

EDITOR'S PROFILE of this issue

from a historical perspective ...

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

March, 1970:

Cover: As we enter the 70's decade, the cover shows the theme design for the IEEE International Convention, being held in NYC. More on pages 6-7.

Page 8: Arthur Schawlow of Stanford talks about current work in lasers. I remember, in my physics class at Stanford, when Prof. Schawlow had our lecturer hold up a clear balloon inside of which was an inflated black balloon. Schawlow fired his invisible laser and popped the black one without damage to the outer clear one. Good demonstration!



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

https://ethw.org/IEEE_San_Francisco_Bay_Area_Council_History

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

April, 2025

Contact p.wesling@ieee.org

Grid

MARCH 1970



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

LAUNCHING
THE
SPECTACULAR

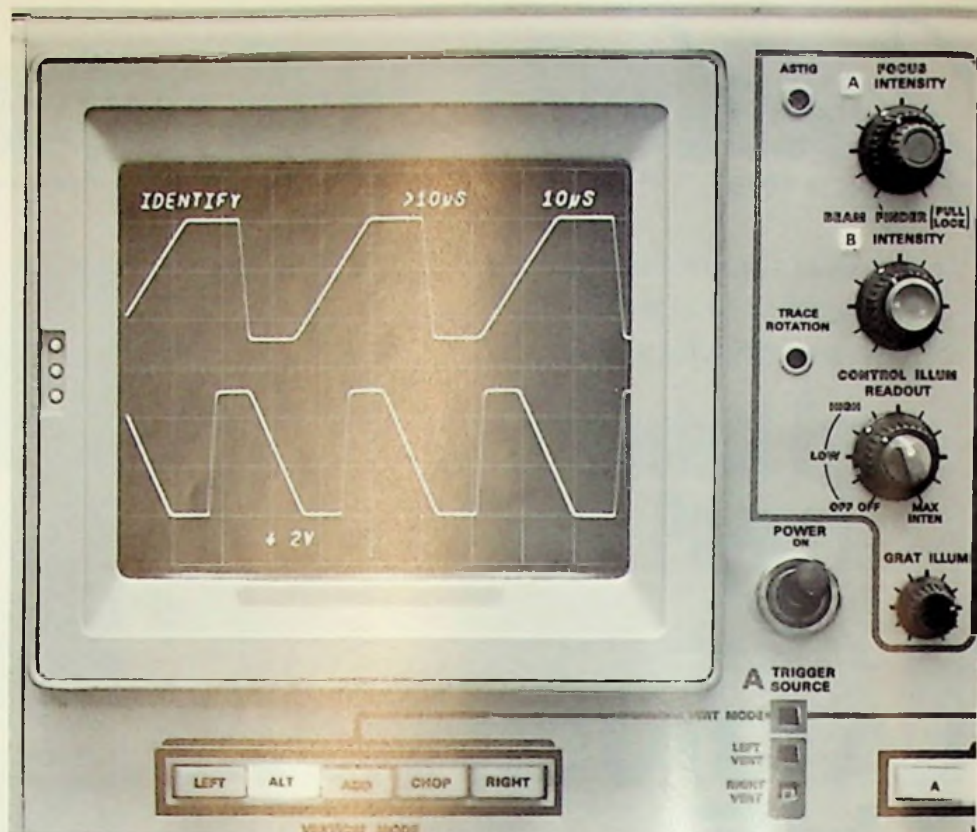
70'S



IN
ELECTRICAL AND
ELECTRONICS
ENGINEERING



Auto Scale- Factor Readout



means faster measurements with fewer errors

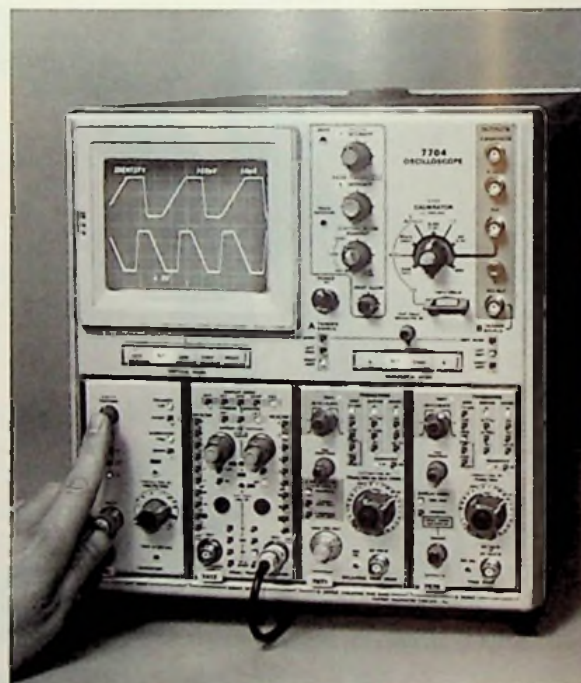
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7B70	Time-Base Plug-In	\$ 600
Note: 7504 DC - 90 MHz Four Plug-In Oscilloscope with Auto Scale-Factor Readout		\$2000

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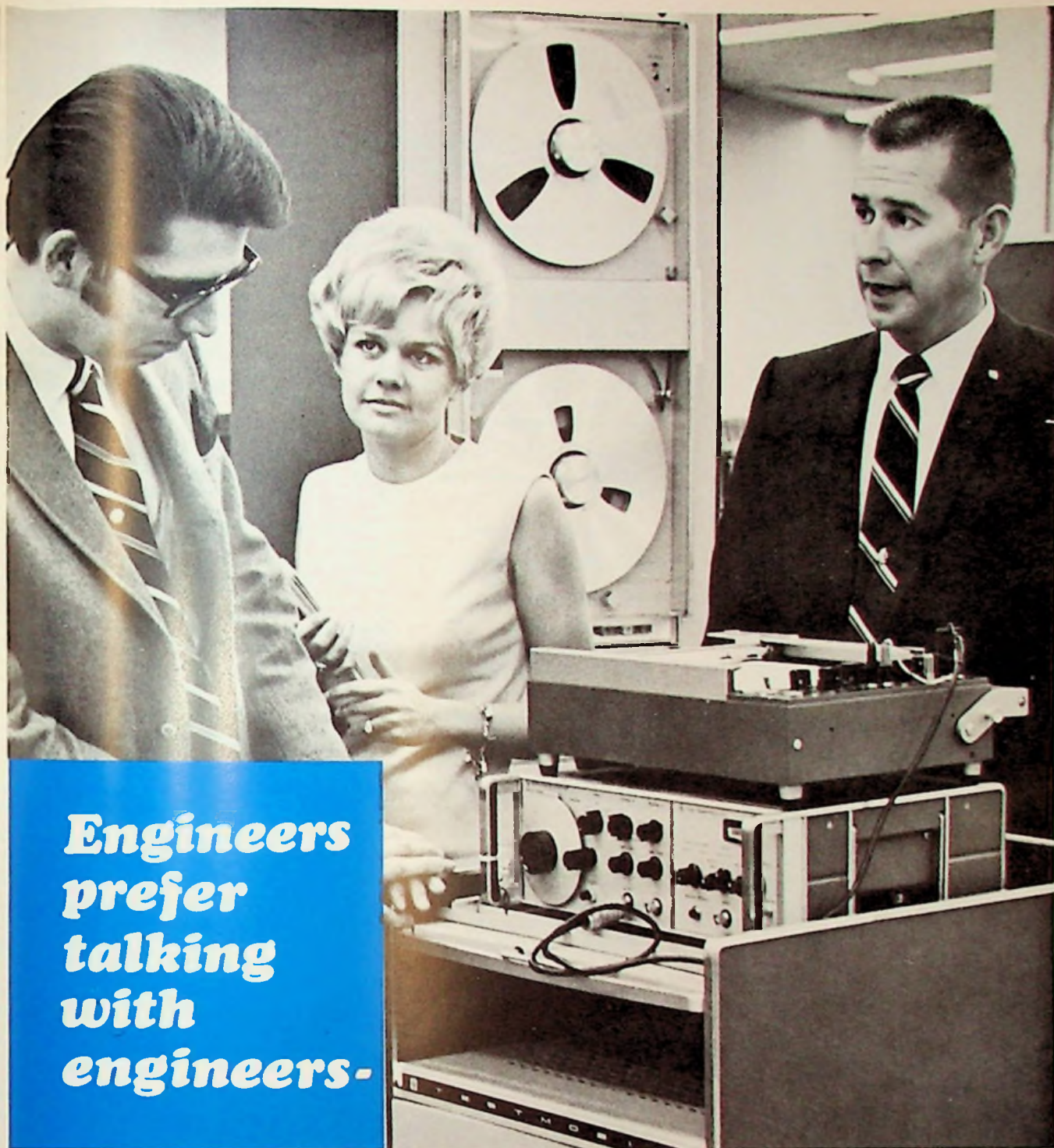
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Grid
MARCH 1970

