

EDITOR'S PROFILE of this issue

from a historical perspective ...

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

February, 1970:

Cover: The figure shows a sequence of frames in rendering the familiar IEEE symbol. The kite represents Ben Franklin's famous experiment with lightning; the arrows represent the right-hand rule of current flow. More on page 9.

Page 12: Stanford Ovshinsky, from Energy Conversion Devices, talks about amorphous materials and their applications, including for transistors and switches.

Page 12: Troy Hatley of Data Disc in Palo Alto discusses high-performance disk drives for recording video programs. I was a VP at Data Disc in Sunnyvale for several years as we developed the Broadcast Disk Recorder (BDR-500), used for multi-channel recording and slow-motion playback for sports such as football games. We also made disk and tape drives for computers. We merged with Datapoint in San Antonio, TX, led technically by Vic Poor, who had been instrumental in commissioning the first microprocessors from TI and Intel.



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

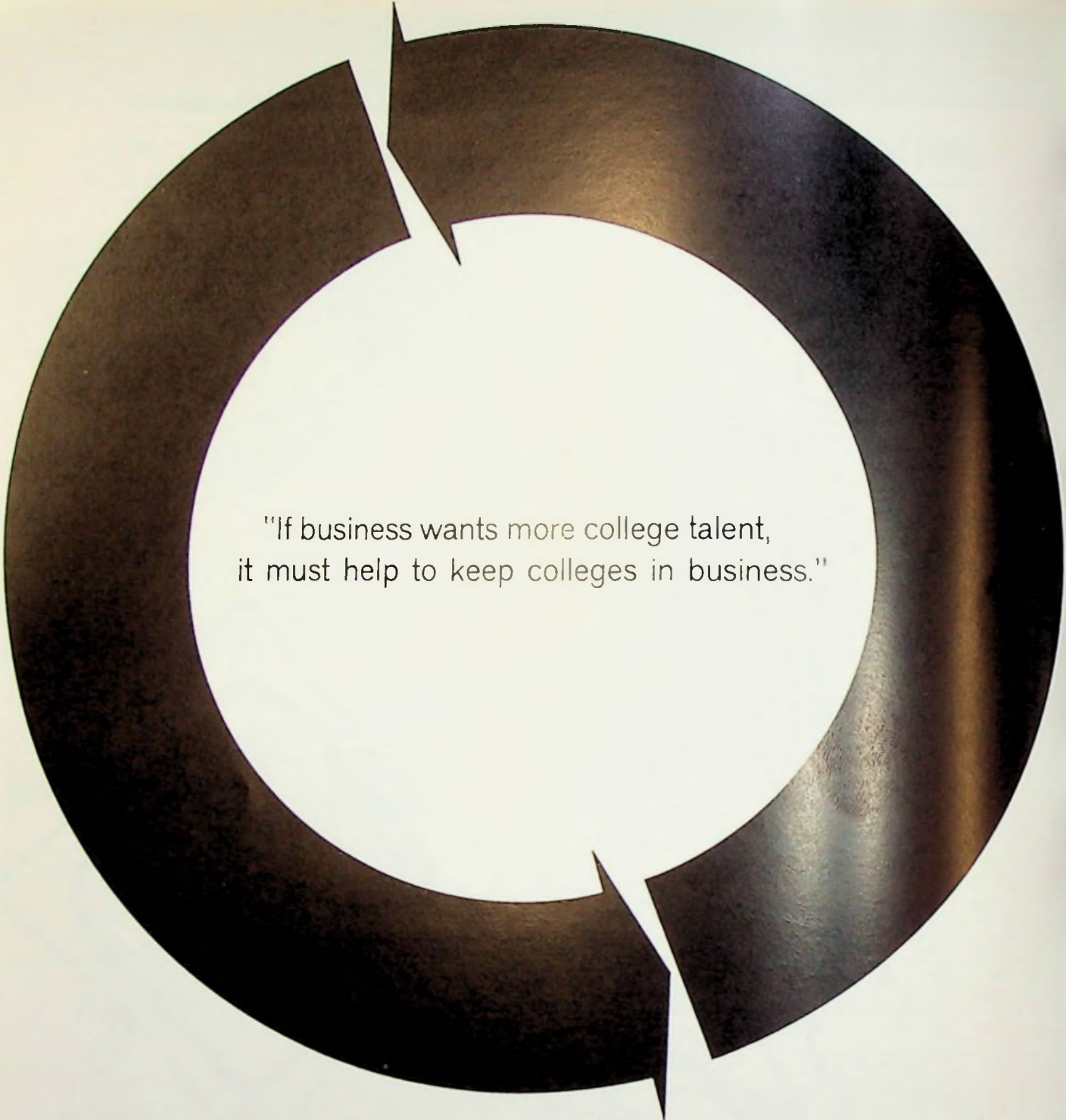
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At time of scanning, the bound volumes are held by Paul Wesling.

April, 2025

Contact p.wesling@ieee.org





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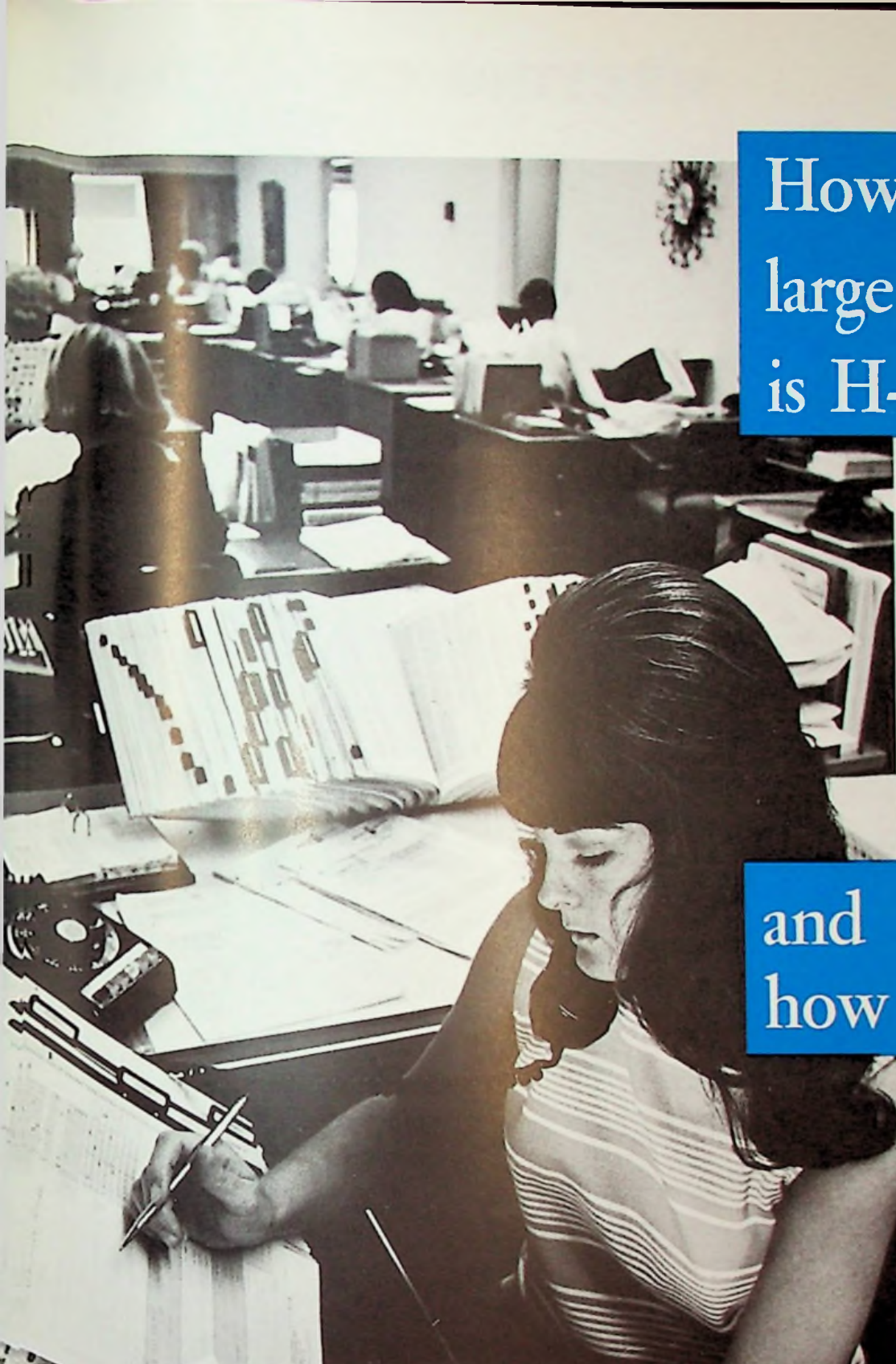
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Grid
FEBRUARY 1970

The picture on the cover is a composite photograph by selecting a sequence of frames from a motion picture generated by a special-purpose animation computer. The input to the computer was a single artist-drawn picture of the complete IEEE symbol. The Computer Chapter meeting scheduled February 24th will present Mr. Francis J. Honey describing and explaining the work of this specialized computer.

Grid
FEBRUARY 1970

volume 16
number 6

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MEETING CALENDAR

AEROSPACE & ELECTRONIC SYSTEMS

Story on
page 8

FEB. 19

FEB. 19, Thursday, 8:00 PM, Philco-Ford Bldg. 56 Auditorium, 3939 Fabian Way, Palo Alto. Cocktails: 6:00 PM; dinner: 6:30 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Dinner reservations: R. Winslow or P. Hoppe, 326-4350 ext. 6143, by Feb. 18th.

ANTENNAS & PROPAGATION

Story on
page 6

FEB. 18

FEB. 18, Wednesday, 8:00 PM, Philco-Ford Bldg. 56 Auditorium, 3825 Fabian Way, Palo Alto. Cocktails: 5:30 PM; dinner 6:15 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto.

