EDITOR'S PROFILE of this issue

from a historical perspective …

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

April, 1970:

Cover: Shown is the antenna on the Skynet spacecraft for defense communications, subject of a meeting on April 15th. More on page 8.

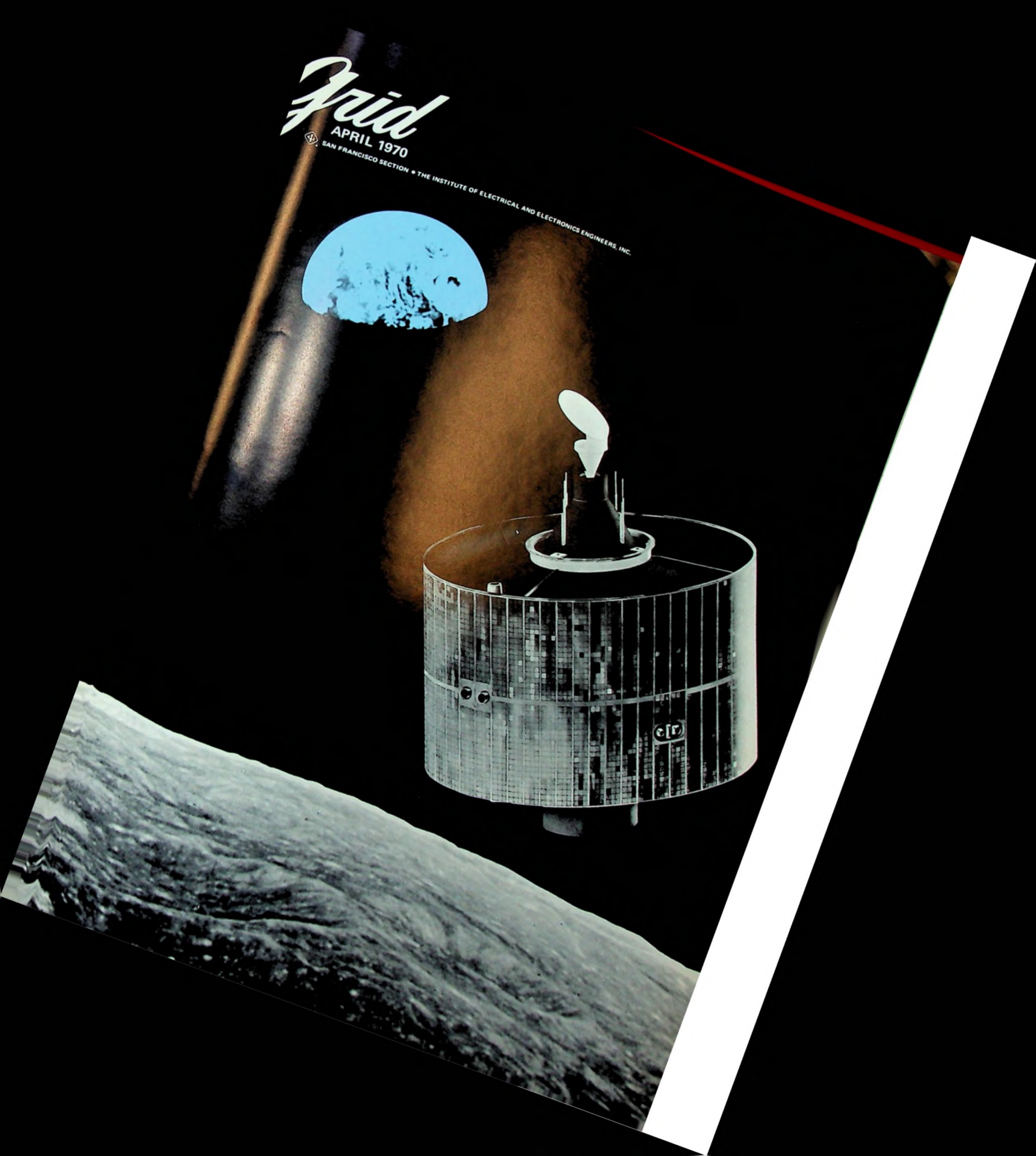
Archive of available SF Bay Area GRID Magazines is at this location:
https://ethw.org/IEEE_San_Francisco_Bay_Area_Council_History

At time of scanning, the bound volumes are held by Paul Wesling. April, 2025 Contact p.wesling@ieee.org

Frid

APRIL 1970

SAN FRANCISCO SECTION • THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.



PAN AMERICAN'S 747

It was not the best flying weather when PAN AM's 747 took off on its maiden flight from Everett, Washington. The sky was heavily overcast, the wind blustery.

As the huge airplane soared skywards with Jack Waddell, Boeing's Test Pilot, at the controls, a smaller watchdog jet paced it. The other pilot found the going rough.

"How's the big bird handling in this heavy turbulence?" he radioed Waddell. "What turbulence?" came back the laconic reply.

PAN AM's 747 is the most stable aircraft ever to go into public service. Its combination of sheer weight, size and power help it weather many of the storms that plague lesser planes and often cause bumpy rides.

It is also one of the quietest to ride in. So quiet, in fact, that a senior PAN AM official riding as one of its first passengers commented that the patter of rain on the windows could be heard while in flight.

The 747 represents evolution in man's saga of flight – a logical progression beyond the 707 and 727. It has adapted all of the better features of today's jets, and introduced many innovations of its own.

Capt. Johnnie Warren

East Bay Subsection Feature

Captain Johnnie Warren, of PAN AM, will speak to the East Bay Subsection about the 747 at a dinner-meeting at the Hilton Inn, San Francisco International Airport on April 27. Following the meeting, the group will tour the PAN AM facilities adjacent to the Inn. The tour will include such items as: Training Building, Flight Simulators, Emergency equipment training (mockup of plane wing over pool of water), possibly training movies such as Hong Kong landing strip, jet pilot movie, 747 movie, grooming room, etc. In addition, the visit will include the Maintenance Hangar Shops and a walk through the plane, if one is available.

Captain Johnnie Warren joined Pan American in November 1941, shortly after graduating from the U.S. Army Air Corps. He flew for PAA in Africa until called back on active duty with the Africa Middle East Wing of the Air Transport Command. During this period of active duty he was a check pilot and earned the Distinguished Flying Cross. Captain Warren returned to PAN AM in 1945 and has been based in San Francisco since December of that year. He has served as an instructor, line pilot and check pilot during this time. Reservations. See calendar.