LAUNCHING
THE
SPECTACULAR

70th
IN
ELECTRICAL AND
ELECTRONICS
ENGINEERING

ON THE COVER

This month's cover features the theme design of the 1970 International Convention of IEEE. Also shown is the New York Coliseum, where the exhibits and a series of Technical Applications Sessions will be held March 23-26. Story on page 6. O'Neal Advertising artist Nanci Chin designed the cover.

Grid
MARCH 1970

volume 16
number 7

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meeting

**AEROSPACE &
ELECTRONIC
SYSTEMS**
MAR. 19

Story on
page 12

TOUR OF TELEVISION STATION KPIX. Donald Lincoln, Assistant Chief Engineer, TV station KPIX. Tour limited to 20 people. An additional tour will be established if required.

MAR. 19, Thursday, 7:00 PM, Station KPIX, corner Van Ness and Greenwich, San Francisco. No dinner. Reservations for tour: R. Winslow or Pat Hoppe, 326-4350, ext. 6143.

**ANTENNAS &
PROPAGATION**
MAR. 18

Story on
page 10

ANECHOIC CHAMBERS AND CHAMBER MEASUREMENT TECHNIQUES. William H. Emerson, Project Mgr., B. F. Goodrich Sponge Prod. Div., Shelton, Conn. and Fred P. Brownell, Manager, Microwave Lab, B. F. Goodrich.

MAR. 18, Wednesday, 8:00 PM, Philco-Ford Bldg. 56 Auditorium, 3825 Fabian Way, Palo Alto. Cocktails: 5:30 PM and dinner: 6:15 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. No reservations required.

**CIRCUIT
THEORY**
MAR. 18

Story on
page 12

THIRD MEETING IN A SERIES ON COMPUTER-AIDED CIRCUIT DESIGN. BIAS-3 - A nonlinear DC Transistor Circuit Analysis Program, William J. McCalla, UC Berkeley; **Automated Design of Monolithic Broadband DC Amplifiers,** Bruce A. Wooley, UC Berkeley.

MAR. 18, Wednesday, 8:00 PM, 134 McCullough Hall, Stanford University. Dinner: 6:00 PM, Red Cottage, 1706 El Camino, Menlo Park. Reservations: Section office, 327-6622 by noon, Mar. 18th.

**COMMUNICATION
TECHNOLOGY/AUDIO &
ELECTROACOUSTICS**
MAR. 18

Story on
page 5

COMMUNICATIONS ASPECTS OF AIR TRAFFIC CONTROL. JOINT MEETING. Lee Y. Wong, a Project Engineer with the FAA.

MAR. 18, Wednesday, 8:00 PM, Oakland International Airport Tower Lounge. Dinner: 6:30 PM, Savarin Restaurant, Oakland International Airport. Reservations: Robert Howland (408) 291-4039 or Don Kidder (415) 591-8461, ext. 303 by Mar. 16th.

COMPUTER
MAR. 24

Story on
page 9

MULTI-PROCESSORS: A NEW LANGUAGE AND ORGANIZATION. Donald D. Chamberlain, Stanford University.

MAR. 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 Mar. 23rd.

**EAST BAY
SUBSECTION**
MAR. 23

THE GREAT QUARK HUNT. Dr. Arnold F. Clark, Lawrence Radiation Laboratory, Livermore. (This meeting, scheduled for Feb. 23, was cancelled and will be held Mar. 23 instead. See February GRID for details.)

