you. Your officers and committeemen will certainly do all that they can to make it so. Won't you help by being an active member and by taking part in our meetings?

John B. Damonte

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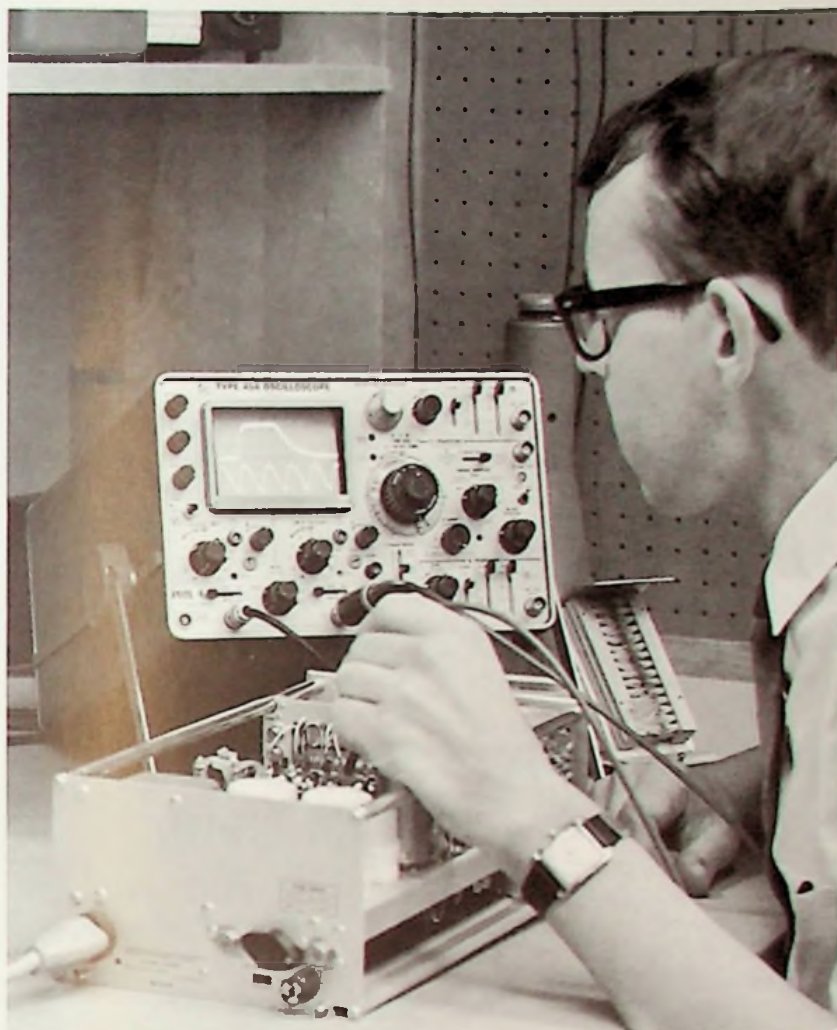
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Close-up view of Temple of Venus on the Villa Montalvo grounds in Saratoga.

Vehicular Technology Joins Com Tech for Kickoff Dinner

Villa Montalvo, the former home of the late U.S. Senator and San Francisco Mayor, will be the location of the Com Tech Chapter's fifth annual Wine Tasting Dinner and Kickoff Meeting, September 19. This year the Vehicular Technology Chapter will co-sponsor the event.

This meeting is primarily a social event to bring together regular members, new members and prospective members of the Tech Groups. Ladies are especially invited. Wine tasting is scheduled for 6:30 PM and dinner is scheduled for 7:30 PM. The wine tasting is being presented by Mirassou Vineyards of San Jose. The sit-down, barbecue New York Steak dinner will be catered by Continental Caterers. Following the dinner, the new officers of both groups will be introduced along with a review of the coming year's program.

Villa Montalvo, located in Saratoga, is one of the more beautiful spots in the Santa Clara Valley. The Villa itself will be open with art exhibits on display. The wine-tasting and dinner will be held in the Garden Court of the Villa and those attending will be able to tour the gardens surrounding the Villa.

We will be looking forward to seeing you on September 19. Reservations are being limited to 120 people, so call early.

Reservations must be in by September 17. The cost is \$7.00 per person, payable in advance, or at the Villa.