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Neely Service Technicians, the most successful in the industry, are preceded by girls dedicated to serving customers and serving them well. The girls initiate paperwork on an instrument the moment it comes through one of our Service Department doors, schedule it into service, and then follow it all the way through to the shipping dock.

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HEWLETT hp PACKARD

NEELY SALES REGION

The cover pictures the Mechanically-Despun Communications Antenna on the Skynet Spacecraft. Mr. Walt Gregorwich of Philco Ford Western Development Laboratories will describe the electrical and mechanical characteristics of this antenna at the April 15 Antennas and Propagation Chapter Meeting.

Grid

volume 16
number 8

APRIL 1970

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meeting

AEROSPACE & ELECTRONIC SYSTEMS
APR. 16

Story on page 5

PROGRESS IN AIRBORNE COLLISION AVOIDANCE SYSTEMS. Paul G. Stoltz, Senior Operations Analyst, SRI, Menlo Park.

APR. 16, Thursday, 8:00 PM, Philco-Ford Bldg. 56. Room 221, 3939 Fabian Way, Palo Alto. Cocktails: 6:00 PM; dinner 6:30 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Reservations: R. Winslow or P. Hoppe, 326-4350 ext. 6143 by Apr. 15th.

ANTENNAS & PROPAGATION
APR. 15

Story on page 8

THE SKYNET MECHANICALLY-DESPUN COMMUNICATIONS ANTENNA. Walter S. Gregorwich, Project Engineer, Philco-Ford, Palo Alto.

APR. 15, Wednesday, 8:00 PM, Philco-Ford Bldg. 56, Auditorium, 3825 Fabian Way, Palo Alto. Dinner: 6:15 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. No reservations.

CIRCUIT THEORY
APR. 22

Story on page 9

DESIGN & APPLICATION OF INSTRUMENTATION-GRADE MONOLITHIC OPERATIONAL AMPLIFIERS. George Erdi, Project Manager; Jerry Collings, Manager, Product Planning & Applications: Precision Monolithics, Inc., Santa Clara.

APR. 22, Wednesday, 8:00 PM, 134 McCullough Bldg., Stanford University. Dinner: 6:00 PM, Red Cottage, 1706 El Camino Real, Menlo Park. Reservations: Section office: 327-6622 by noon, Apr. 22nd.

COMPUTER
APR. 28

Story on page 10

A PROCESSOR FOR CHARACTER RECOGNITION RESEARCH. Dr. Roy J. Zingg, Associate Professor, Electrical Engineering and Computer Sciences, Iowa State University.

APR. 28, Tuesday, 8:00 PM, Skilling Auditorium, Stanford (next to McCullough Bldg.). Dinner 6:15 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Reservations: Mary McGlone, 321-3300, ext. 270 by Apr. 23rd.

EAST BAY SUBSECTION
APR. 27

inside front cover

PAN AM's 747. Captain Johnnie Warren, PAN AM.

APR. 27, Monday, 6:30 PM, Hilton Inn, San Francisco International Airport, starting with dinner. Reservations: Livermore: Ginny Mayer, 447-1100, ext. 7671; Oakland: Florence Wanser, 835-8500, ext. 53; San Francisco: Mary Vilter, 399-4974 by Apr. 23rd.

EDUCATION
APR. 25

Story on page 8

PICTUREPHONE will be discussed by Paul D. Fry, District Plant Manager, Pacific Telephone, and a tour of the Foothill Electronics Museum of the Perham Foundation.

APR. 25, Saturday, 10:00 AM, Foothill Electronics Museum at Foothill College, El Monte Road and Hiway 280. (See story for directions). Coffee and refreshments will be served before the meeting.

ELECTROMAGNETIC COMPATIBILITY
APR. 20

Story on page 10

MEANINGFUL EMC MEASUREMENTS IN SHIELDED ENCLOSURES. Horacio A. Mendez, IBM Corp., San Jose.

APR. 20, Monday, 8:00 PM, Hewlett-Packard Auditorium, 5301 Stevens Creek Blvd., Santa Clara. Dinner: 6:00 PM, Custom House, 20060 Stevens Creek Blvd., Cupertino. Reservations: Paul Gagner, 969-1050 by Apr. 20th.

ELECTRON DEVICES
APR. 23

Story on page 11

THE CHANGING ROLE OF ELECTRON BEAMS IN ELECTRON DEVICES. Prof. Thomas Everhart, EE Dept. UC Berkeley. LADIES INVITED.

APR. 23, Thursday, 8:30 PM.Cocktails 6:00 PM, dinner 7:30 PM. Call the Section office -- 327-6622 -- for reservations and location of dinner and meeting.

ENGINEERING MANAGEMENT
APR. 8

Story on page 8

COMMUNICATIONS. Dr. Witold Krassowski, University of Santa Clara. WIVES' NIGHT.

APR. 8, Wednesday, 8:00 PM, Dinner: 6:00 PM, $4.50 incl. tax & tip -- Roast Beef or Seafood. Kozy Grotto, 210 Hope St., Mt. View (opposite Post Office) Reservations: Kozy Grotto, 961-3500 by noon Apr. 8th.

calendar

ENGINEERING IN MEDICINE & BIOLOGY
APR. 21

PROBLEMS IN BIOMEDICAL ENGINEERING FOR A TEACHING HOSPITAL. Emil Barish, Mechanical Engineer and Director, Research & Development Lab, UC at San Francisco (UC Medical Center).

APR. 21. Tuesday, 8:00 PM, Madrone Room, Guy S. Millberry Union, Masonic & Parnassus Sts., San Francisco. Dinner: 6:00 PM, El Portal Restaurant, Fulton & 8th Ave. S.F. Reservations: E. R. Lewis, 642-3338 by 5 PM, Apr. 20th.

GOLDEN GATE SUBSECTION
APR. 22

Story on page 4

FIELD TRIP: CITY OF SAN FRANCISCO'S NEW FIVE-MILLION-DOLLAR AUTOMATED GRAIN HANDLING & STORAGE FACILITY. Dan Gillham, Chief Electrical Engineer, Homan & Lawrence.

APR. 22, Wednesday, 6:00 PM, Islais Creek Grain Terminal, Pier 90 off 3rd St., San Francisco. Dinner: 7:00 PM, Costra Bravo Restaurant at Bayside Motel, Intersection of 3rd St., & Bayshore Blvd. For reservations and assistance with transportation, call Artwel Electric, 467-1880 by Apr. 21st.

INDUSTRY & GENERAL APPLICATIONS
APR. 9

Story on page 9

APPLICATION OF LARGE ELECTRIC DRIVES FOR GRINDING MILLS. Walter H. Schwedes, Manager, Mining Industry Engineering, General Electric Co., Schenectady, N.Y.