AUDIO & ELECTROACOUSTICS/ COMMUNICATION TECHNOLOGY

Story on
page 14

FEB. 19

FEB. 19, Thursday, 8:00 PM, Centennial Hall, Room 356, San Jose State College, 6th & San Fernando St., San Jose. Dinner: 6:15 PM, Paolo's Continental Restaurant, 12th & Santa Clara St., San Jose. Reservations: Robert Howland, (408) 291-4039 or Don Kidder, (415) 591-8461 ext. 303 by Feb. 17th.

AUTOMATIC CONTROL

Story on
page 16

FEB. 17

FEB. 17, Tuesday, Room 551, Engineering Center, Santa Clara University. Dinner: 6:30 PM, Angelo's Restaurant, 11 Race St. at the Alameda. No reservations.

CIRCUIT THEORY

Story on
page 5

FEB. 25

FEB. 25, Wednesday, 8:00 PM, 134 McCullough Hall, Stanford University. Dinner: 6:10 PM, Stickney's Hick'ry House, El Camino Real at Embarcadero, Palo Alto. Dinner reservations: Section office 327-6622 by noon, Feb. 25th.

COMPUTER

Story on
page 9

FEB. 24

FEB. 24, Tuesday, 8:00 PM, Room 134, McCullough Bldg., Stanford University. Dinner: 6:15 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Reservations: Mary McGlone, 321-3300, ext. 270 by Feb. 23rd.

EAST BAY SUBSECTION

Story on
page 15

FEB. 23

FEB. 23, Monday, 7:30 PM, PG&E Service Center, 4801 Oakport Road, Oakland. Cocktails: 5:30 PM; dinner 6:00 PM, Venetian Restaurant, 6701 Foothill Blvd., Oakland. Reservations: Livermore: Ginny Mayer, 447-1100 ext. 7671; Oakland: Florence Wanser, 835-8500 ext. 53; San Francisco: Mary Vilter, 399-4974; San Jose: Linda Jarrett (408) 291-4567 by Feb. 20th.

ELECTROMAGNETIC COMPATIBILITY

Story on
page 15

FEB. 16

FEB. 16, Monday, 8:00 PM, Hewlett-Packard Auditorium, 5301 Stevens Creek Blvd., Santa Clara (adjacent to Interstate 280). Dinner: 6:00 PM, Custom House, 20060 Stevens Creek, Cupertino. Reservations: Paul Gagner, 969-1050 by noon, Feb. 16th.

ELECTRON DEVICES

Story on
page 12

FEB. 26

FEB. 26, Thursday, 8:00 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Cocktails: 6:00 PM; dinner: 7:00 PM. Reservations: Section office 327-6622.

ENGINEERING MANAGEMENT

Story on
page 14

FEB. 11

FEB. 11, Wednesday, 8:00 PM, Conference Room A, Bldg. 1, Stanford Research Institute, Menlo Park. Dinner: (with the speaker) 6:00 PM, Red Cottage, 1706 El Camino Real, Menlo Park. (Optional - no reservations required.)

ENGINEERING IN MEDICINE & BIOLOGY

Story on
page 9

FEB. 17

FEB. 17, Tuesday, 8:00 PM, Room 277 Cory Hall, University of Calif., Berkeley. (Northeast corner of campus, parking across the street). Dinner: 6:00 PM (SHARP) Spenger's Fish Grotto, 1919 4th Ave., Berkeley. (Bottom of University, at the Freeway). Reservations: E. R. Lewis, 642-3338 by 5 PM, Feb. 16th.

THE CITIES PROBLEMS - HOW CAN WE HELP?

Raymond I. Schneyer, Lockheed M & S Co., Sunnyvale.

SURVIVAL IN THE WORLD OF THE COMPUTER.

Panel discussion. Jack L. Bellamy, Dr. John D. Bruce, Dr. Frank B. Harris and Dr. Ken K. Mei.

FEB. 18, Wednesday, 8:00 PM, Philco-Ford Bldg. 56 Auditorium, 3825 Fabian Way, Palo Alto. Cocktails: 5:30 PM; dinner 6:15 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto.

JOINT MEETING WITH SAN JOSE STATE COLLEGE STUDENT BRANCH. DEVELOPMENT AND APPLICATION OF TRANSDUCERS AND ACOUSTICAL TUBES FOR COMMERCIAL AND SPACE COMMUNICATIONS. W. H. (Bill) Schaumberg, Chief Engineer, Pacific Plantronics, Inc., Santa Cruz.

PROBLEMS WITH APPLYING MODERN CONTROL THEORY TO REAL SYSTEMS.

Richard W. Koepcke, Research Staff member, IBM, San Jose.

FEB. 17, Tuesday, Room 551, Engineering Center, Santa Clara University. Dinner: 6:30 PM, Angelo's Restaurant, 11 Race St. at the Alameda. No reservations.

AUTOMATED DESIGN OF TRANSISTOR BIASING AND SWITCHING CIRCUITS. Second meeting in a series on computer-aided circuit design: Dr. Donald Rohrer, Fairchild Semiconductor, Palo Alto with Richard Dowell and Paul Russo, University of California, Berkeley.

ANIMATION COMPUTERS: A SUCCESSFUL BLEND OF ART AND TECHNOLOGY.

Francis J. Honey, VP of Engineering Computer Image Corp., Denver, Colo. Ladies invited.

FEB. 24, Tuesday, 8:00 PM, Room 134, McCullough Bldg., Stanford University. Dinner: 6:15 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Reservations: Mary McGlone, 321-3300, ext. 270 by Feb. 23rd.

THE GREAT QUARK HUNT.

Dr. Arnold F. Clark, Lawrence Radiation Lab, Livermore.

INTRA SYSTEM COMPATIBILITY USING COMPUTER ANALYSIS TECHNIQUES.

James Spagon, Staff Engineer, TRW Systems, Redondo Beach.

FEB. 16, Monday, 8:00 PM, Hewlett-Packard Auditorium, 5301 Stevens Creek Blvd., Santa Clara (adjacent to Interstate 280). Dinner: 6:00 PM, Custom House, 20060 Stevens Creek, Cupertino. Reservations: Paul Gagner, 969-1050 by noon, Feb. 16th.

OVSHINSKY EFFECT.

Stanford R. Ovshinsky, Chairman of the Board, Energy Conversion Devices, Inc., Troy, Michigan.

NEW DIRECTIONS IN MANAGEMENT.

Charles A. Anderson, President, Stanford Research Institute.

MECHANICAL DESIGN OF ARTIFICIAL LEGS.

Prof. Charles W. Radcliffe, Professor of Mechanical Design, Dept. of Mechanical Engineering, University of California, Berkeley.

FEB. 17, Tuesday, 8:00 PM, Room 277 Cory Hall, University of Calif., Berkeley. (Northeast corner of campus, parking across the street). Dinner: 6:00 PM (SHARP) Spenger's Fish Grotto, 1919 4th Ave., Berkeley. (Bottom of University, at the Freeway). Reservations: E. R. Lewis, 642-3338 by 5 PM, Feb. 16th.

MAGNETICS
FEB. 10

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page 12

FEB. 10, Tuesday, 8:00 PM, Hewlett-Packard Conference Room 5M, 1501 Page Mill Rd., Palo Alto. (Signs will be posted to indicate the parking area and building entrance to be used.) No dinner.

MICROWAVE
THEORY &
TECHNIQUES
FEB. 11

THICK FILM TECHNIQUES AS APPLIED TO MIC.
Presented in cooperation with International Society for Hybrid Microelectronics. Bob Chapin, Applied Technology.

FEB. 11, Wednesday, 8:00 PM, Stanford Research Institute Bldg. 44, Laurel St., Menlo Park. Cocktails: 5:30 PM; dinner: 6:00 PM. Reservations: 969-9304 for location of dinner.

NUCLEAR
SCIENCE
FEB. 17

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page 13

TECHNICAL AND SOCIETAL ASPECTS OF ENVIRONMENTAL POLLUTION. Dr. Egon E. Loebner, Hewlett-Packard Co., Palo Alto.

FEB. 17, Tuesday, 8:15 PM, Hewlett-Packard Conference Room 5M, 1501 Page Mill Rd., Palo Alto. Cocktails: 6:00 PM; dinner: 7:00 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Reservations: Jane Costa, 447-1100 ext. 7036 or write L-383, Lawrence Radiation Lab, Livermore 94550 by Feb. 16th.

PARTS, MATERIALS
& PACKAGING
FEB. 3, 10 and 17

MICROELECTRONICS ENGINEERING COURSE.
2nd, 3rd and 4th sessions. Dr. Don McWilliams, Director, Research Dept. at California State College is the Course Director.

FEB. 3, 10 and 17, 7:30 PM, Conference Room of Research Bldg. (Bldg. 7), Varian Associates, 611 Hansen Way, Palo Alto. No dinner. (See January Grid for details)

POWER
FEB. 10

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page 11

THE SEMICONDUCTOR - ITS GROWING ROLE IN THE POWER BUSINESS. J. L. Fink, Project Mgr., General Electric Co., New Brunswick HVDC PROJECT.

FEB. 10, Tuesday, 7:30 PM, Engineers Club of SF, 160 Sansome St., SF. Cocktails: 5:30 PM; dinner: 6:30 PM. Reservations: Engineers Club, 421-3184 by Feb. 9th.

RELIABILITY
FEB. 12

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TOUR OF LOCKHEED M & S LABORATORY. C. Ross Bumstead, Mgr., LMSC Failure Analysis Lab, Sunnyvale.

FEB. 12, Thursday, 7:30 PM, Lockheed, Bldg. 104, Sunnyvale. Dinner: 6:30 PM, The Bold Knight, 769 Mathilda Ave., Sunnyvale. Reservations: Gil Bowers, 962-4111 or Lew Finch, 743-1577 by Feb. 11th.