Hahn Speaks to A & P Chapter

"Frequency Independent Antenna Arrays and Their Application to Precision Monopulse Direction Finding Systems" will be discussed by George A. Hahn at the Antennas and Propagation Chapter Meeting on Thursday, September 11, at 8:00 PM. In a broadband monopulse direction finding system it is highly desirable to utilize antenna arrays which provide frequency independent performance. Arrays of log periodic antenna elements configured so that the effective phase center spacing is constant with frequency will provide far field sum and difference patterns that are independent of frequency.



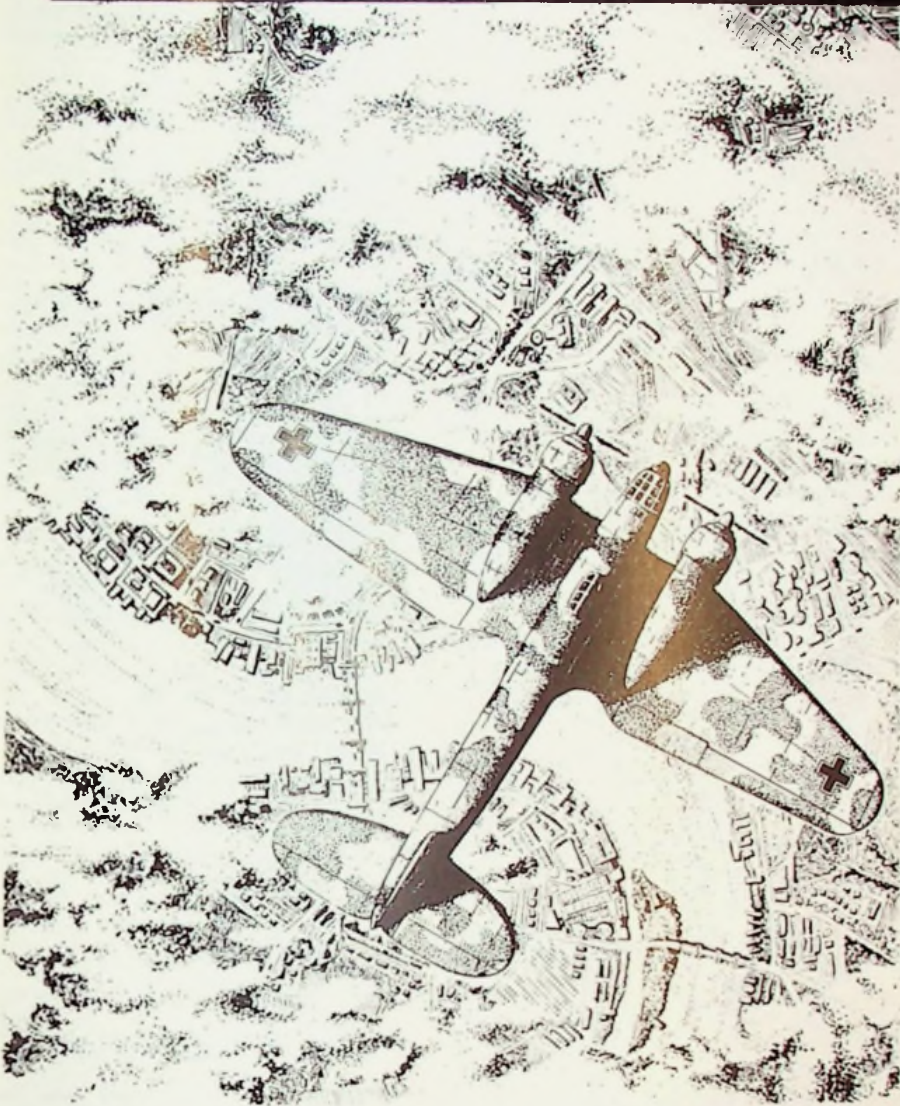
George Hahn

Mr. Hahn will qualify the term frequency independent when applied to circularly polarized arrays of conical log spirals. In this type of array the axis of the antenna elements are skewed to obtain frequency independent sum and difference radiation patterns. The array element radiation patterns are therefore non-coincident and result in angular limitations to the array spatial coverage. Furthermore, the sum-to-difference amplitude ratio, as measured in an amplitude and phase monopulse system, becomes dependent on the element factor whose errors degrade system accuracy. These limitations will be discussed and compared to measured data which will illustrate the effect of antenna phase and amplitude errors on the phase and amplitude characteristics of a broadband precision monopulse direction finding system.