APR. 9, Thursday, 8:15 PM, Engineers Club of San Francisco, 160 Sansome St., S.F. No-host cocktails 6:30 PM; dinner 7:00 PM, $5.00 incl. tax & tip. Reservations: H. B. Thysell, 557-2025 by Apr. 8th.

INFORMATION THEORY
APR. 16

Story on page 11

LOGICAL ANALYSIS OF PICTURES OF POLYHEDRA. Prof. David A. Huffman, UC, Santa Cruz.

APR. 16, 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., E. Palo Alto. Reservations: Mrs. Toshi Furukawa, 326-4350, ext. 6162 by Apr. 15th.

PARTS, MATERIALS & PACKAGING
APR. 12

Story on page 12

MICROELECTRONICS COURSE. Second series of 6 sessions, beginning April 21 through May 26 (Tuesdays). Course Director: Dr. William Cox, Director Applications Lab. of Hugle Industries, Sunnyvale.

APR. 21, Tuesday, 7:30 PM, Varian Associates Research Lecture Hall, Bldg. 7, 611 Hansen Way, Palo Alto. Registration: See application with story.

POWER
APR. 14

Story on page 10

AEP's 765-kv TRANSMISSION SYSTEM. Howard C. Barnes, Ass't. V.P.-Engineering, American Electric Power Service Corp., NYC.

APR. 14, Tuesday, 7:30 PM, Engineers Club of San Francisco, 160 Sansome St., S.F. Cocktails: 5:30-6:30; dinner 6:30 PM. Reservations: 421-3184 by Apr. 13th.

RELIABILITY
APR. 9

Story on page 8

INTEGRATED CIRCUIT SCREENING TESTS AND IMPLICATIONS OF SPEC MIL-M-38510. C. Gray, Director of Reliability and Quality, Fairchild Semiconductor.

APR. 9, Thursday, 8:00 PM, Brave Bull, Mathilda Ave. at Central Expressway, Sunnyvale. Dinner: 7:00 PM, same location. Reservations for either: Gil Bowers, 962-4111 or Lew Finch, 743-1577 by Apr. 8th.

SANTA CLARA VALLEY SUBSECTION/ USNPGS STUDENT BRANCH
APR. 11

SPRING AFTERNOON IN MONTEREY – Annual joint meeting with U.S. Naval Postgraduate School Student Branch. See March Grid.

APR. 11, Saturday afternoon. Luncheon at Officers' Club, USNPGS, Monterey at 12 noon – $2.10 per person, followed by tours of the school with demonstrations and visitor participation. Cocktail hour 4:00 to 5:00 PM. Reservations: Monterey: LCDR R. R. Owens, (408) 646-2231 or San Jose, Mrs. Pat Fregosa, (408) 291-4434 before 4:15 PM Apr. 8th.

VEHICULAR TECHNOLOGY
APR. 20

RECEIVERS – EIA TEST PROCEDURES – PRACTICAL APPROACH TO DESENSITIZATION & INTERMODULATION. Roy Lockhart, Mgr., Systems Engineering, Motorola Co. and Wrex Beaman, District Representative, General Electric Co.

APR. 20, Monday, 8:00 PM, Lyon's Restaurant, El Camino & Murchison (Millbrae Ave.) Millbrae. Dinner: 7:00 PM, same location. Reservations: Al Isberg or W. H. Nye, 328-1200 by Apr. 17th.

THE Chairman's Message

John B. Damonte

"Launching the Spectacular 70's" is the theme of the 1970 IEEE International Convention in New York. Fifty-five technical sessions will attempt to project the technological trends of the 70's. The variety of topics is staggering! Consider, for example: Frontiers in Power Engineering, Electrography, Optoelectronics, Microwave Integrated Circuits, Holography, Environmental Pollution, Satellite Communication Electronics in Education,and Electro-Acousto-Magneto-Elasto Interactions! It seems doubtful that today an electrical engineer could function as the "general practitioner" of days gone by. One of the main functions of the Convention is to give us an opportunity to learn a little something about those fields in which we may have an interest but no experience. I hope that all of you will take advantage of this opportunity either by attending the Convention – or by reading the Digest and papers that result from it.

The last twelve months have seen a sharp increase in the number of layoffs among the aerospace and electronics organizations in our area. This is due primarily to a reshuffling of National priorities which has caused a stretchout of existing programs and either the cancellation or a delay in the start of new programs. The worst is probably yet to come. Although many of us have experienced these "cycles" before, it is, nonetheless, traumatic when we are the one who is "laid off." We then face the task of looking for a new position in an environment of recession. It's at a time like this that we would appreciate a friendly tip as to where we might find a suitable position. One of our EXCOM Directors, Jerry Schloss, recently experienced the agonies of looking for a new job and he is now in the process of studying ways and means by which your IEEE Section Office can help you relocate should conditions require it. If you have any suggestions or recommendations, please jot them down and send them to Jerry in care of the Section Office.

Finally, I wish to call your attention to the announcement for the Annual Section Meeting. This dinner-dance honors our newly-elected Fellows and Officers. It is designed for a minimum of business and a maximum of fun. IEEE members and their guests are cordially invited to attend. The pasta and the garlic French bread are a concession to your Chairman who is of Italian parentage. Form a party and plan to attend. I am sure you will enjoy it.