MAR. 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 Mar. 20th.

**ELECTRON
DEVICES**
MAR. 19

Story on
page 8

SOME EXPERIMENTS AND TECHNIQUES WITH LASERS. Prof. Arthur L. Schawlow, Chairman, Dept. of Physics, Stanford University.

MAR. 19, 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 by Mar. 18th.

**ENGINEERING
MANAGEMENT**
MAR. 11

Story on
page 16

THE VIEW ACROSS THE ENGINEERING GENERATION GAP. A forum led by Dr. W. R. Kincheloe, Stanford University, with engineering students from Bay Area colleges and universities and the audience as participants.

MAR. 11, Wednesday, 8:00 PM, Kozy Grotto, 210 Hope St., Mountain View. Dinner: 6:30 PM. No reservations required.

GOLDEN GATE SUBSECTION/EAST BAY SUBSECTION/SANTA CLARA VALLEY SUBSECTION/SAN FRANCISCO SECT.
MAR. 16

Story on
page 13

ANNUAL PIONEERS' NIGHT. A panel of "oldtimer" utility engineers. Moderator: C. W. "Brodie" Leith, Engineering Editor of Electrical West. Charles A. Powell and Almon Copley from Westinghouse; Joseph Thompson from Federal Pacific Electric; Art Scott, Bunny Dexter and Clyde Baugh from PG&E and Donald I. Cone from PTT.

MAR. 16, Monday, 8:00 PM, Engineers Club of SF, 160 Sansome St., San Francisco. Cocktails: 6:30 PM; dinner: 7:00 PM. Reservations: Artwel Electric 467-1880 by Mar. 12th.

calendar

INDUSTRY & GENERAL APPLICATIONS MAR. 12

Story on
page 9

MILESTONES TO THE COMPLETION OF BART. John V. Andrews, Senior Engineer, Bay Area Rapid Transit District.

MAR. 12, Thursday, 8:15 PM, Great Eastern Restaurant, 649 Jackson St., Chinatown, San Francisco. No-host cocktails: 6:30 PM; dinner: 7:30 PM. \$5.00 incl. tax & tip. Reservations: H. B. Thyself, 557-2025 by Mar. 9th.

INFORMATION THEORY MAR. 19

Story on
page 13

INFORMATION RATES OF AUTO-REGRESSIVE SOURCES. Prof. Robert M. Gray, EE Dept., Stanford University.

MAR. 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., E. Palo Alto. Reservations: Mrs. Toshi Turukawa, 326-4350, ext. 6162 by Mar. 18th.

MAGNETICS MAR. 10

Story on
page 4

THE FUTURE OF FERRITE MEMORIES. Richard J. Bravo, Director, Marketing — Systems Products, Electronic Memories.

MAR. 10, Tuesday, 8:00 PM, Conference Room B, Stanford Research Institute, 333 Ravenswood Ave., Menlo Park. No dinner.

PARTS, MATERIALS & PACKAGING MAR. 3 and 10

Story on
page 10

MICROELECTRONICS ENGINEERING COURSE — 5th and 6th sessions. Course Director: Dr. Don McWilliams, Director of Research at California State College.

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

POWER MAR. 10

Story on
page 11

FIELD TRIP TO LAWRENCE RADIATION LABORATORY AT UNIVERSITY OF CALIFORNIA. A short talk in the auditorium will precede the visits to the various areas.

MAR. 10, Tuesday, 7:30 PM, Lawrence Radiation Lab, UC, Berkeley. Take East Shore Freeway to University Ave. turnoff and take it east to the end. Turn north one block to Hearst Ave. then go right uphill to the laboratory's cafeteria parking lot. Dinner: 6:30 PM in the Laboratory cafeteria at \$4.40 ea. Dinner reservations: Paul Breitenbach, 843-2740, ext. 5261 or Elmo Huston, 434-0260 by Mar. 6th.

RELIABILITY MAR. 12

Story on
page 16

THE INDEPENDENT PARTS TESTING LABORATORY'S ROLE IN MILITARY AND COMMERCIAL INDUSTRY. Robert J. MacDonald, Qualification Program Coordinator, DCA Reliability Laboratory.