An IEEE member, Mr. Hahn is an Engineering Specialist in the Electromagnetics Laboratory at Sylvania's Electronic Defense Laboratories in Mountain View. He is presently engaged in the design and development of microwave antennas for broadband precision airborne monopulse Direction Finding Systems.

Dinner is planned for 6:00 PM at Rick's Swiss Chalet. See calendar for further details.

A Page From The History of Countermeasures



Portable FM stations placed along bombing routes guided German bombers to their targets in World War II.

The British countered by using a skilled linguist who transmitted false orders to the German pilots on the original FM frequency. The countermeasure was so effective some confused pilots actually landed at British air bases.

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Fred MacKenzie



John Beckett

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Stanley F. Kaisel



Charles Sedam

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John Barkle

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Ed Jackson

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Group Chapter Coordinator: **Ed Jackson**, Pacific Telephone, 111 No. Market St., Room 409, San Jose 95113; 291-4586.



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Membership: **Jeremy K. Schloss**, 20613 Ritanna Court, Saratoga 95070; 253-6218.

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(Chairmen: See Executive Committee)

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Allen Hastings



Allen Smoll

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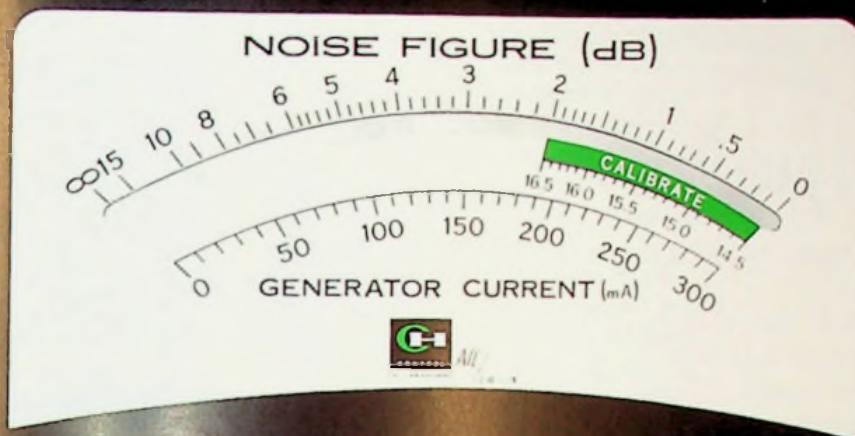
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Four Presidents "Tell it Like it is"

The Electron Devices Chapter will host a four-member panel discussion at its meeting on Monday, September 22. The distinguished members of the panel will discuss various aspects of the semiconductor industry such as new technologies, layoffs, compensation of employees and price cutting. The panel consists of Mr. C. Lester Hogan, Mr. Robert N. Noyce, Mr. James F. Riley and Mr. Charles E. Sporck.

Mr. Hogan, President and Chief Executive Officer at Fairchild Camera and Instrument Corporation, is generally ac-

quainted with fifteen patents on semiconductor methods, devices and structures.

Mr. Riley has been President of Signetics Corporation since September 1964 when he joined the Corning Glass Works subsidiary from his former post as general sales manager of Corning's Electronics Products division with headquarters in Raleigh, North Carolina. He is past director of the Western Electronic Manufacturer's Association and has given numerous talks before a variety of business and technical groups.

Mr. Sporck has been President and Chief Executive Officer of National Semi-



C. Lester Hogan



James Riley



Robert Noyce



Charles Sporck

knowledge to be one of the outstanding executives in the Electronics field, combining business acumen and decisiveness with an outstanding scientific background, based on his experience as an educator at Harvard and as a member of the technical staff at Bell Laboratories. He is a Fellow of the IEEE.

Mr. Noyce, President-Director of Intel Corporation is also a Fellow of the IEEE. He was one of the founders of Fairchild Semiconductor in 1957. Mr. Noyce has made major contributions to the development of diffused silicon devices. He holds

conductor Corporation since February 1967. From 1959 to 1967 he held various management positions with Fairchild Semiconductor. They ranged from Production Manager to General Manager. Prior to that, he was with the General Electric Company in various manufacturing positions.