John B. Damonte, Chairman
IEEE San Francisco Section

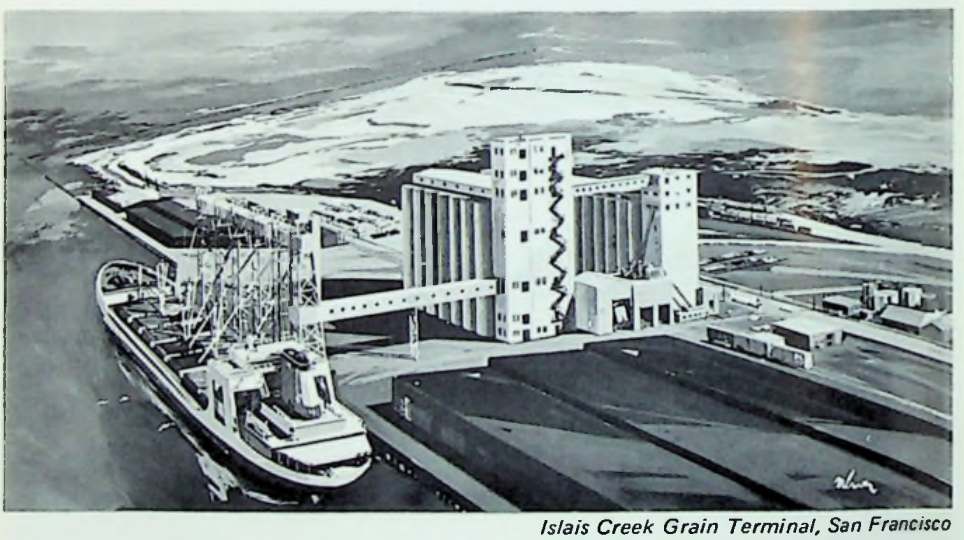
Automated Grain Terminal Field Trip

A field trip to San Francisco's new five-million-dollar automated grain terminal is scheduled for April 22, beginning at 6:00 PM at the Islais Creek Grain Terminal, Pier 90; Arthur St. off 3rd St. A 7:00 dinner at the nearby Costra Bravo Restaurant will follow the field trip, which is being arranged by the Golden Gate Subsection.

Dan Gillham

The new grain terminal is expected to make the Port of San Francisco one of the most efficient grain terminals in the world. The completely automated grain terminal will be capable of unloading 50,000 bushels of grain per hour with automated blending, mixing, grading, cleaning, fumigating and aerating of the grain under solid-state logic control.

The facility receives power at 12 KV and has a large 480-volt motorized load. Therefore, there are examples of all phases of modern electrical substations, control centers and associated equipment as well as the solid-state control and control console display.



Islais Creek Grain Terminal, San Francisco

The field trip will be under the direction of Dan Gillham and assisted by members of the port authority technical staff and the installing electrical contractor.

Following the field trip the dinner meeting will feature a discussion of the project by Dan Gillham, chief electrical engineer of Homan & Lawrence, the installing engineering contractor building the facility.

Dan Gillham is a member of IEEE, registered EE, and has been with Homan & Lawrence 8 years. After graduation from Stanford he worked for a major electrical equipment manufacturer and a consulting engineering firm before taking his present employment.

Please call Artwel Electric 467-1880 for reservations and assistance with transportation. Reservations by April 20th please.

"Electrical Safety" Conference Theme

The Industrial and Commercial Power Systems Committee will hold its 1970 Joint Technical Conference with the Electric Space Heating and Air Conditioning Committee at the Jack Tar Hotel in San Francisco, May 4-7, sponsored by the Industry & General Applications Group of the IEEE and the San Francisco Section.

The theme, "Electrical Safety," will be highlighted with papers on 1) "Interpretation of the New ANSI Standard for Circuit Breaker Applications," 2) "Criteria for Rating and Application of Transfer Switches," 3) "Elements of the Design of Industrial Plant Power systems." A panel discussion by Safety Code experts on "Essential Safety Considerations for the Design of Industrial Plant Power Systems" will bring the thoughts presented by these papers into clear focus. The I&CPS Sessions will also contain papers on 1) "A 69KV Inplant Distribution System," 2) "Reliability and Availability Companion of Common Low Voltage Power Distribution Systems," 3) "Taking Advantage of Low Voltage Fuse Capabilities," 4) "Instrument Transformers." A panel discussion on "Computers and Digital Control Systems vs. Normal, Noisy Power Systems" will bring out the thinking of the experts on this timely question.

The Electrical Space Heating and Air Conditioning Committee Session will shed new light on the ever-increasing role electricity is playing in environment control. Papers will be presented covering 1) "The Electrical Engineer's Role in Space Conditioning," 2) "The Economics of Electrical Heat Applied to a Multiple Building University Complex," 3) Estimating Electrical Heating Loads from Customer Use," 4) "Economic Analysis of Building Energy Estimating," 5) "Comfort Control for Central Electrical Heating Systems," 6) "Slab System Constructive Technique."

Added features will be a tour to interesting electrical installations, a field trip to the United Airlines repair facility, a reception and social events for the ladies.

Progress in Aircraft Collision Avoidance Systems

Paul Stoltz

With the rising volume of air traffic, primarily scheduled air carrier and general aviation traffic, the probability of mid-air collision has increased. Increased attention, therefore, is being given to ways to increase ATC system capability. The current ATC system employs controllers aided by radar beacon symbology displays to separate IFR traffic. Pilots play no real active role in maintaining separation in IFR conditions, but still have the responsibility to "see and be seen" during VFR conditions.

Techniques for achieving separation between aircraft by a cooperative exchange of signals between aircraft have been seriously investigated since the late 1950s. This more decentralized approach has been generally described as air-derived separation assurance (ADSA). Elements of ADSA are collision avoidance, stationkeeping, and proximity warning.

In his talk on Thursday, April 16 at the AES meeting, Mr. Paul Stoltz will review the background of ADSA and discuss the characteristics and the expected operational performance of the Air Transport Association's Collision Avoidance System. This system employs time-frequency techniques to permit aircraft to communicate one-way transmissions among themselves in an orderly way.

Mr. Stoltz is presently a Senior Operations Analyst at Stanford Research Institute. He has been involved in ATC studies for a number of years and is an active private pilot.

Nomination and election of group officers for the coming year will be held priot to Mr. Stoltz's talk.

1970/71 SUBSECTION CANDIDATES

CHAIRMAN
MARVIN B. RUDIN
President, Precision Monolithics, Inc., Santa Clara. Mr. Rudin received the BSEE in 1949 from Cal Tech and the MSEE in 1951 from the same institution. He has performed work and written papers on analog integrated circuits, telemetry multiplexing, modulation, and synchronization, and microwave stabilized oscillators for radar application. Since entering the Santa Clara Valley in January, 1966, Mr. Rudin was Manager of LIC R and D at Fairchild Semiconductor until November, 1968, when he left to form Analog Integrated Microsystems. He is the SCVSS Vice Chairman.


Marvin B. Rudin

VICE CHAIRMAN
O. THOMAS PURL
Presently vice president, Devices Group, Watkins-Johnson Company. In this position he is responsible for the activities of the Tube Division, Stewart Division, and the Solid State Division of the Company. He has been with Watkins-Johnson Company for over ten years starting as a Project Engineer on traveling-wave tube programs. Formerly he was associated with the Research Laboratories of Hughes Aircraft Company, Culver City, California, where he was head of the Power Traveling-Wave Tube Section. He obtained BSEE, MS, and PhD degrees from the University of Illinois in 1951, 1952, and 1955 respectively. Mr. Purl is now serving as subsection Secretary.