SANTA CLARA
VALLEY
SUBSECTION
FEB. 18

Story on
page 8

TIRED OF SMOG? LEARN HOW ELECTRONIC INSTRUMENTATION CAN HELP. Panel discussion. Moderator: Marvin B. Rudin; Panelists: Milton Feldstein, Director of Technical Services for the Bay Area Air Pollution Control, Dr. Robert Robbins of SRI's Environmental Sciences Dept., John Little, an instrumentation design consultant and Dr. J. T. Wang, Director of Environmental Services Dept. of San Jose State.

FEB. 18, Wednesday, 8:00 PM, Philco-Ford Bldg. 56 auditorium. Dinner: 6:00 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. No reservations.

SYSTEMS
SCIENCE &
CYBERNETICS
FEB. 26

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page 10

REF-ARF: A SYSTEM FOR SOLVING PROBLEMS STATED AS PROCEDURES. Dr. Richard Fikes, Artificial Intelligence Group, SRI.

FEB. 26, Thursday, 8:00 PM, Stanford Research Institute, Bldg. 1, Conference Room B, 333 Ravenswood Ave., Menlo Park. Dinner: The Shirt Tail, 2515 El Camino Real, Palo Alto at 6:00 PM. Reservations: Carolyn Smith, 326-6200 ext. 3212 by 5:00 PM, Feb. 25th.

VEHICULAR
TECHNOLOGY
FEB. 16

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page 13

PARTICLE ACCELERATORS AND STEAM BUSES. Warren W. Eukel, V.P. Operations, William M. Brobeck & Assoc., Berkeley.

FEB. 16, Monday, 8:00 PM, meeting place and gastronomical surprise, Berkeley House, 920 University Ave., Berkeley. Cocktails 6:00 PM; dinner 7:00 PM. Reservations: W. H. Nye, 328-1200 or Al Isberg, 433-3800 by Feb. 15th.

GOLDEN GATE
SUBSECTION
FEB. 18

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page 11

PICTUREPHONE® - PAST, PRESENT AND A VIEW TO THE FUTURE. Paul D. Fry, District Plant Manager, Pacific Telephone Co., San Francisco.

FEB. 18, WEDNESDAY, 5:00 PM. No-host courtesy cocktails and tour of Cogswell Polytechnical College, 3000 Folsom St., corner of Army and Folsom, San Francisco. Dinner: 6:15 PM, Kerry's Restaurant, 3330 Army St. Meeting at 7:45 PM, Cogswell Auditorium. Reservations Roland Grannis, 982-8729 or Bob Marchand, 399-4974 by Feb. 13th.

INFORMATION
THEORY
FEB. 19

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page 10

COMPARISON OF THE POTENTIAL PERFORMANCE OF LINE-BY-LINE PROCESSING AND TWO-DIMENSIONAL PROCESSING OF VISUAL DATA. Prof. V. R. Algazi, University of California, Davis, EE Dept.

FEB. 19, Thursday, 8:30 PM, Stanford Research Institute, Bldg. 1, 333 Ravenswood Ave., Menlo Park. Dinner: 6:15 PM, Ming's of Palo Alto, 1700 Embarcadero Rd., East Palo Alto. Reservations: Mrs. Toshi Furukawa, 326-4350 ext. 6162 by Feb. 18th.

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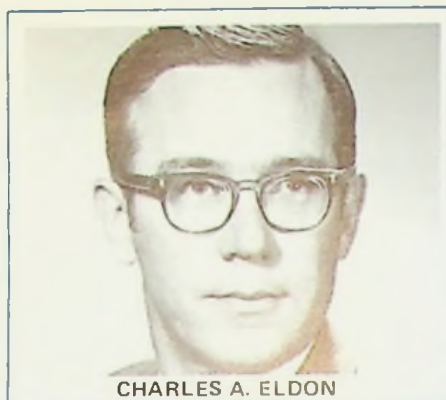
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Donald O. Pederson
FOR CHAIRMAN

Present Vice-Chairman, a professor, dept. of electrical engineering, U.C., Berkeley. Received the B.S. degree in 1948 and the M.S. and Ph.D. degrees in 1949 and 1951. He was research associate at Stanford and on the technical staff at Bell Labs, N.J. Since 1955, he has been a faculty member at U.C., Berkeley. Was made a Fellow of the Institute in 1964, and received the IEEE Education Medal in 1969. He and three co-authors were awarded a best paper award for a paper at the 1963 International Solid-State Circuits Conference. He received a Certificate of Appreciation for his participation in the 1966 International Solid-State Circuits Conference. He was a Guggenheim Fellow in 1964, is a member of Sigma Xi and Eta Kappa Nu. He is a member of the Ad Com for Circuit Theory, member of the committees on Solid-State Circuits and Computer-aided Network Design.

L. G. FitzSimmons, Jr.
FOR VICE-CHAIRMAN

Present Secretary, now Chief Engineer in San Jose for Central Counties Pacific Telephone. Graduated from University of California in 1940 with B.S.E.E. Completed one-year Applied Communications course at Naval Postgraduate School, Annapolis. Eleven years with Bell Telephone Laboratories. Since 1951 with Pacific Telephone in various engineering, maintenance and staff assignments. Member of Tau Beta Pi, Eta Kappa Nu and American Society for Engineering Education. Fellow of the IEEE. Member of the Communication Technology group and on their National Awards Committee.



CHARLES A. ELDON

NOMINATIONS 1970-1971 PROGRAM YEAR



DALTON W. MARTIN

Charles A. Eldon
FOR SECRETARY

Present Treasurer, received a B.S. degree in Physics from Stanford University in 1948, and an M.B.A. from Stanford in 1950. He joined Hewlett-Packard Company in 1951 and following a series of managerial assignments became production manager for the Microwave Division in 1957. Early in 1961 he was named assistant to the operations vice president and later that year moved to the Rockaway Division as Manufacturing manager. In 1962 he became manager of corporate systems, and since 1967 served as systems and planning manager for the Frequency & Time Division until his recent appointment as Operations Manager (and VP/General Manager of two subsidiaries) at Ness Industries. He is a Senior Member of IEEE, and in 1956 started the San Francisco Chapter of PEP. He subsequently served in all offices, and was national chairman from 1963 to 1965. From then until 1968 he was on the national administrative committee of PMP Group, which was created from a merger he guided between PEP and CP Groups.

Dalton W. Martin
FOR TREASURER

Received a BSEE from Stanford University in 1954 and an MSEE from Stanford in 1956. He was associated with Stanford Research Institute from 1953-1959 in the Radio Systems Laboratory, Low-Frequency Navigation Systems, and Direction Finding Systems. Mr. Martin was a co-founder of VIDAR Corporation in 1960 and served as Vice President-Engineering from 1960-1968. He is presently Vice President-Manager, VICOM Division. Martin has been an IEEE member since 1955 and served as Technical Program Chairman for WESCON/69.



CHARLES H. SEDAM



J. E. BARKLE

Charles H. Sedam
FOR TREASURER

Present Director-at-Large. B.S.E.E., University of Washington, 1940. With P.G.&E. since 1941 as inspector, foreman, assistant engineer, engineer, manager of station construction. Presently Vice President-General Construction since 1964. Past president, San Francisco Electric Club. Served AIEE from 1941 to merger in various capacities: Membership Committee, 1956-57; Program Committee, 1960-61; Chairman, Fellowship Committee, 1961-62; Chairman, Arrangements Committee, 1962-63; Director-at-Large, 1962-63; Ad-Hoc Committee to organize P.T.G. Power, 1963. A Senior Member, Sedam has been active in IEEE as Director-at-Large, 1966-70, and Chairman of the By-Laws Committee, 1968-69 and 1969-70.

J. E. Barkle
FOR DIRECTOR-AT-LARGE

Project Manager, Bechtel Corporation. Currently Junior Past Chairman of the San Francisco Section, active in Section affairs since moving to San Francisco in 1957. Organized and was first Chairman of the Power Group Chapter in 1963-65. Member-at-Large of the Administrative Committee and of the Meetings Department of the Power Group, and Member-at-Large of the Council of the I&GA Group. Currently a member of the Transmission and Distribution Committee of the Power Group and of the Industrial and Commercial Power Systems Committee of the I&GA Group. Has served on several other Technical Committees and is a 1970 Fellow of IEEE.

Automated Design of Transistor Biasing and Switching Circuits

While much remains yet to be done, over the course of the past few years computer-aided circuit design has evolved from a strictly theoretical discipline through feasibility studies toward practical applications. Two examples of presently available quasi-general, non-interactive computer-aided circuit design programs which indicate the state-of-the-art will be discussed at the February 25th Circuit Theory Chapter meeting.

AUTOMATED DESIGN OF TRANSISTOR BIASING CIRCUITS. Selection of a set of design parameters to achieve a desired bias state for a fixed structure, direct-coupled analog circuit is usually performed on a cut-and-try basis. Explicit design relations are generally unobtainable, and, hence, the initial design is often based mainly on the experience of the designer and perhaps on drastic simplifying assumptions. A step-and-repeat procedure is then ordinarily used to adjust the design parameters until a "best" design is obtained. The merit of intermediate trial designs is assessed from experimental results or from computer simulation studies.

A circuit biasing program has been developed which uses the computer for both design evaluation and design improvement.

Several multiple stage operational amplifier circuits serve as examples of the effectiveness of the bias design program. The most complicated of these circuits consists of eight transistors, has eight voltages and current specifications, and allows nine designable resistance values. The attendant computation times indicate that present generation computers are easily capable of executing such bias designs at reasonable cost.

AUTOMATED DESIGN OF TRANSISTOR SWITCHING CIRCUITS. The emergence of relatively efficient computer programs for the transient analysis of nonlinear circuits has stimulated interest in the computer optimization of transistor switching circuit time responses. A similar approach to that of the automated bias design problems may be taken, only here the performance function must measure the deviation of a transient response from some desired waveform. Results are to be presented which illustrate the feasibility of these results in the case of the simultaneous optimization of the turn-on and turn-off of an emitter-coupled logic gate.