Location for the evening's program will be the Bold Knight in Sunnyvale. The 8:30 PM panel discussion will be preceded by cocktails at 6:00 and dinner at 7:30. Check calendar for further information.

Computer Controls 3-D Computer Graphics

Dr. Ivan E. Sutherland, guest speaker at the Computer Chapter's first meeting of the season on Tuesday, September 23, will describe recent developments in processing equipment which make it possible to display dynamic perspective views of moving three-dimensional objects. The equipment now available to do this, operates on very simple, yet sophisticated mathematical principles. Dr. Sutherland will also consider the techniques used to control three-dimensional objects in computer memory and to manipulate them on the screen. His talk will finish with a survey of the hidden line problem and some discussion of the future of three-dimensional computer graphics.

Dr. Sutherland received his B.S. at Carnegie Tech in 1959, his M.S. at Cal Tech in 1960 and his Ph.D. at M.I.T. in 1962. He was former Director for Information Processing Techniques at the Advanced Research Projects Agency, Department of Defense. He was presented an award from American Federation of Information Processing Societies, in recognition of his authorship of the outstanding paper presented at the Fall Joint Computer Conference, San Francisco, December, 1968.



Dr. Sutherland

Dr. Sutherland has taught his own course, "Computer Graphics," at Harvard and at the University of Utah. A member of IEEE, he is at present Vice President and General Manager of the Evans and Sutherland Computer Corporation, Salt Lake City, Utah, a newly-formed manufacturing company producing equipment for real time display of dynamic perspective pictures.

The 8:00 PM meeting will be held in McCullough Hall, Stanford. A 6:15 PM dinner at Rick's Swiss Chalet is also planned for the evening. See calendar for full details.

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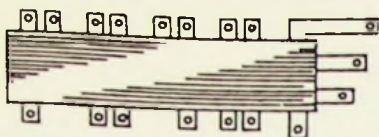
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IEEE and WESCON Announce Joint Study

Joint announcement, IEEE/New York and WESCON/Los Angeles

The world's largest international convention and exhibition, sponsored each year in March by the Institute of Electrical and Electronics Engineers, will be the subject of a joint study, it was announced today.

An agreement between WESCON (Western Electronic Show and Convention) and the IEEE establishes a study project under which Donald E. Larson, general manager for WESCON, and other members of the WESCON staff, will work as consultants with members of IEEE convention and exhibition committees and with the headquarters staff in a general review of the IEEE March event.

The purpose: objective, knowledgeable appraisal of all current aims, procedures, and results, plus possible recommendations for improvements and changes in the future.

Mr. Larson and associates, it was emphasized, will continue to carry present WESCON responsibilities, and will work with IEEE only on a part-time basis. The timetable calls for a report to IEEE management in January of 1970.

The USA Standards Institute

The USA Standards Institute is considering a suggestion by the National Electrical Manufacturers Association that USASI initiate a USA Standards Committee on Medical Electronics. The increasing use and growing complexity of medical electronic apparatus has created a pressing need by hospitals, doctors, and patients for coordination of safety and performance standards on these apparatus.

USASI's role in this program would be to:

1. provide the means for coordination of efforts toward national voluntary standards
2. minimize duplication of work
3. avoid promulgation of conflicting standards
4. assure that the interest of the public is represented
5. stimulate the work of existing committees and organizations
6. work toward optimum compatibility between government codes and standards and voluntary standards so as to achieve maximum common usage of standards in the USA

Apollo 11: NASA's Men on the Moon

The story of Apollo 11, America's successful attempt to put a man on the moon, will be the subject of the joint meeting of the East Bay Subsection, the Golden Gate Subsection and the San Francisco Section on Monday, September 22. The speaker will be Mr. Bradford A. Evans, Public Affairs Officer for the National Aeronautic Space Administration's Ames Research Center at Moffett Field.

Mr. Evans' talk will cover the lunar landing mission in detail from launching through moon landing and return and will include film and pictures taken on the moon.