O. Thomas Purl

SECRETARY
RAYMOND A. POWER
Mr. Power received the BSEE and MSEE in 1949 and 1950 respectively from Stanford University. He is presently Advisory Engineer at the IBM Systems Development Division Laboratory in San Jose and is involved in the design of AC and DC power systems for new computer products. Mr. Power is a Senior Member of IEEE and is a California registered Electrical Engineer.


Raymond A. Power

TREASURER
ROBERT M. EANES
Received his BSEE from the University of New Mexico in 1959. In 1961, Mr. Eanes joined Philco-Ford Corporation, WDL Division, to design and procure the ground transmitting equipment for the Advert Satellite Program and is presently responsible for the design and procurement of RF equipment used in the receiving, transmitting, and boresight subsystems of a 60 ft. satellite tracking antenna. He is a member of the IEEE and the Professional Group on Communications Technology.


Robert M. Eanes

TREASURER
ROBERT A. MARTIN
Mr. Martin received his BSEE from the University of Nevada in 1955. He began his career with Pacific Telephone as a transmission engineer in San Francisco. From 1959 to 1961 he was a member of the Bell Telephone Laboratories technical staff. Previous to his present assignment, he was Transmission and Customer Service Engineer for the Central Counties Area of Pacific Telephone. Since 1967 he has been the General Traffic Engineer for the Central Counties Area. He is a Senior Member of IEEE.


Robert A. Martin

GOLDEN GATE

CHAIRMAN
KENNETH R. WALTERS
Engineer with the Bell System for 14 years at Western Electric in Chicago and Columbus, Bell Telephone Laboratories in New York, and Pacific Telephone in San Francisco. He is presently Staff Engineer, Quality and Protection Group of the Chief Engineer's Department. He graduated from the University of Nebraska with a B.A. in Radio and Television Communications. Mr. Walters is Secretary of the Executive Committee of the 1970 International Communications Conference. Mr. Walters is the current Vice Chairman.


Kenneth R. Walters

VICE CHAIRMAN
JACK M. SHULMAN
Fellow District Engineer, Power Systems, in the San Francisco Field Sales Office of Westinghouse. Prior to his present assignment he was Engineering Manager for Electrical Products at the Sunnyvale plant of Westinghouse. A graduate of Ohio State University, he received the MSEE degree at the University of California in Berkeley. He joined AIEE in 1940 and has served as Secretary and Chairman of the Santa Clara Valley Subsection, and as a member of the national Switchgear Committee and Subcommittee on assembled Switchgear. Mr. Shulman is a Senior Member of IEEE, and serves the subsection as Secretary.


Jack M. Shulman

SECRETARY
BRYAN R. BAARTS
Engineering Department at PG&E, the last three years in transmission substation design. He graduated from Stanford with a BSEE and served two years with the U.S. Army on a missile test project. He is a member of the Power and Insulation Groups and has served as an assistant coordinator for the Insulated Conductors course offered by the Professional Education Committee of the Power Group. He is also a member of the Pacific Coast Electric Association and the Electric Club. He is the current GGSS Treasurer.


Bryan R. Baarts

TREASURER
J. A. WELLS
President of Artwel Electric, Inc. Mr. Wells is a Senior Member of IEEE. Previous IEEE duties include serving the Santa Clara Valley Subsection as Chairman. He is also a Past Chairman of the local Industry & General Applications Chapter and has been a national Member-at-Large of the I&GA Group. He is currently serving the Golden Gate Subsection as Program Chairman.


J. A. Wells

EAST BAY

CHAIRMAN
J. L. CATTOLICA
Graduate of the University of California with a B.S. degree in Electrical Engineering. He joined the Pacific Gas and Electric Company in 1937, and worked with the Construction Department. He later transferred to the Engineering Department as an Electrical Engineer, holding various positions in the Engineering and Operations Department. His present position is Senior Substation Engineer, East Bay Division.

Mr. Cattolica was an Electronics Officer in World War II.

He has worked on several committees for the East Bay Subsection, was Program Chairman in 1964 and Arrangements Chairman in 1965 and Treasurer in 1967 and Secretary in 1968. Mr. Cattolica now serves as Vice Chairman.


J. L. Cattolica

VICE CHAIRMAN
F. G. DOELL
Mr. Doell graduated from the University of Washington in 1962 with a BS degree in Electrical Engineering. He is currently employed by Pacific Telephone as a Senior Engineer in the Chief Engineer's Protection Group.

Mr. Doell is Subchairman of the San Francisco Section Membership Committee and has been Program Chairman for the East Bay Subsection for the past three years. He is the current subsection Secretary.


F. G. Doell

SECRETARY
C. J. BILLS
Mr. Bills received the BS degree in Business Administration from the University of Missouri in 1953. From 1953 to 1955 he served as an Executive Officer in the U.S. Army 14th Armored Cavalry Division in Germany. In 1956 he joined the Electrical Cable Division of the U.S. Rubber Company in Houston, Texas. Since 1957 he has been associated with the Kaiser Aluminum-Electrical Products Division, Houston, Texas and San Leandro, California, where he is now District Manager. He is a member of the San Francisco Electric Club and has been an IEEE member since 1957. He is currently Student Relations Chairman for the IEEE East Bay Subsection.


C. J. Bills

TREASURER
JAY D. WIEDWALD
Mr. Wiedwald received his BSEE from the University of Pittsburgh in 1961 and his MSEE from the University of California in 1965. He has been an Electronics Engineer at Lawrence Radiation Laboratory since 1965 and is a Project Leader. A member of IEEE since 1960, he has served the East Bay Subsection as Arrangements Chairman, 1967-68, and as Membership Chairman since 1968.


Jay D. Wiedwald

EM Has Dr. Krassowski on Communications

The Engineering Management Chapter is pleased to announce an outstanding program planned for its Wednesday, April 8 meeting. Dr. Withold Krassowski of the University of Santa Clara will speak on the broad subject of Communications. Since Communications is not only a major problem in business but in all forms of social interaction, the Administrative Committee has declared this program Wives' Night. Accordingly, wives or guests are cordially invited to attend this meeting and a dinner preceding it.

Dr. Krassowski is Director of Social Sciences and Professor of Sociology at the University of Santa Clara. He has received many national and internatonal awards for his work and is advisor/lecturer and/or consultant to many State, U.S. Government and industrial agencies and firms. His broad knowledge in the Communications field and his excellent delivery make him not only an educational but an entertaining speaker as well.

Both dinner and meeting will be held at the Kozy Grotto in Mountain View which is located at 210 Hope St. opposite the Post Office. The dinner, starting at 6:00 PM, is optional but for this meeting is just $4.50 each, including tax and tip for either roast beef or a sea food plate. Reservations are not required but would be appreciated by the Kozy Grotto (961-3500).