Automated circuit design is on the way; it awaits only the evolution of realistic circuit simulation programs, a reasonable change of designer attitudes, and a hell of a lot of hard work.

Ronald Rohrer received the B.S. degree from the Massachusetts Institute of Technology, Cambridge, Massachusetts, in 1960, and the M.S. and Ph.D. degrees from the University of California, Berkeley, California in 1961 and 1963, respectively.

Since 1963 he has held professorships at the University of Illinois, Urbana, Illinois, the State University of New York, Stony Brook, New York, and the Electrical Engineering Department of the University of California, Berkeley, where he is now an associate professor engaged in research in computer-aided design.

He is presently a Ford Foundation Resident in Engineering Practice in the Digital Integrated Electronics Department of the Fairchild Semiconductor R&D Laboratory, Palo Alto, California.



Richard I. Dowell received the B.S. and M.S. degrees in Electrical Engineering from the University of California, Berkeley in 1966 and 1969, respectively, where he is currently completing requirements for the Ph.D. degree.

Concurrent with his graduate studies he has been employed as a teaching assistant and a research assistant.

His interests are in the field of computer-aided design, particularly circuit optimization.



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Robert M. Ward

Stanley F. Kaisel



Fred J. MacKenzie

Ward, Kaisel and MacKenzie Named WESCON Directors

Three San Francisco Bay Area electronics executives have been seated as directors of the Western Electronic Show and Convention.

Robert M. Ward, general manager of the Ultek Division, Perkin-Elmer Corporation, and Fred J. MacKenzie, Administrative Engineer at Stanford Research Institute, started their terms at the board's annual meeting late last month. They succeed Emmet G. Cameron (Varian Associates) and John C. Beckett (Hewlett-Packard), whose four-year terms were completed with WESCON/69 in San Francisco in August.

Dr. Stanley F. Kaisel, presently operating his own technical and management consulting offices, has been appointed to serve the unexpired two-year

term of Ernest W. Pappenfus as one of the four IEEE representatives on the Board.

The WESCON board is made up of eight volunteer directors, equally representing two sponsors, the Western Electronic Manufacturers Association, and the Los Angeles Council and San Francisco Section, Region 6, Institute of Electrical and Electronics Engineers. There is also equal representation from WESCON's two "host areas," the Bay Area and Southern California. Dr. Kaisel and Mr. MacKenzie were appointed to be the San Francisco Section IEEE representatives on the Board, and Ward was appointed to be a WEMA representative.

In addition to the three new members, the 1970 WESCON board includes

Donald C. Duncan (Duncan Electronics), named chairman of the Board; Floyd L. Goss (Los Angeles Department of Water and Power), executive committee chairman; Charles M. Edwards (United Geophysical), convention director; and Rudy Hummes (Bell Electronics), show director.

San Francisco members who will serve as the board's long-range planning committee in 1970 include William H. Heflin (FRL Inc.), MacKenzie, Ward and Kaisel.

Los Angeles members Goss, Duncan, Edwards, and Hummes, and Don Larson, WESCON general manager, serve as the executive committee for the 1970 show and convention, scheduled in Los Angeles on August 25-28.

The Antennas and Propagation Chapter will host a four-member panel discussion at its meeting on Wednesday, February 18. The distinguished members of the panel will discuss the application of the computer to the solution of antenna and propagation problems. Topics to be covered include the following: the background history of numerical techniques in this field, the general approach to structuring and programming a class of problems, the economics of developing computer programs, the segmentation of programs by logical function, and the engineer's required involvement in a program development.

Management awareness and understanding of the company investment required to remain competitive will also be discussed. The panel consists of Mr. Jack L. Bellamy, Dr. John D. Bruce, Dr. Frank B. Harris, and Dr. Ken K. Mei.

A senior member of IEEE, Mr. Bel-

Continued on page 16

Survival in the World of the Computer

Jack Bellamy



J. D. Bruce



Frank Harris



Ken Mei



IEEE Field Awards . . .
Nominations Now Open!

IEEE Field Awards are established for a number of specific fields of interest. The names of the awards, the distinctive features and the presentation are described in the following table.

Individual members, Subsections and Group Chapters of the San Francisco Section are invited to submit nominations for the 1970-71 Field Awards. All members of the IEEE are urged to participate in this annual quest for the best qualified candidates who will be recognized by IEEE for their outstanding contributions to the field of electrical and electronics engineering.

The deadline date for receipt of nominations and supporting letters is April 11, 1970. Each nomination should be accompanied by supporting letters from persons familiar with the accomplishments and qualifications of the nominee. Send your nominations to: J. E. Barkle, Chairman, Awards Committee — San Francisco Section, Bechtel Corporation, P.O. Box 3965, San Francisco, Calif. 94119. He has nomination forms for each of the awards and will work with you to develop a meaningful nomination for your nominee.

We have many members in the Section who would make outstanding nominees for these awards. Please send your suggestions at an early date.

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IEEE FIELD AWARDS		
Harry Diamond Memorial Prize Award	Outstanding technical contribution by a person in the field of Government service.	One annually. Certificate and \$500. Date established: 1949
William M. Habirshaw Award	Outstanding contribution in the field of transmission and distribution of electric power, to an individual or group	One annually. Bronze Medal, \$500, and Certificate. Sponsored by Phelps Dodge Foundation. Date established: 1958.
IEEE Award in International Communication in honor of Hernand and Sosthenes Behn	Outstanding contribution in the field of international communication, to an individual or group	One annually. Plaque, Certificate, and \$1000. Sponsored by International Telephone and Telegraph Corporation. Date Established: 1966
Mervin J. Kelly Award	Outstanding contribution in the field of telecommunication, to an individual or group	One annually. Bronze Medal, \$1000, and Certificate. Sponsored by Bell Telephone Laboratories, Inc. Date established: 1959
Morris E. Leeds Award	Outstanding contribution in the field of electrical measurement, to an individual or group. Special consideration given to value of contribution made before candidate reached 36th birthday	One annually. Illuminated Certificate and \$500. Sponsored by Leeds & Northrup Foundation. Date Established: 1958.
Morris N. Liebmann Memorial Prize Award	Important contribution to radio and allied arts recognized during preceding three calendar years	One annually. Certificate and \$1500. Date established: 1919
David Sarnoff Award	Outstanding Contribution in the field of electronics	One annually. Gold Medal, \$1000, and Certificate. Sponsored by RCA Corporation. Date established: 1959
Vladimir K. Zworykin Prize Award	Outstanding technical contribution in the field of electronic television	One annually until 20 awards have been made. Certificate and \$500. Date established: 1951

Tired of Smog? Learn How Electronics Instrumentation Can Help

Everyone complains about smog and air pollution but few of us feel we can do anything about it. Most electrical and electronics engineers share the same helpless, frustrated attitude toward this vexing and serious problem of modern society as does the population at large.

But a few of our brethren have been pursuing the very important first step in the control of air pollution – quantitative measurement of it. In all of its manifestations, the polluted atmosphere is a highly complex 3-dimensional, time-varying field of diverse kinds of spurious substances, each with its own set of noxious effects. The commonly annoying obstruction of visibility by



Milton Feldstein



J. W. Wang

A PANEL OF EXPERTS DESCRIBES THE PROBLEMS OF AIR POLLUTION MEASUREMENT – ACCOMPLISHMENTS TO DATE, UNSOLVED PROBLEMS, AND FUTURE REQUIREMENTS.

brown haze is but one effect to be measured. Ozone content is another. The multiplicity of measurements and the enormous volume of atmosphere to be mapped as frequently as the weather patterns change, make for a very challenging instrumentation and data analysis problem.

At the February 18 meeting of the Santa Clara Valley Sub-Section a panel of four experts in air pollution measurement, moderated by SCVSS Vice Chairman, Marvin B. Rudin, will describe the problems, solutions to date, and the problems still remaining before pollution control can be effectively enforced.

Mr. Milton Feldstein, Director of Technical Services for the Bay Area Air

Pollution Control District, will first present an overview on the accomplishments in air pollution measurement and control. Then a researcher in air pollution chemistry, Dr. Robert Robbins, of SRI's Environmental Sciences Department, will discuss the state of understanding of air pollution chemistry, and of the interfacing electronic instrumentation problems. He will be followed by Mr. John Little, an instrumentation design consultant working on equipment for air pollution measurement, who will give a detailed description of the measurement techniques and problems which he has encountered. Finally, Dr. J. Y. Wang, Director of the Environmental Sciences Department at S. J.

State, will take a devil's advocate position. He will challenge the effectiveness of present knowledge of the characteristics of, the causes of, and therefore the cures for air pollution; and he will propose the taking of needed data, and suggest new techniques and equipment which may be necessary to gather it.

The panel will then take questions from the audience as well as revisiting the controversial issues resulting from the initial panel discussion.

The meeting will be held at the Philco-Ford Building 56 auditorium at 8 PM; a no-reservation dinner is planned for 6 PM at Rick's Swiss Chalet.

Fellow Proposal Deadline

The Fellow Committee is receiving proposals for consideration for 1970 submission of Section nominations for Fellow grade for its February 2nd meeting. It is possible to include a few more until February 16th if they are well documented. Nomination forms for preliminary submission are available at the Section Office, or a one- to two-page resume and summary of accomplishments will suffice. Final nomination kits will be sent out for completion following this screening period. Members of any grade in IEEE can serve as sponsors. Call Vic Siegfried, 742-8039, at Lockheed for any further information.

The Cities' Problems — How Can We Help?

With the predicted decrease in Defense and NASA expenditures over the next five years, it is mandatory that aerospace engineers look to other areas to apply the technical and management skills that have been so effectively used on NASA and DOD programs. The aerospace industry's long and short range planning disciplines, combined with the systems management approach of establishing clearly defined requirements, goals and schedules and optimizing the elements of a system for the benefit of the overall system, can be effectively

applied toward solving the problems of the cities.

In his talk on Thursday, Feb. 19th at the AES meeting, Mr. Raymond I. Schneyer will discuss the need for applying aerospace management techniques to the cities' problems with specific emphasis on his experience in the training of the hard-core unemployed.