Mr. Evans received his B.S. and M.S. degrees from Boston University. He started in the missiles and space program in 1948. Following an assignment in Washington, D.C., where he was in charge of public information matters for the U.S. Air Force, aircraft, engine and missile developments, Mr. Evans went to Cape Canaveral in 1949 to organize and operate the public information program for the country's first long-range missile launching facility. He is a member of the Ameri-



Bradford Evans
can Institute of Aeronautics and Astronautics.

The dinner and meeting will be held at the Engineers Club of San Francisco. Wives and guests are invited. A large attendance is expected, so make reservations early. See calendar for details.

Alternative Approaches to the Urban Education System

An urban education system is a typical soft system. System boundaries are poorly defined, statements of objectives murky, theoretical relationships between variables incomplete and conflicting, and empirical data sketchy or non-existent. Thomas C. Thomas will review alternative approaches to analysis under such conditions and describe the results of recent contracts conducted at SRI at the first meeting of the season for the System Science and Cybernetics Chapter. The meeting will be held on Thursday, September 25, at 8:00 PM.

Dr. Thomas will base his talk upon his experience in modeling urban education for the State of New York and the Educational Policy Research Center and evaluations of E.S.E.A. Title I programs for the San Francisco Unified School District. Other experience at SRI includes the estimation of the value of travel time savings for non-commercial motorist and logistic management models for the Polaris. He received a Ph.D. in Economics in 1961 and a B.S. in E.E. in 1957.

Taylor Discusses Aspects of Antenna Breakdown

The Microwave Theory and Techniques Chapter will hear William C. Taylor speak on recent developments in the antenna breakdown problem at the meeting scheduled for Wednesday, September 10.

The first half of Mr. Taylor's presentation will be a discussion of the breakdown threshold power levels for various antenna shapes in room-temperature air and in the much more complicated environment associated with hypersonic flight. The transmission losses incurred due to breakdown will also be discussed.



William Taylor

In the second part of his talk, Mr. Taylor will deal with various measures one can take to raise breakdown thresholds, including chemical injection and D.C. electric field application.

The 8:00 PM meeting will be held in Building 5M at Hewlett-Packard, 1501 Page Mill Road, Palo Alto.



Thomas Thomas

The 8:00 PM meeting will be held at SRI in Main Conference Room B. Preceding the meeting, there will be a 6:00 PM dinner at the Coach and Six in Menlo Park. Consult calendar for complete information.

Implantable Biotelemetry Systems to be Shown

Tuesday, September 16, a film entitled "Implantable Biotelemetry Systems" will be presented to the Engineering in Medicine and Biology Chapter along with a talk by Mr. Thomas Fryer, Assistant Chief of the Electronics Research Branch at NASA. Discussion will follow. The film and talk will be accompanied by a display of various biomedical instrumentation used in life science research at Ames Research Center.

Some of the instrumentation on display will be: respiration failure detection system for hospitalized infants, helmet system for sensing and transmitting electroencephalograms, implantable biopotential transmitter for recording EKG, ultrasonic transducer for measuring blood flow, intra-arterial pressure measuring system with an ultraminiature manometer-tipped catheter, implanted blood pressure transmitter, implantable temperature transmitter, multichannel telemetry system and ultrasensitive piezoelectric accelerometer.

The one-hour program which will be held at 8:00 PM in Room 261, Building 213, NASA-Ames Research Center, will be divided equally between the showing of the film and the talk-discussion.

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The conference will offer approximately twenty-five papers in the following materials handling engineering fields: Materials Handling-Engineering Management, Bulk Materials Handling, Con-

veyors and Tramways, Control Systems and Container Handling. Two stimulating panel discussions are planned in the area of Crane Controls and Material Handling Management. An interesting and informative luncheon program and a plant tour of a local paper mill will also be included for your enjoyment. The ladies' program and social activities are directed toward acquainting the visitor with the scenic beauty of the Portland area.

All portions of the technical program are planned to develop stimulating discussions and the free interchange of ideas in the exciting area of Materials Handling Engineering.