The meeting is scheduled for 8:00 PM.

Integrated Circuits for Military Use

Military specification MIL-M-38510 has been prepared by the services as a general spec covering integrated circuits. It is similar to the old transistor spec MIL-S-19500 but in addition picks up screening and special test requirements for selecting higher reliability parts. These details will affect both supplier and user.

C. R. Gray, Director of Reliability and Quality Assurance for integrated circuits at Fairchild Semiconductor will speak on Integrated Circuits Screening Tests and Implications of MIL-M-38510 at the Reliability Group's April meeting.

The talk is scheduled for April 9, 8:00 PM, at the Brave Bull, Town & Country Shopping Center, Mathilda at Central Expressway, Sunnyvale. Premeeting dinner at $4.60 is optional and begins at 7:00 PM. If you plan to attend either, reserve by April 8. Call Gil Bowers (962-4111) or Lew Finch (743-1577).

The Skynet Mechanically–Despun Communications Antenna

On November 21, 1969, the Skynet Defense Communications Satellite was launched into a 24-hour equatorial orbit and will be kept in that position for a period of five years. This spin-stabilized satellite is now providing a communications link among Commonwealth countries throughout the world. Mr. Walt Gregorwich of Philco-Ford Western Development Laboratories will describe the electrical and mechanical characteristics of the Skynet's High Gain Mechanically-Despun Communications Antenna at the Wednesday, April 15, 1970, Antennas and Propagation meeting.

Walt Gregorwich

Walter S. Gregorwich was born in New York, N.Y., on February 21, 1938. He received his BSEE and MS degree in electrophysics in 1964 and 1969, respectively, from the Polytechnic Institute of Brooklyn, Brooklyn, New York. From 1964 to 1968 he was with Airborne Instruments Laboratory, where he carried out research and development on advanced radar antenna systems. Since 1968 he has designed satellite antennas for the Space Vehicle Antenna Section of Philco-Ford's Western Development Laboratories. He is currently the project engineer responsible for the antennas on the Skynet I and II satellites.

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

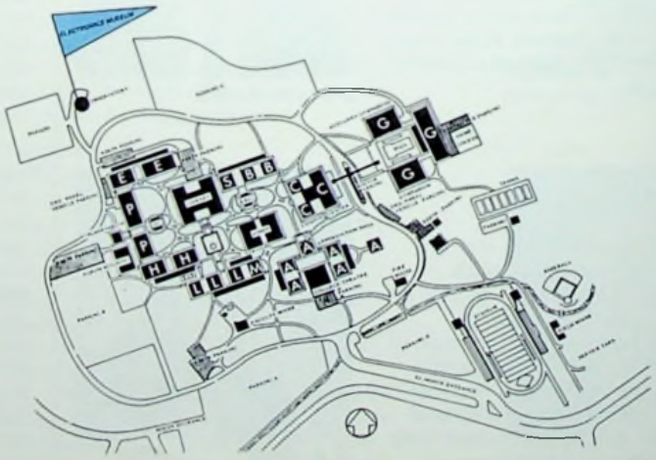
Foothill Electronics Museum Tour

C. L. Thacker, Chairman, announces that the Education Chapter will have its Spring Meeting at the Foothill Electronics Museum of the Perham Foundation, Foothill College, on Saturday, April 25 at 10:00 AM.

The program will be two-fold, with a tour of the Museum and the Science Center and a presentation by Mr. Paul D. Fry, who will speak on "Picturephone." Mr. Fry is District Plant Manager for the Pacific Telephone Company, and was responsible for the success of the new voice-operated Picturephone system demonstrated at the recent National Industrial Conference Board Meeting in San Francisco. Previously, Mr. Fry spoke before the Golden Gate Subsection on this subject, and because of its timeliness, Chairman Thacker stated many educators wanted a similar talk.

To reach the Foothill College campus from the Bayshore Freeway, take the San Antonio Road off-ramp. From San Antonio Road, turn left onto the Foothill Expressway for ¼ mile. Turn right onto El Monte Road and continue to the campus.

Coffee and refreshments will be served before the meeting.



Design of Instrumentation–Grade Monolithic Operational Amplifiers

Monolithic integrated circuit technology has now evolved to the point where it can compete successfully with discrete chopper-stabilized designs in instrumentation applications. The design and application of such an IC operational amplifier will be presented at the April 22nd Circuit Theory Chapter meeting by George Erdi and Jerry Collings of Precision Monolithics, Inc., of Santa Clara.

The necessity of open-loop gains exceeding one million will be demonstrated. Circuit and lay-out techniques allowing the realization of this gain on a monolithic chip will be presented. Additional benefits from such a design are the superior performances of all matching-dependent parameters, such as input offset voltage (V_{OS}) and current, common-mode and power supply rejection.

An optimum V_{OS} nulling network required to minimize V_{OS} drift with temperature will be given.

Because of the excellent input and drift characteristics of this type of amplifier, a variety of useful instrumentation amplifier circuits is available to the designer. Strengths and weaknesses of several circuits will be discussed. To be presented is an analysis of errors due to input characteristics, impedance level, common mode rejection, resistor matching, gain, and source impedance. Comparisons with other methods and devices available will be given.

George Erdi

Originally from Budapest, Hungary, Mr. Erdi's undergraduate education was completed in Canada. He attended McGill University, graduating with distinction in 1965. In 1966 he obtained an MSEE degree from the University of California, Berkeley. Mr. Erdi is now Microcircuit Designer and Project Manager with Precision Monolithics. Previously he was at Fairchild Semiconductor Research and Development Laboratories, where he designed the recently--released μA725 high performance instrumentation operational amplifier, and was co-designer of the μA722 10-bit D/A current source, the largest commercial linear integrated circuit.

Jerry Collings

Mr. Jerry M. Collings received his BSEE in 1956 and MSEE in 1958 from the University of California, Berkeley. He joined Systron Donner Corporation in 1956 and for the following year designed analog computer and flight control systems. He also supervised the analog computer design group there. In 1962, along with three other businessmen, he founded Zeltex, Inc., an operational amplifier and analog module manufacturer. In January of 1970 he joined Precision Monolithics, Inc., as Manager of Product Planning & Applications.

IGA Features Schwedes on Large Electric Drives

In all industries machine drive requirements are increasing by leaps and bounds. In mineral ore concentrating the increases are exemplified in proposals for larger and larger grinding mills. Is there a limit in size and if so what factor sets that limit? Is it the electric drive? The Industry & General Applications Chapter invites members and non-members to enjoy a social evening and be presented with the latest information on an interesting subject.