Mr. Schneyer is presently a Special Assistant to the President of Lockheed M&S Company, and the Manager of Human Resources Programs.

Computers Blend Art and Technology

The Computer Group Meeting on February 24 has been selected as Wive's Night because the program provides interesting and dynamic illustrations in the new field of computer-generated art. Wives and guests are invited for both the meeting and the dinner preceding.

Animation computers provide a successful means of interaction between a creative artist and modern technology using techniques familiar to the artist. These hybrid computers which were designed and built specifically for artist use permit low-cost generation of animated materials at standard cine or television frame rates. The artist receives immediate visual feedback of his creative efforts. The new computers can be used to produce standard animation stand effects as well as effects unobtainable or impracticable by other methods.

Mr. Francis J. Honey, Vice President of Engineering at Computer Image Corporation, Denver, Colorado, will illustrate the program and lecture with several example movies. Mr. Honey received his MSEE from Denver Univer-



Francis J. Honey

sity in 1968. He received the B.S. degree in Electrical Engineering from Kansas State University in 1957. From 1957 to 1960 Mr. Honey was involved in environmental studies at the Jet Propulsion Lab in Pasadena. From 1960 to 1967 he was a Research Engineer with the Denver Research Institute where he worked with control systems and digital frequency synthesizers in the area of VLF Communications. Prior to becoming Vice President of Engineering at Computer Image Corporation, Mr. Honey, as Chief Engineer was responsible for establishment of the engineering force and the early implementations of the animation computers.

Distribution System Design

Due to the overflow at the Distribution System design lectures offered by the IEEE Power Group in the Fall of 1969, the course will be offered again during 1970. The course will consist of 8 lectures to be held each Monday night beginning on February 9, 1970, and excluding February 23, the day after Washington's Birthday. The lectures will be held from 6:00 to 8:00 p.m. on the 2nd floor of the Bechtel Building.

The registration fee will be \$7.50 for IEEE members and \$10.00 for Non-IEEE members. If enrollment limitations are required, IEEE members will be given preference. Subjects discussed will include Distribution Transformer Application, Voltage Regulation, Switching, Protection, Design of Overhead and Underground Systems, and Capacitor Applications.

For more information please contact John B. Cottingham at Sangamo Electric Company, 1061 Howard Street, San Francisco, 94103. Telephone: 431-4738.

Mechanical Design of Artificial Legs

The University of California Biomechanics Laboratory was established by the Mechanical Engineering Department on the Berkeley campus in 1946, and a branch at the Medical Center in San Francisco was established very soon thereafter. The Laboratory was designed to bring physicians and engineers together in a concerted attack on all of the problems of the lower-extremity amputee.

Charles W. Radcliffe, Professor of Mechanical Design, has been associated with the Laboratory since its inception and has been concerned primarily with the design of prosthetic devices for the lower limbs. At the EMB Chapter meeting on February 17, he will speak briefly about the Laboratory itself and then concentrate on how engineers have improved the fitting and design of artificial legs.

The 8:00 PM meeting in Room 277, Cory Hall, UCB, will be preceded by dinner at 6:00 PM, Spenger's Fish Grotto, 1919-4th Avenue, Berkeley (bottom off the University at the Freeway). For reservations, call E. R. Lewis, 642-3338, by 5:00 PM, February 16.

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- 4 Slide screw tuners: one each S870A, G870A, two X870A.
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Two Dimensional and Line by Line Processing of Visual Data

In the acquisition of images by electronic means, the intensity of an electronic image is in general scanned line-by-line and results in data which appear as an ordinary time series. Most data compression or source encoding algorithms process this data without regard to the line-to-line coherence of the random field from which the data originates, each line of the image being processed independently of all others. This independent processing of different lines is usually done for ease of implementation and to avoid a burdensome amount of data storage. The success of such algorithms depends on the coherence of the data along a line of scan. It is known, however, that the statistics of images are highly coherent from line to line. Thus a two-dimensional encoding which exploits the two-dimensional coherence of images may result in a more efficient algorithm. Some specific two-dimensional techniques have been proposed and sometimes implemented. Since they are more difficult to implement than the line-by-line processing of a scan it is of interest to compare the two approaches. The object of this work is to examine the potential or limiting performance of the two-dimensional processing and of the line-by-line processing of images from the standpoint of data compression.

Consider the following specific prob-

lem: A two-dimensional gaussian random field is to be represented efficiently for transmission within a pre-assigned frequency-weighted mean-square distortion measure. We are interested in the evaluation of the minimum information rate needed for a given distortion; thus we wish to evaluate the rate distortion



V. R. Algazi

function. Two approaches to the representation of the random field are considered in turn. In the first one, which we shall call "two dimensional encoding," any two-dimensional operation on the random field is permitted. Thus, the rate of interest here is simply the rate distortion function of the two-dimen-

sional random field. In the second approach, the random field is first scanned linearly, let us say in the horizontal direction, and an approximation to the random field that is stepwise constant in the vertical direction is obtained. This scan is then processed line by line, each line being treated independently of all others, in an efficient manner, and with some additional distortion. We thus evaluate the rate-distortion function of this line-by-line scan. In both approaches the same frequency-weighted mean-square distortion measure is used.

The above topic will be presented to the Information Theory Chapter by Vidal R. Algazi on February 19, 8:00 PM at SRI. Professor Algazi received the degree of Ingenieur Radio de l'Ecole Supérieure de Paris in 1952, and the M.S. and Ph.D. degrees in electrical engineering from M.I.T. in 1955 and 1963, respectively.

From 1955 to 1959 he worked for Feedback Controls, Inc., Natick, Massachusetts, and for Westinghouse in Pittsburgh. From 1959 to 1963, he was a research and teaching assistant at M.I.T. and from 1963 to 1965, was an Assistant Professor and a Ford post-doctoral fellow at M.I.T. Since 1965, he has been with the EE Department of the University of California, Davis. Dr. Algazi is a member of Tau Beta Pi and Sigma Xi.

REF-ARF: A System For Solving Problems Stated As Procedures

A system which allows one to easily state any of a large class of both numerical and non-numerical problems and which uses constraint satisfaction methods and heuristic search methods to find solutions will be described by Dr. Richard Fikes for the SSC Chapter, Thursday, February 26. Dr. Fikes recently joined the artificial intelligence group at Stanford Research Institute where he is currently assisting in the design of the problem solving executive for an intelligent automaton.

Problems to which the system has been successfully applied include a crypt addition puzzle, the 8-queens problem, Instant Insanity, and the monkey and bananas problem. REF, the problem statement language, was formed as an extension to a standard programming language. The desirability of such a language for stating problems will be discussed and illustrated with



Richard E. Fikes

examples. The conceptual structure of the program, ARF, will be described with examples showing the power of its problem solving methods. Last spring each member of a class of computer science graduate students used REF-ARF to solve problems of his own choosing. This class exercise will be discussed both in terms of the performance of the program and in terms of its value to the class.

NEW MEMBERS

The Section
welcomes these new members:

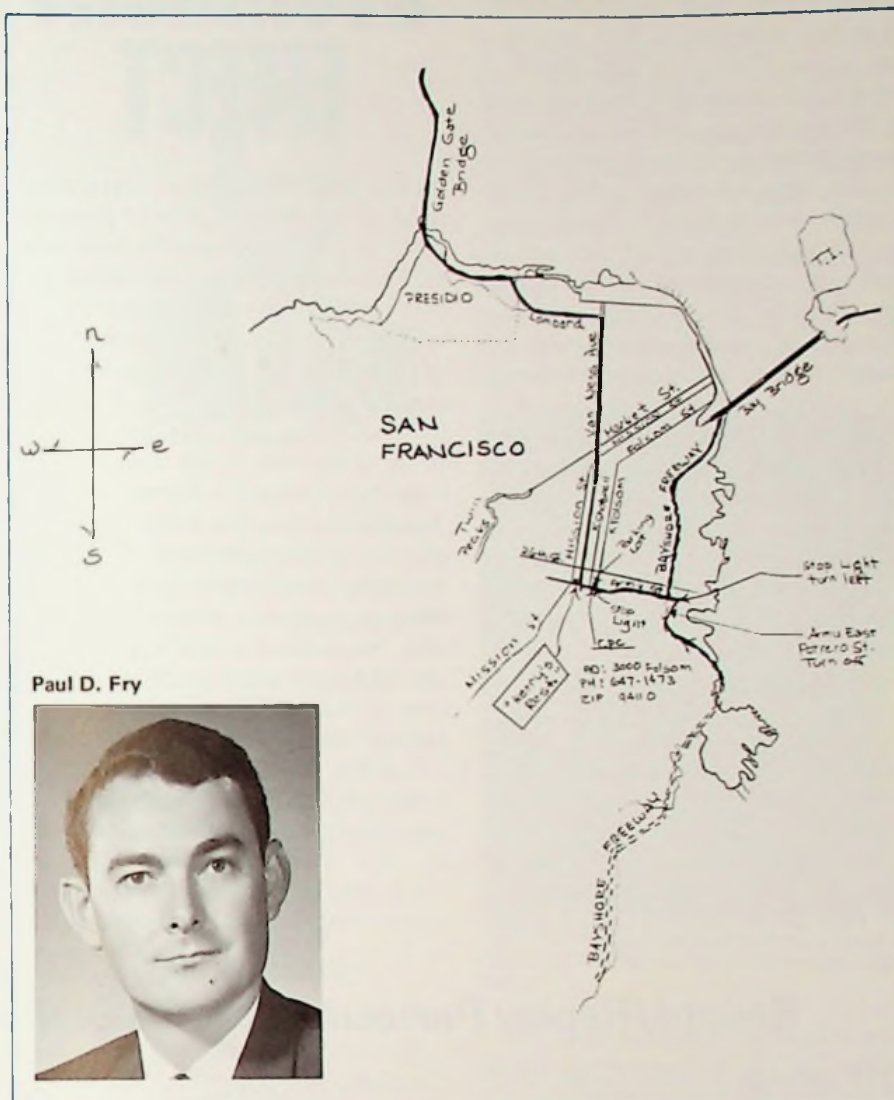
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Picturephone®...Past, Present and a View of the Future

The history, development and future applications of the new Picturephone service about to be offered by the Bell System will be the topic at the Wednesday evening, February 18, meeting of the Golden Gate Subsection. The meeting will be held at Cogswell Polytechnic College, San Francisco. Mr. Paul D. Fry of Pacific Telephone will be the guest speaker. Mr. Fry is the District Plant Manager who was responsible for the success of the new voice-operated Picturephone system demonstrated at the recent National Industrial Conference Board Meeting in San Francisco. The participants in this historic Picturephone demonstration were located in Tokyo, Japan; Hamburg, Germany; Holmdel, New Jersey; and San Francisco. As each participant spoke, his picture was flashed simultaneously to all the other locations. This and other useful applications of Picturephone will be described in detail by Mr. Fry.