For further information and an advance program contact: The American Society of Mechanical Engineers, United Engineering Center, 345 E. 47th Street, New York, N.Y. 10017

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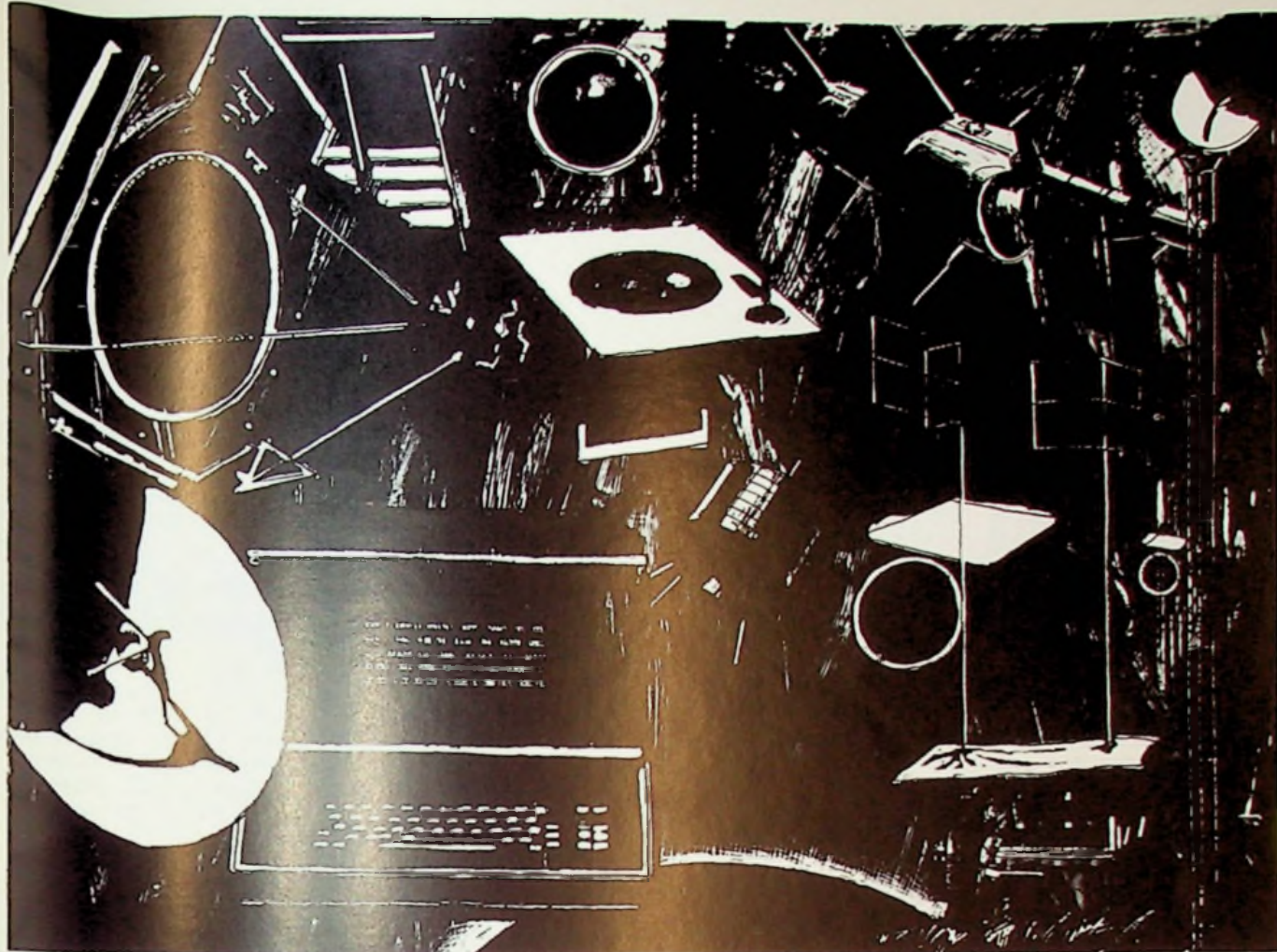
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We've just been granted the right to drop the TM from "PARAX" and replace it with our first ®. Now the word belongs to us. And, in a sense, it belongs to you, too. True, it represents a proprietary concept developed by Wanlass Electric, but it also symbolizes the results of our attempt to provide you with the best possible products. Here it is, for the first time ever, with our brand new ®: PARAX®.

Know what PARAX® means?