Mr. Walter H. Schwedes, General Electric Company, Schenectady, New York, will discuss several alternate solutions to the problems brought about by the need for larger electric drives. Schwedes is a graduate of the University of Minnesota and has studied at M.I.T. and Union College, Schenectady. His early experience was as an electrician in both open pit and underground mines while in college. He joined General Electric in 1939, advancing from design engineer and application engineer through supervising engineer and is now Manager, Mining Industry Engineering, General Electric Company, Schenectady. He is also a graduate of General Electric's Modern Engineering Course. Mr. Schwedes is a member of both IEEE and AIME.

Meeting and dinner location is the Engineers Club of San Francisco, 160 Sansome St. No-host cocktails at 6:30 PM, dinner at 7:00 PM ($5.00 includes tax and tip). Reservations by April 8. Call H. B. Thysell, 557-2025.

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IEEE 1970 ANNUAL MEETING

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DINNER AT 8:00 PM
DANCING FROM 9:00 PM to 1:00 AM

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Building a 765kv System

Unusual problems encountered in construction of American Electric Power's 765-kv transmission system will be discussed at the Power Group meeting April 14.

The first 68-mile leg of the five-state 1250-mile system was energized last spring for tests and demonstration purposes.

Howard C. Barnes

Howard C. Barnes, Assistant Vice President-Engineering for American Electric Power Service Corp., will first present a new sound film "Interstate 765 kv" which introduces the subject and characteristics of the area.

The meeting will begin at 7:30 p.m. in the Engineers' Club of San Francisco, 160 Sansome St. Dinner will be served at 6:30, preceded by a social hour. Phone 421-3184 to make dinner reservations.

EMC Presents Symposium Winner

Horacio A. Mendez of IBM will present a paper on "Meaningful EMC Measurements in Shielded Enclosures" at the April 20 meeting of the Electromagnetic Compatibility Group. At the 1969 International Electromagnetic Compatibility Symposium this paper received the award for the best paper presented from the United States.

The paper develops the theory of electromagnetic field-strength measurements in shielded enclosures. At frequencies below cutoff, theoretical expressions for the field distribution are derived using eigenvector expansions of the fields. At higher frequencies, the relation between field-strength values and power radiated by the source is obtained. Measurement procedures are then proposed for the different frequency ranges, including the use of field perturbation and spatial averaging at the higher frequencies. The results of using these methods are correlated with open-field measurements, showing good agreement.

Horacio A. Mendez

Mr. Mendez is a member of the EMC staff at IBM, San Jose. He has published several papers in his specialty areas of electromagnetic theory and theory of solids. Originally from Argentina, Mr. Mendez received his basic engineering education at the Argentine Navy Post Graduate School. He received his MSEE in 1964 from California Institute of Technology and an Engineer degree from Stanford in 1969.

The meeting will be held at 8:00 at the Santa Clara Hewlett-Packard Auditorium. Dinner before the meeting will be at the Custom House. See calendar.

Character Recognition Research Processor

A sizable fraction of information processing cost in some computing environments is the cost of converting programs and data to a machine readable form. For example, on a typical university campus thousands of student-originated programs are run per month. A handprinted document processor in such an environment would be of considerable value.

A small research character recognition processor employing a number of novel system concepts has been designed and constructed. This processor has been designed to serve as a research instrument for investigating algorithms for the recognition of handprinted characters (or other array patterns). Dr. Zingg, speaker at the April 28th Computer Chapter meeting will discuss the above system, the rationale for system design decisions, and some preliminary results of this system as used with a special document reader.

Dr. Roy Zingg

Dr. Roy J. Zingg is an Iowa native, and holds the BS, MS and PhD degrees in electrical engineering from Iowa State University. He has been on the staff of the Department of Electrical Engineering at Iowa State University since 1958. Presently he is an Associate Professor of Electrical Engineering and Computer Science. His present research interests are in the areas of computer memories and system organization. Dr. Zingg is a member of Tau Beta Pi, Eta Kappa Nu, Sigma Xi, and the IEEE.

The meeting, scheduled for April 28, will begin at 8:00 PM in Skilling Auditorium (next to McCullough Bldg.), Stanford. The dinner preceding at 6:15 PM will be at Rick's Swiss Chalet. For reservations, contact Mary McGlone, 321-3300, ext. 270, by April 23.

NEW MEMBERS

The Section welcomes these new members:

C. B. Ablett	R. B. Lewis
J. D. Berman	G. J. Maleski
A. M. Bigliardi 3rd	M. F. Merriam
A. M. Byrne	G. F. Miller
B. A. Coddington	R. A. Paz
H. D. Crosby	C. K. Radnoty
M. W. Dowley	R. M. Rhodes
J. M. Fesler	H. Roennmann
J. M. Fleischer	A. P. Sahasrabudhe
R. N. Forrest	F. W. Smith
W. D. Fountain	R. W. Smith
J. J. Gould	A. G. Stanford
R. H. Hayes	R. H. Stockwell
C. B. Hitz	O. Z. Thogersen
R. S. Johnson	G. B. Weathersby
J. J. King	T. J. Yung
W. N. Lee	

The Changing Role of Electron Beams in Electron Devices

As solid state devices take over the information handling, amplification, and signal processing functions previously handled by electron tubes, many predicted the death of electron beams. Now, we find that electron beams are re-emerging in new roles.

Some of these new uses for electron beams, directly related to solid-state devices, such as microscopy, fabrication and analysis of materials, will be discussed. A short film on the migration of metal in integrated circuit leads, taken with a transmission electron microscope, will be shown. In addition, some

Thomas Everhart

new uses of electron beams in electron devices will be presented. It is expected that these techniques will result in both smaller and improved electron and solid-state devices in the 1970's.

Professor Thomas E. Everhart will speak on this engrossing topic at the April 23 meeting of the Electron Devices Chapter. He received the BS degree from Harvard University, the MS degree from the University of California at Los Angeles and the PhD degree from Cambridge University, Cambridge, England. He was engaged in traveling-wave tube work at the Hughes Research Laboratories from 1953 to 1955 and performed work on scanning electron microscopy at Cambridge University from 1955 until 1958 when he joined the faculty at the University of California at Berkeley.

The 1962/63 academic year was spent on the use of scanning electron beam techniques in the evaluation of semiconductor integrated circuits at the Westinghouse Research Laboratory, Pittsburgh, Pa. During the 1966/67 academic year, Professor Everhart was Guest Professor at the Institute for Applied Physics, University of Tubingen, West Germany, as a National Science Foundation Senior Post Doctoral Fellow. He is presently Professor of Electrical Engineering and Computer Sciences at University of California, Berkeley.