In addition to Mr. Fry's presentation, the counsellors and student officers of the IEEE student branches from the schools in the Golden Gate Subsection area will be introduced.

This evening program will begin with a tour of Cogswell from 5:00 to 6:00 PM, followed by dinner at Kerry's Restaurant at 6:15. The meeting is scheduled to start at 7:45 in the auditorium of Cogswell College. See Calendar for reservation information.



Paul D. Fry



Ness Names Eldon



Charles A. Eldon, former Systems and Planning Manager at Hewlett-Packard, has been named Operations Manager for Ness Industries. At the same time, Eldon will be Vice President and General Manager of the firm's two manufacturing subsidiaries: Pacific Assemblers Co. (PASCO), and IndoNess, Inc. He will also serve as a consultant in manufacturing operations for the Ness Consultants Division of the firm. Eldon is the current Treasurer of the San Francisco Section of IEEE.

SCR Graduates to High Power Transmission

Many new and exciting applications of semiconductors will be discussed at the Power Chapter meeting on February 10th at the Engineers Club of San Francisco. Within a few short years, the power handling capability of these solid-state devices has increased from low kilowatt levels to series-parallel combinations successfully tested at 200 KV and 2000 amperes — and there appears to be no practical limit to the capacity.

The SCR has been used for variable frequency motor drive controls, uninterrupted power supplies, rectifiers for power conversion, static frequency charges and custom power control for metal heating, melting and stirring. A notable application is an induction heating SCR system which controls 210,000 KW of power uniformly heating a 30-ton slab of steel in 53 seconds.

With thyristor valves, the SCR has stepped up to HVDC. A solid-state asynchronous tie will transfer 320 Mw from Hydro-Quebec to the New Brunswick system beginning in 1972. An 80 Mw dc transmission line with solid-state conversion is being seriously considered for the Snettisham project in Alaska. Both of these applications will be discussed in detail.

Mr. J. L. Fink, the speaker, is Project Manager for the General Electric Company on the New Brunswick HVDC project. He has been active in the field of solid-state power electronics since graduating from the University of Kansas. Prior to his present assignment, he held positions as design engineer, development engineer, regulating systems consultant and manager-HVDC business development.

Solid state physics and technology, which was founded on the basis of the understanding and development of crystalline materials, is now entering a new phase. There is a high degree of interest and excitement being generated by the physics and technology of amorphous materials, that is, materials which do not have long range order. Unfortunately, a great deal of misunderstanding surrounds the subject. Stanford R. Ovshinsky, founder of Energy Conversion Devices, Inc., a company totally dedicated to research, development and manufacture in the amorphous semiconductor field, will outline the history of amorphous switching, its theoretical background and practical applications and systems based upon amorphous materials at a meeting of the Electron Devices Chapter on Thursday, February 26th. In 1958, Mr. Ovshinsky built the first amorphous switches reported and since that time has been actively engaged in development of the amorphous field.

In 1946, Mr. Ovshinsky founded the Stanford Roberts Manufacturing Company in Akron for the purpose of producing his invention of a unique, high-speed, automatic metal cutting machine. This development was later licensed to the New Britain Machine Company and

OVSHINSKY EFFECT

became the United States government standard for the production of cartridge cases. In 1950, he joined the New Britain Machine Company as manager of the center-drive department, where he developed a templateless duplicating method which utilized the principles of an analog computer.

After serving for three years as Director of Research for the Hupp Corporation, Mr. Ovshinsky founded General Automation, Inc., for the development of new types of electrical controls for automatic manufacturing equipment. Here he engaged in extensive research into ion formation and electrostatics and carried out comprehensive investigations of magnetic films and the metallurgy of electrical conducting materials.

In 1958, Mr. Ovshinsky participated in the establishment of the Ovitron Corporation in order to investigate usages of the amorphous semiconducting switch that he had invented. This development, together with his work in the

fields of electrical controls and energy conversion, led to his founding in 1960 of Energy Conversion Devices, Inc., of which he is currently chairman of the board.

Mr. Ovshinsky has worked in the field of neurophysiology. His studies on the physical basis of the formation of the nerve impulse and of memory in biological systems led him to build models to illustrate these processes. This work, combined with his continuing intensive research in solid state physics, chemistry and metallurgy, led to the development of his amorphous switching devices — the Ovonic Threshold Switch, the Ovonic Memory Switch, optical switches and printing systems. These are all now being made by thin-film technology.

Mr. Ovshinsky is the author of numerous publications in both solid state physics and neurophysiology and the holder of over 40 patents.

He is a member of the American Chemical Society, the American Physical Society, the Electrochemical Society, etc. Mr. Ovshinsky is one of four Americans thus far to be honored by being awarded the Diesel Gold Medal by the German Inventors Association. He received this award for his inventions in amorphous switching.

Record/Replay Performance of a Disc-Recorder System

The recording of video images on a magnetic medium is optimized by the use of an analog to bi-level modulation scheme. This bi-level modulated signal contains the video information in the relative spacing between transitions in the bi-level signal. For quality television displays, a signal-to-noise ratio of 40 dB or greater is required. Experience has shown that the video signal-to-noise performance of a video disc-recorder system is essentially that established in the replay of the bi-level signal from the disc.

When the parameters of the head/disc interface are available for "adjustment," it is important to have a better understanding of the relative effects of each parameter on the overall record/replay operation. By maximizing the record/replay performance of the head/disc combination, the overall system signal-to-noise capabilities are improved.

The thin-film cobalt/nickel magnetic substrate used in the Data Disc Video Disc-Recorder Systems makes possible the record/replay performance analysis through use of the classical approach of saturated recording of a medium that is



Troy Hatley

considered to be infinitesimally thin. Information has been derived and combined in this report to provide understanding of the significant parameters and their effects on the overall density response of the system. Factors of magnetic media thickness, coerciveness, remanence, and self-demagnetization; head-to-media separation and velocity, head-gap length, and record-current rise time have been considered. The effects of these factors on the pulsewidth performance of the record/replay channel are used to direct the optimization of the disc-recorder system.

Troy Hatley will cover this interesting field during his talk to the Magnetics Chapter at their February 10 meeting. Mr. Hatley is manager of the Video Systems Department in the Video Division of Data Disc, Inc., Palo Alto. Since joining Data Disc in 1968 he has spent considerable time in the development of modulators, demodulators, and video-processing circuits used as building blocks in production and custom video disc-recorder systems. The study of video disc-recorder record/replay performance was important in the design of the interfacing electronics.

Mr. Hatley is a member of IEEE. He received his bachelor of science degree in electrical engineering from the University of Utah in 1963, and the M.S.E.E. from Stanford University in 1966. Prior to joining Data Disc he was with the Advanced Systems Development Division Laboratories of IBM at Los Gatos for five years. At IBM he worked in the high-density magnetic recording area and conducted basic experiments that proved the feasibility of high-speed magnetic duplication of video-program tapes.

Technical and Societal Aspects of Environment Pollution

Dr. E. E. Loebner, head of the Special Projects Department of the Solid SState Laboratory at Hewlett-Packard, FPalo Alto, will present an overview of scientific facts about the dynamics of environment pollution and will discuss various current hypotheses about the sources and causes of pollution at the meeting of the Nuclear Science Chapter on February 17. Several proposed solutions will be examined in the light of their technological feasibility, economic cost, and social as well as political consequences. In addition, Dr. Loebner will discuss a new social and political posture for engineers and applications-oriented scientists: what positions could and should technical people occupy in political decision-making?

Dr. Loebner holds a degree in mechanical engineering, and B.A. and PPh.D. degrees in Physics. He is well known for his work in optoelectronics and is quite active in numerous fields that straddle engineering, physics, and education. He has a long standing interest in environmental problems, and as a



Dr. Egon E. Loebner

member of the New Jersey State Commission on Radiation Protection, he was instrumental in developing new regulations regarding nuclear and x-ray radiation. During the past two years, he has worked intensively on problems in the air pollution field. He is a member of the AAAS, APS, and IEEE.

Hewlett-Packard Conference Room 5M will be the location for the 8:15 meeting. Cocktails and dinner are scheduled earlier at Rick's Swiss Chalet. See calendar.

Particle Accelerators and Steam Busses

About two years ago, when particle accelerator research reached a plateau, the steam-powered automobile was a conversation piece. The central problems of steam propulsion lay in the very areas that had been most exhaustively analyzed by nuclear scientists — technological manipulation of the laws of thermodynamics, effective transfer of large amounts of heat, strengthening of

construction materials, development of metallic alloys resistant to corrosion, complex mechanical and electrical and electronic controls, miniaturization of components, simplified packaging of delicately tuned devices. Now, however, William M. Brobeck and Associates, Berkeley, will put a steam engine into a bus to replace a diesel. The points at which new research ought to be directed will become evident only after prototype steamcars are put on the open road and into urban traffic snarls.