PARAX® is the trademarked name for the revolutionary new Wanlass concept for controlling AC power electrically, without mechanical or solid-state elements, by utilizing parametric techniques to eliminate the need for mutual inductance in electrical energy transformation. By rhythmically varying the inductance of a magnetic circuit, the Wanlass PARAFORMERTM achieves transient free energy transfer without relying on mutual inductance. While transient free energy is one of the most significant advantages of this advanced concept, the PARAFORMERTM also regulates voltage, exhibits minimum waveform distortion, provides electrical isolation and transforms voltage.

A PARAFORMERTM is different enough from conventional transformers to warrant a separate and distinct symbol all its own. You've probably seen it before, but in case you haven't, we'll print it right here. Recognize it? If not, take a good look so you will next time. It's starting to appear on some very important prints!



Write for our new capabilities brochure
The Capacity for Achievement

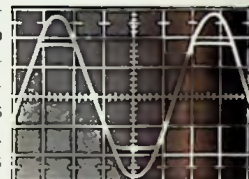
And Model C-3000* Units are already available for immediate delivery from stock of Wanlass national and local distributors!

Contribution to technology is one of our fundamental objectives. That's why we're particularly proud of this recent R & D achievement we have named CLIP-AC™. As its name suggests, CLIP-AC™ symmetrically clips peaks from unregulated AC input voltage to produce a constant output waveform which can then be transformed into a variety of regulated output voltages through the use of appropriate transformers. And it does it better, costs less and is smaller than a ferroresonant transformer it will replace.

Here's how it works: Output voltage is continuously monitored by a sensor which uses a zener diode as a reference to initiate closed loop control of the regulation process. Control circuitry adjusts the clipping level of a pass transistor to maintain the desired constant output. The use of a floated reference and a diode bridge makes it possible to use the same pass transistor on both halves of the AC cycle. Short duration surge currents

from capacitor charging, motor or lamp starting loads, or related sources are bypassed around the pass transistor by an SCR triggered by a bias resistor between the transistor and sense transformer. The result? Through choice of an appropriate sensor and the quality of the solid-state componentry, any degree of precision in AC voltage regulation can be met with true RMS, average, or peak voltage held to a constant... in ratings up to 1KVA.

CLIP-AC™ voltage regulators outperform ferroresonant transformers in every way. Compare the specifications in the table below... then call us to discover how fast you can improve your equipment performance... and save money to boot!



CLIP AC INPUT TRACE
SUPERIMPOSED OVER OUTPUT TRACE

*C-3000 units feature impressive $\pm 0.5\%$ RMS regulation, for a $\pm 10\%$ AC line change. Regulation is true RMS with RMS sensor type reference.

	CLIP-AC™ Principle	Ferroresonant Principle
Input Frequency	Wide range acceptable without degradation in regulation (47-420 Hz typical)	Single frequency (output voltage shifts 1.5% for 1% change in input frequency)
Line Regulation	Any reasonable degree of precision (0.1% easily achievable)	Cannot be modified (1-3% typical)
Load Regulation	Load compensation circuitry inherent in design (1% typical)	No compensation (5.7% typical)
Power Factor	No problem	Shifts output voltage level appreciably
Phase Shift	None	Appreciable — dependent on load current
Response Time	Typically 10-50 μ sec	Typically 25,000 μ sec
Cost / Size / Weight	Smaller and Cheaper — less material content (typically 50%)	Inherent weight and expense of iron and copper

Here's the inventor of CLIP-AC™...

CRAVENS (CHRIS) L. WANLASS,
VICE PRESIDENT, RESEARCH AND DEVELOPMENT

You could almost tell by his title that Chris would be the one to come up with an idea like CLIP-AC™. Good as it is, it is only one among many. Chris has more than 30 U.S. and 100 foreign patents listed in his name. His past affiliations are impressive, too. They include names like Ford Aeronautics where he was one of the founders, Packard Bell Computer, North American Aviation, Philco Computer and Philco Electronics Research Laboratory. Chris has B.S. and M.S. degrees in Electrical Engineering from the University of California, and has taught at both UCLA and USC. (No wonder CLIP-AC™ is the best idea in years!)



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FROM ANYWHERE
IN THE
UNITED STATES!**

IN CALIFORNIA
call collect
(714) 545-8467
FROM EVERYWHERE ELSE
call toll-free
(800) 854-3258

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