Dr. Everhart is a member of Phi Beta Kappa, Sigma Xi, and Eta Kappa Nu.

Analysis of Pictures of Polyhedra

To every 3-dimensional scene there corresponds an infinite variety of 2-dimensional pictures. It is, however, possible to construct pictures for which there is no corresponding scene. The study of such "impossible pictures" gives insight into the grammatical rules which are associated with an appropriate picture language. The advantage of having a clear and precise understanding of these grammatical rules is analogous to having an understanding of the grammatical rules of any language. For instance, if parts of a picture of a scene are missing or partially obscured, it might be possible to reconstruct them if one knows what redundancies and ambiguities are possible in the language.

Pictures of scenes which contain only plane-bounded solid objects (that is, assortments of polyhedra) are especially attractive for purposes of logical analysis. The speaker at the April 16 meeting of the Information Theory Chapter will explore the language of pictures of such scenes and the decision rules by which it is possible to tell whether or not these pictures are "grammatical."

The speaker is David A. Huffman, presently Chairman of the Board of Studies in Information and Computer Sciences, and the Board of Studies in Linguistics at the University of California at Santa Cruz.

He is a Fellow of IEEE, a member of the Association for Computing Machinery, Sigma Xi and Tau Beta Pi. In 1965 he received a Distinguished Alumnus Award from Ohio State University.

Professor Huffman's Sc.D. thesis, "The Synthesis of Sequential Switching Circuits," was awarded the Louis E. Levy Medal of the Franklin Institute (1955). A more recent paper, "The Generation of Impulse-Equivalent Pulse Trains," was given an award as the Best Paper of the Year (1962) by the Professional-Technical Group on Information Theory of the IEEE. A technique, now known as Huffman Coding, was the subject of an early paper, "A Method for The Construction of Minimum Redundancy Coding."

The meeting location is SRI, Building 1, Conference Room B at 8:30 PM. Dinner time is 6:15 PM at Ming's of Palo Alto. Reservations. See Calendar.

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Microelectronics Course

Continued high interest in the Microeelectronics Engineering course sponsored by the Parts, Materials, and Packaging Chapter has resulted in the organizing of a second series of six sessions to begin in late April. The sessions will be held each Tuesday evening at 7:30 PM starting April 21st and continuing for six weeks through May 26th. Classes will be held at Varian Associates Research Lecture Hall (Bldg. 7), 611 Hansen Way, Palo Alto. There will be a registration fee of $10.00 per person.

The course is designed for career engineers and engineering managers who are using or thinking of using microelectronic components in systems applications and want to know more about the fabrication of integrated circuits. Emphasis will be placed on an understanding of the limitations imposed by the fabrication processes upon the performance and reliability of microelectronic components.

The course director will be Dr. William Cox, Director of Applications Laboratory of Hugle Industries in Sunnyvale. Dr. Cox was previously associated with Lockheed's Palo Alto Research Laboratory and the Lockheed Microelectronics center. He was earlier Manager of Applied Research for Raytheon's Semiconductor Division.

SESSON I – The semiconductor device fabrication procedures used in the production of bipolar integrated circuits will be reviewed. Processes to be covered include epitaxy, oxidation, diffusion, photolithography and metalization. The significance of process control to yield, cost, performance and reliability will be stressed.

SESSION 2 – Metal-Oxide-Semiconductor (MOS) technology will be the subject of the second session. The specialized processes designed to minimize ionic contaminants during wafer fabrication will be reviewed. MOS device performance and reliability will be compared to that of bipolar devices. Finally, the impact of Large Scale Integration (LSI) based on MOS technology upon the complexity and cost of systems will be discussed.

SESSION 3 – The third evening will be devoted to a discussion of thin film hybrid circuit fabrication. The selection of substrates and the use of high vacuum techniques to form resistor and conductor patterns will be reviewed as well as resistor trimming techniques. The advantages and disadvantages of thin film hybrids in comparison to monolithic circuits will be brought out.

SESSION 4 – Thick film hybrid circuits will be the topic of the fourth session. The flexibility and reliability of this approach to integrated circuit manufacture will be discussed. The types of inks used for thick film hybrid circuits and the screening and firing processes developed for resistor, capacitor, and conductor fabrication will be reviewed. Applicable resistor trimming techniques will be described.

SESSION 5 – The assembly and packaging techniques that are largely common to bipolar, MOS, and hybrid circuit manufacture will be reviewed. Die attach procedures will be compared as well as such alternative wire bonding techniques as thermocompression, ultrasonic, beam lead, and flip chip. The economic and reliability aspects of the various assembly and packaging approaches will be reviewed.

SESSION 6 – The last session will be devoted to reviewing the reliability problems inherent in today's microelectronic components. Incoming inspection procedures and screening procedures that can be used to weed out potentially defective microelectronic devices before they are incorporated into an electronic system will be described. Also, the lessons to be learned from failure analysis and failure mechanism studies will be discussed.

Several of the sessions will be presented by guest lecturers having special expertise in the particular topic under consideration. The "Microelectronics" text by Max Fogel and published by Research and Education Association, New York City, is desired but not required for the course. The book is $15.75 and may be ordered through the PMP Chapter.

The course will be limited to a maximum of 70 people so register early.

ADVANCE REGISTRATION FORM
Six Sessions Microelectronics Course

To: Ed Hilton, Sec'y/Treas., PMP Microelectronics Course, c/o Hewlett-Packard Co., 5301 Stevens Creek Blvd., Santa Clara, Calif. 95050
Please register me in the six-session microelectronics course starting April 21st at Varian Associates. Enclosed is my check for $.....

☐ Course registration $10.00 — Please make checks out to PMP Chapter of IEEE.
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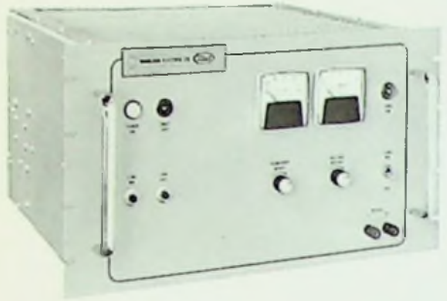

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	Freq. (Nom.)	400 or 60			
	Voltage Adjustment Range	±10%			
	Freq. Adjustment Range	±5%			
	Voltage Regulation	±0.5%			
	Freq. Stability	±0.25%			
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