Particle accelerators and steam busses will be discussed by Warren W. Eukel, Vice President, Operations, Brobeck & Associates, during the Vehicular Technology Chapter meeting, 8:00 PM, February 16. Mr. Eukel is currently responsible for the administrative supervision of all Project Managers as well as the assignment of various engineers to tasks. Previously as Group Manager, Mr. Eukel was responsible for the engineering study of the negative ion cyclotron meson factory for the University of California at Los Angeles and directed consultation in the design of a proton linear accelerator meson physics facility for the Los Alamos Scientific Laboratory.



Gavel Presented to Golden Gate Subsection

The November meeting of the Golden Gate Subsection started out with a brief ceremony during which Cal Thacker, Associate Dean of Cogswell Polytechnic College and Cogswell Student Branch Counsellor, presented a gavel to the Golden Gate Subsection. The gavel, which resembles a vacuum tube, was designed by Mr. Thacker and made by Mr. Jim Thompson, Pattern Shop Instructor at Cogswell Polytechnic College.



Cal Thacker, right, presenting gavel to Roland Grannis, Chairman of the Golden Gate Subsection

The Golden Gate Subsection membership is comprised of all IEEE members who receive their IEEE mailings in San Francisco, plus all other IEEE members who wish to affiliate with the Subsection. For members who live outside of San Francisco, but whose professional interests are inside the City, affiliation with the Golden Gate Subsection can be achieved by calling Jean Helmke at the Section Office (327-6622), or by completing and mailing the coupon below. Becoming a member of the Subsection costs nothing, but will place members on the Subsection mailing list, and permit them to vote for Subsection officers.

I receive my IEEE mail outside of San Francisco, but my professional interest is in San Francisco. Please add my name to the Golden Gate Subsection Roster.

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Mail to: Mrs. Jean Helmke, San Francisco Section, IEEE, Suite 2210, 701 Welch Road, Palo Alto, Calif. 94304

Transducers and Acoustical Tubes For Commercial and Space Communications

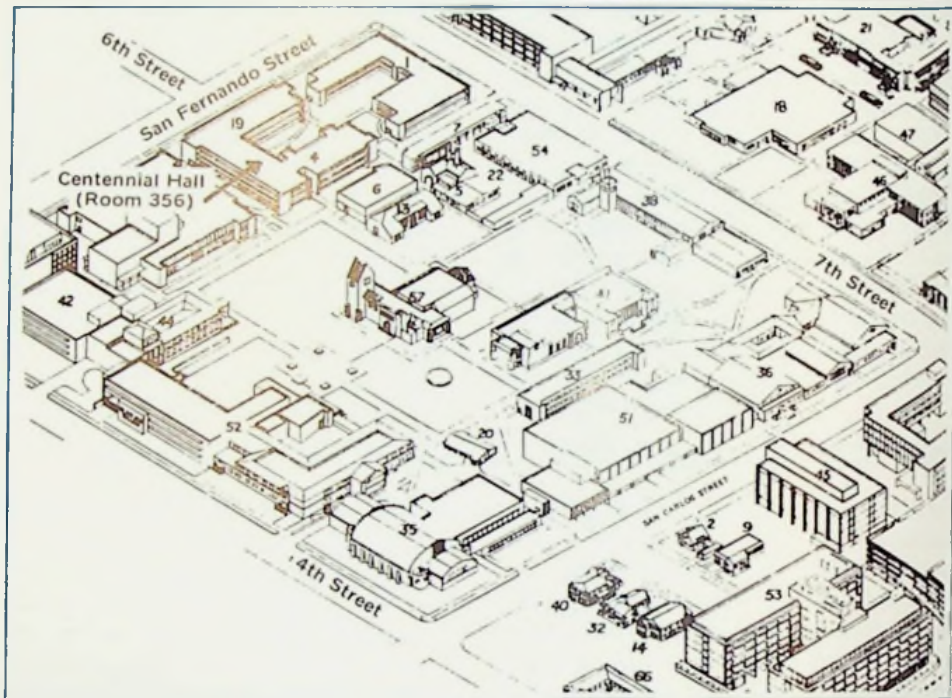
W. H. Schaumberg, Chief Engineer of Pacific Plantronics, Inc. will discuss the underlying principles and application of transducers and acoustical tubes for light weight headsets at the February 19 meeting of the A&E Chapter. Mr. Schaumberg's company pioneered the development and manufacture of small headsets that do not require head bands, because they are so light. These headsets are widely used in telephone and space communications.

One of the newest headsets, the Starset, will be discussed in the presentation. The acoustic system is described and the amplifier's special characteristics are illustrated. The total headset response curve is given. The human factors pertaining to the design and wearing quality of the headset are discussed. Also, the headsets supplied NASA for space flights will be illustrated and described.

Mr. Schaumberg taught undergraduate theory and laboratory courses at the University of Wisconsin from 1947 to 1949. In 1951 Mr. Schaumberg joined Honeywell, Inc. His experience included product design, systems analysis, and compilation and negotiation of customer and Military Specifications. Mr. Schaumberg joined Maico Electronics, Inc., in 1954. Projects under his direction included disciplines in acoustics, communications, magnetic recording, digital logic and radiation measurement. Since 1961 he was with GCA Corporation. He initiated and structured its En-

gineering Department. Major efforts included R&D projects pertaining to passive communication, atmospheric platforms and space structures. The most notable program was the Echo II Controlled Inflation System. Mr. Schaumberg joined Pacific Plantronics, Inc., in June 1966 as Chief Engineer. He is a member of IEEE.

Prior to the meeting, a Meet-The-Speaker dinner will be held at Paolo's Continental Restaurant at 6:15 PM. Meeting place will be Centennial Hall at San Jose State College, 8:00 PM. See calendar.



Lockheed M & S Company Lab Tour

C. Ross Bumstead, Lockheed M&S Company, will host the Reliability Chapter on February 12 at the Sunnyvale facility for a tour of the LMSC failure analysis laboratory, of which he is the manager. The meeting will start at 7:30 PM in the lobby of the Lockheed 104 building.

Prior to the tour of the laboratory, Mr. Bumstead will discuss its operation as a vital activity in the analysis of equipments reported failing to meet requirements during functional checkout or acceptance. He will indicate the organizational requirements of the laboratory and the skill levels of personnel needed for successful operation of such a laboratory. Details will be given of the unique and specialized equipments

needed for performing the complex and exacting steps in the analysis of the failures which frequently include the dissection of the failed devices. He will discuss the results of some of the more intriguing failures which have been analyzed by his laboratory, including integrated circuits and hybrids.

Mr. Bumstead will conduct the laboratory tour to show the equipment and provide a feel for the flow of a problem equipment under investigation. He will also demonstrate some devices and analyses currently under investigation.

A pre-meeting dinner with Mr. Bumstead will begin at 6:30 PM at The Bold Knight restaurant, Mathilda Avenue near the Bayshore Freeway in Sunnyvale.

New Directions in Management

Mr. Charles A. Anderson, whose previous careers include Vice President, Finance, Kern County Land Company, President, Walker Manufacturing Company; President, J. I. Case Company; and Associate Dean, Stanford Graduate School of Business; has seen continuing modification of management techniques. Recently, management innovations, additional tools, and the shortened implementation period have forced some rather drastic changes in management philosophy. Aspects of these changes will be the subject of Mr. Anderson's talk on "New Directions in Management" at the Engineering Management Chapter meeting, February 11 at 8:00 PM. See Calendar for location details.

The Great Quark Hunt

Physicist Charles McCusker, of Australia, has recently announced the discovery of the quark, the most fundamental particle of matter. Interest in this discovery is widespread, and the search for the elusive quark has been mounted by a team of Lawrence Radiation Laboratory physicists.

Heading up the efforts at the Laboratory's Livermore site is Dr. Arnold F. Clark of Test Division's cloud chamber group. The capabilities of this group are well-suited for this quest, since cloud chambers were used in the original experiments. Dr. Clark will discuss the history and current state of this challenging new area at the February 23rd meeting of the East Bay Subsection.

DR. CLARK

Dr. Clark has been with Lawrence Radiation Laboratory since 1954, and in his capacity as a nuclear physicist has been responsible for many new developments in the measurement of low-energy electrons with cloud chambers. He graduated from Swarthmore College with an A.B. in 1937, and was awarded an M.A. and the Ph.D. from Indiana in 1939 and 1941, respectively. He has had numerous teaching and research positions at major institutions including Wisconsin, California, and the Carnegie Institute of Technology.

Dr. Clark is a fellow of the American Physical Society, and his areas of interest include electromagnetic accelerator design, radiation effects, and particle physics.

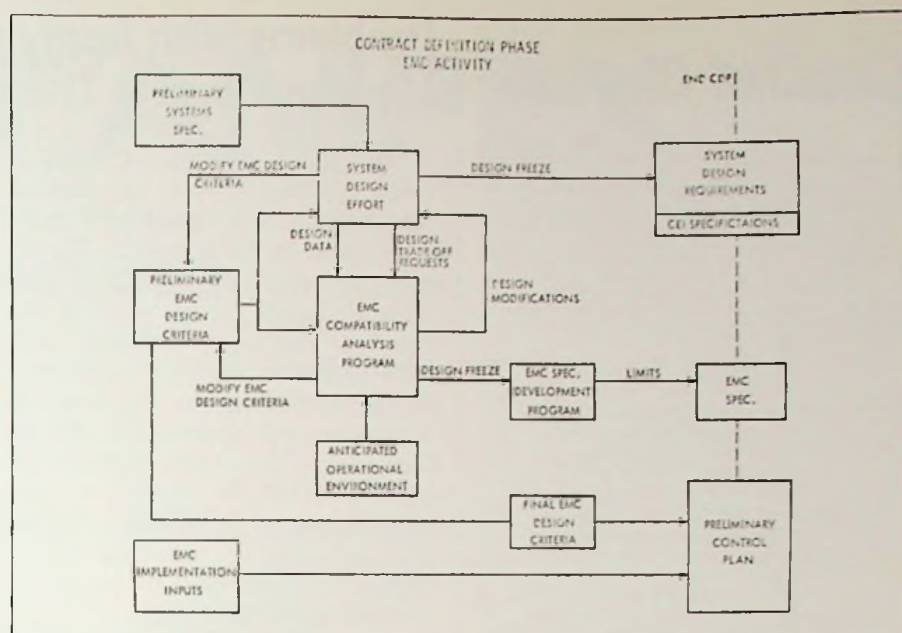
THE MEETING

The meeting will be held at 7:30 PM at the Pacific Gas and Electric Company Service Center, located at 4801 Oakport Road, Oakland. Cocktails will be at 6:30 PM with dinner at 6:00 PM at the Venetian Restaurant, 6701 Foothill Boulevard, Oakland. Dinner reservations are necessary, and can be made by phoning one of the following: Livermore: Ginny Mayer, 447-1100, ext. 6671; Oakland: Florence Wanser, 835-8500, ext. 53; San Francisco: Mary Wilster, 399-4974; San Jose: Linda Jarrett (408) 291-4567 by February 20.