MAR. 12, Thursday, 8:00 PM, PH 104, Stanford University. Cocktails: 6:00 PM, dinner 6:30 PM, Stanford View Restaurant, Palo Alto. Reservations: Gil Bowers, 962-4111 or Lew Finch, 743-1577 by Mar. 11th.

SANTA CLARA VALLEY SUBSECTION/USNPGS STUDENT BRANCH APR. 11

Story on
page 8

SPRING AFTERNOON IN MONTEREY — Annual joint meeting with U.S. Naval Postgraduate School Student Branch.

APR. 11, Saturday afternoon. Luncheon at Officer's 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.

SYSTEMS SCIENCE & CYBERNETICS MAR. 26

Story on
page 15

DESIGN OF A MEDICAL INFORMATION SYSTEM. Gordon T. Uber and his associates at Lockheed Medical Systems Development organization. Demonstration of the data content and user interaction using on-line terminals.

MAR. 26, Thursday, 8:00 PM, Lockheed Bldg. 534, 590 E. Middlefield Rd. (at Logue Ave. one block east of Ellis St.) Cocktails: 6:00 PM; dinner: 6:30 PM, The Bold Knight, 4469 No. Mathilda, Sunnyvale. Reservations for tour and dinner: Maureen Silva, 7742-9840 by March 25th.

VEHICULAR TECHNOLOGY MAR. 16

Story on
page 10

TRANSMITTER COMBINERS, A SYSTEM OF FERRITE CIRCULATORS & HYBRID COUPLERS. John Hall, Mgr. Components Applications Engineering, SCM Melabs, Inc.

MAR. 16, Monday, 8:00 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Cocktails: 6:00 PM; dinner: 7:00 PM. Reservations: W. H. Nye, 328-1200 or Al Isberg, 433-3800 by Mar. 13th.



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The Chairman's Message

'Membership'



John B. Damonte

March is the month that many people used to take inventory. Business firms are concerned with property tax calculation while individuals like you and me worry about income taxes.

It's a good idea to "take stock" once a year to see what we've accomplished and to plan what we hope to achieve.

One measure of our professional achievements is our interface with the IEEE.

- Have we attended and participated in technical meetings, conferences or symposia?

- Have we written or presented a technical paper?

- Have we kept up to date by reading the Spectrum, the Proceedings, the Transactions and other pertinent publications?

- Have we served on committees or as officers of the various IEEE Organizations in an effort to promote the welfare of electrical and electronics engineering?

- Have we advanced in technical experience and professional maturity, as evidenced by advancing our grade of membership?

Each of these points is an important one. If we haven't done very well during the past years, let's resolve right now to do better this year!

An easy place to start is to examine your membership status with IEEE. What is your grade of membership?

If you have a BS in EE from a school

of recognized standing or have regularly been employed in the fields of electrical or electronics engineering for a period of six years, you probably qualify as a Member.

If you are an engineer, scientist, educator or technical executive with ten years of experience in the fields of electrical or electronics engineering, five years of which are distinguished by:

- publication of important technical papers,

- direction of significant technical work,

- contributions of original designs and inventions,

- establishment of scientific or engineering courses in a school of recognized standing, or

- contributions in allied areas such as patent law, technical editing, etc., which serve to advance the engineering profession, you may qualify as a Senior Member. Holding this grade enhances your prospects for serving on important headquarters committees and being elected to the grade of Fellow.

How does one transfer to a higher grade of membership? Simply fill out an application form available from the Section office (327-6622) and mail it to IEEE headquarters in New York.

The dues for Associate Member, Member and Senior Member are the same, \$25.00 per annum.

Upgrading your IEEE membership is a simple but positive step that you can take toward professional advancement in 1970! Do it now before you forget!

John B. Damonte

Chairman

San Francisco Section

Future of Ferrite Memories

The Magnetics Chapter will present a talk by Richard J. Bravo on the "Future of Ferrite Memories." The meeting will be held in conference room B at SRI. Mr. Bravo will stress the impact of semiconductor memories on ferrite systems. It is predicted that ferrite memories in the 50,000 bit size class will be replaced by late 1971.