For those attending only the meeting, it is requested that any one of the above be contacted so that the approximate attendance will be known.

The PG&E Service Center is located just south of High Street and west of the Nimitz Freeway on Oakport Road.

FEBRUARY 1970



New Approach to EMC Program A Must!

With the availability of computer programs and modeling techniques, the EMC discipline has, within its grasp, a technical base to handle the complexities of intra-system compatibility in large aerospace systems. A new approach in the management of EMC programs is now required to best utilize the growing technology in a cost effective manner.

James Spagon will define the basic computer analysis tools and discuss the utilization of these tools in terms of data requirements, engineering methods and procedures for the EMC Chapter on Monday, February 16. The integration of this computer approach into new procurement cycles will be examined from the position of the procuring agency and integrating contractor. Directions for further growth and future modes of contractor-customer EMC management will be discussed.

The engineering process required to utilize the computer analysis tools relies heavily on system and subsystem interface information. The EMC engineer works closely with design integration engineers in a "pre-modeling" activity wherein the pertinent interface information is gathered. A "modeling" activity follows which formats the data and permits engineering judgments to be exercised as required to strengthen the data base. The data is entered into a Univac 1108 computer and the analysis performed.

Mr. Spagon is presently employed at TRW Systems as staff engineer within the Electrical Systems Compatibility Department where he is responsible for advanced planning of EMC Projects and research and development activities. He is national chairman of the Student Activities Committee for the professional group of IEEE, G-EMC. He is past chairman of the Los Angeles Chapter of G-EMC and is serving as secretary for the 1970 International IEEE/G-EMC Symposium.

Automated Design of Transistor (Cont'd from page 5)



Paul M. Russo received his B.Eng. degree in engineering physics from McGill University, Canada, in 1965, and his M.S. degree in electrical engineering from the University of California at Berkeley, in 1966, where he is presently completing his Ph.D. studies.

He has been a Teaching Assistant, a Teaching Fellow, and a Research Assistant at the University of California, where he presently holds the position of Acting Assistant Professor. His research interests include the area of computer-aided design with emphasis on the analysis and optimization of nonlinear networks in the time domain.

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Problems with Applying Modern Control Theory to Real Systems

The general problem of applying modern control theory to chemical processes will be reviewed by Richard W. Koepcke at the Automatic Control meeting on February 17 at 8:00 PM. Modern Control theory, with its emphasis on state-space, maximum likelihood parameter estimation, minimum variance state-estimation, and optimum control laws will be contrasted with the classical approach of exponential filtering and two-mode controllers. Case studies of cement plants, pulp and paper mills and aluminum pot lines will be used to demonstrate that remarkably little progress has been made.

Mr. Koepcke received his BS degree in Electrical Engineering from Northwestern University in 1953 and the MS degree in 1957. He joined IBM in 1957



R. W. Koepcke

where he has been concerned primarily with real-time use of computers as applied to discrete control processes.

The meeting will be held in Room 551, Engineering Center, Santa Clara University. Dinner is planned for 6:30 PM, Angelo's Restaurant, 11 Race Street at The Alameda. No reservations.

Survival in the World of the Computer

Continued from page 6

lany is presently a Group Engineer for Lockheed M&S Company, where he supervises the Electrical Design Section of the Antennas and RF Electronics Department. He received his education at the Georgia Institute of Technology and at Cornell University.

Dr. Bruce is a Senior Member of the Technical Staff at ESL Incorporated. He received his education at the University of Kansas. He has been engaged in the analysis and modeling of Antenna and Propagation problems since joining ESL in 1966. During this time, he developed a computer program for optimally designing broadband microwave couplers. Prior to joining ESL, he was an assistant professor at the University of Santa Clara for four years.

Dr. Harris is Manager of Data Processing and Computer Applications at Technology for Communications Interna-

tional, Mountain View. He received his education at M.I.T. He has been engaged in the solution of antenna and scattering problems by digital computer techniques for many years. He has developed a large library of highly sophisticated computer sub-routines of wide applications in electromagnetic theory and structural engineering.

Dr. Mei is an Associate Professor of Electrical Engineering and Computer Sciences at the University of California, Berkeley. He has been engaged in the research of numerical methods, antenna and plasmas since he joined the University in 1962. He is a recipient of the G-AP achievement award of 1967.

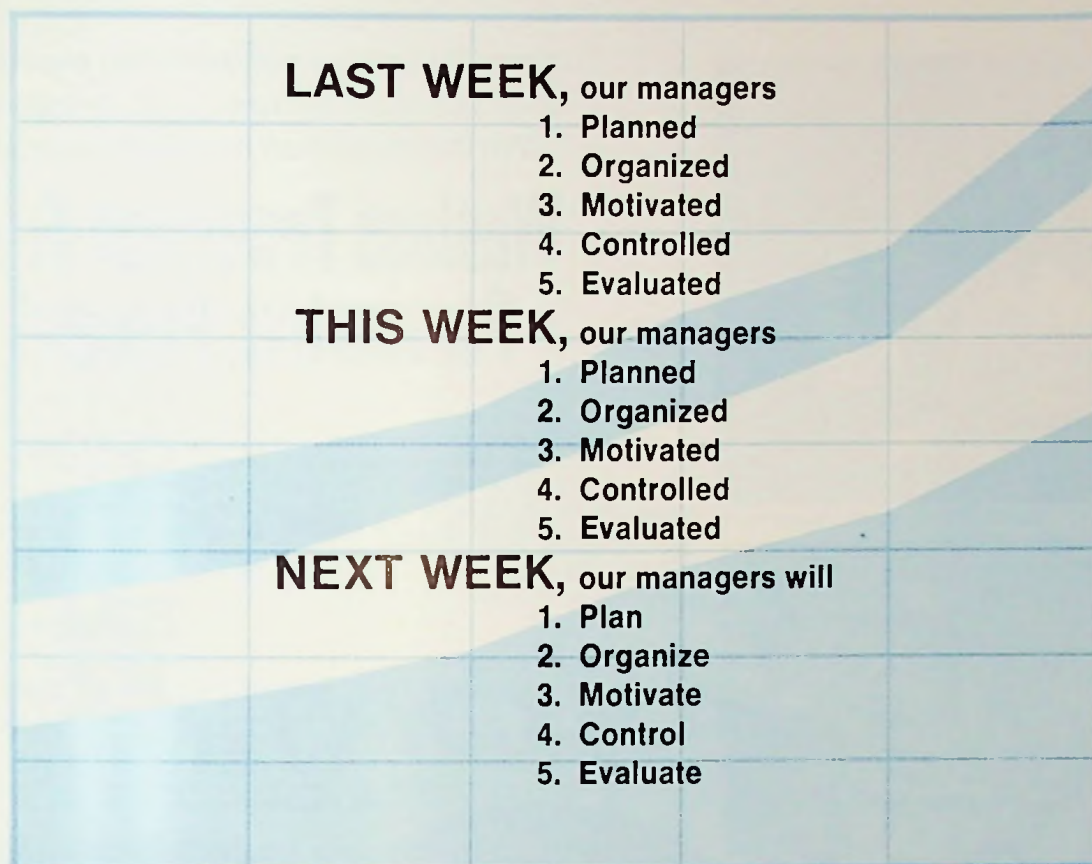
The meeting will be held at Philco-Ford in Building 56 Auditorium, 3825 Fabian Way, Palo Alto, at 8:00 PM. Cocktails and dinner are planned for 5:30 and 6:15, respectively, at Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto.

1970 Region 6 Conference

Chairman Dave Edwards announces that plans for the 1970 IEEE Sixth Region Conference are rapidly taking shape. The conference will be held at the Washington Plaza Hotel, Seattle, May 26-28, 1970. A most interesting Technical Program covering eight technical groups is being assembled by Dr. Peter Metz. The social program featur-

ing a salmon barbeque and field trips including an inspection of the Boeing 747 is being prepared by Steve Dyrnes, Arrangements Chairman. Mrs. Dyrnes is heading the Ladies Entertainment Committee. An announcement giving full details of the conference will be mailed to all Sixth Region members early in 1970.

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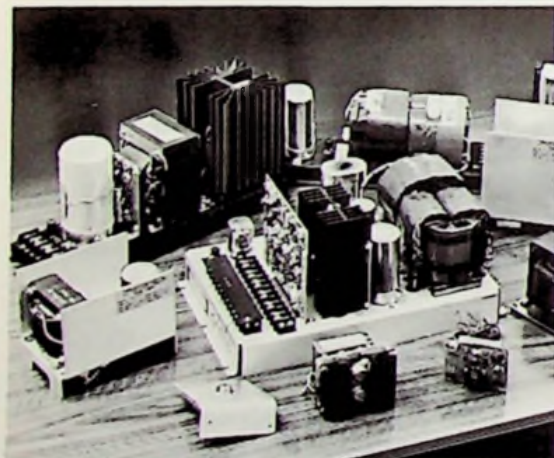
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