Ferrite systems in the 500,000 bit class may eventually succumb to semiconductor implementation, but this is not likely to happen sooner than early 1973. One million bit core memories will not be significantly affected by semiconductor devices before mid-1974. The replacement of these core memories will be primarily for cost reasons although speed will have some bearing also. Semiconductors will have relatively little impact on core systems larger than one million bits through 1975.

New core memory designs appearing through 1975 will be aimed at providing larger capacities at lower costs. 100-million bit, 1.5 to 3.0 microsecond systems selling for 0.6 to 0.8 cents per bit will probably appear before mid-1971. 200-million bit buffered "backing" storage systems with average access times of 300 nanoseconds should appear by mid-1974. 100-million bit core memory replacements for disc/drum storage, selling for about 0.2 cents per bit can appear by mid-1975. Faster core memories (2.5D, 225 to 275 nanoseconds and 2D, 100 to 150 nanoseconds) may also be offered before the end of 1974.

Mr. Bravo is Director of Marketing Systems Products, at Electronic Memories, a division of Electronic Memories & Magnetics Corporation. He directs all marketing activities associated with memory system products, including product planning and program management. Prior to joining Electronic Memories, he was first Engineering Manager and then Product Manager, Core Products, at Ampex Corporation's Computer Products Division, where he was responsible for managing the core, core stack and core memory system product lines.

Earlier, he served as Research and Development Section Manager at the Electrada Corporation and was instrumental in the development of a large cathode ray storage tube display system, and of techniques for the chemical deposition of magnetic alloys onto disc, drum and tape surfaces.

Smyth Communication Engineer at Lynch

J. P. S. Smyth has been appointed Communication Engineer, Major Accounts, for Lynch Communication Systems. In this capacity he will be calling on Bell System companies to assist them in the field engineering and application of Lynch equipment.

Smyth has over twenty years experience in the telecommunications industry. He began his career with Southern Bell and over a period of seventeen years held the positions of Special Services Design Engineer, Coordinator of Special Communication Designs and Planning Engineer.

Smyth is a member of IEEE, the Na-

J. P. S. Smyth



tional Society of Professional Engineers, the Florida Engineering Society and holds a Florida Professional Engineering License.

Communications Aspects of Air Traffic Control

Lee Y. Wong, a Project Engineer with the FAA, will discuss the "Communications Aspects of Air Traffic Control" at the joint meeting of the Communication Technology and the Audio and Electro-acoustics Chapters on March 18, at 8 P.M. He will discuss Antenna Systems, transmitters and receivers, remote control systems, interphone systems, voice recorder systems and data handling systems.

The presentation will include a brief film in color entitled "A Traveler Meets Air Traffic Control." The film depicts the departure, en route, and arrival of air traffic control services provided to an air carrier during its flight.

After a discussion period, a tour will be conducted through the Bay Terminal Radar Approach Control facility located at the Oakland International Airport. During the discussion period the present problems of the present FAA Communications system will be covered. This will include frequency congestion and interference and the disadvantages of electrical-mechanical control systems. The future in FAA systems will also be discussed. This will include solid-state systems for control towers and satellite communications systems. The Oakland International Airport Tower Lounge will house the meeting at 8 PM. Dinner is scheduled at 6:30 at the Savarin Restaurant located in the airport complex. See calendar.



Lee Y. Wong

Mr. Wong has been with the FAA since receiving a BSEE degree from Texas Tech in June, 1960. He has served with the FAA in Texas, Oklahoma, Colorado, Nevada and California. He has been with the FAA in the San Francisco Bay Area since August, 1964. Mr. Wong has served with the FAA as crew member, crew chief, design engineer, and project engineer in the establishment and maintenance of various FAA air/ground communication, radar and microwave systems. His primary responsibilities over the past five years have been in the area of air/ground communications and data handling systems.

"Telemetry in Transition" at



"Telemetry in Transition" will be on display in Los Angeles April 27-30, when the 1970 National Telemetry Conference presents 14 technical sessions, a half-dozen "live" scientific demonstrations and an advanced equipment expo.

All sessions and exhibits will be held in the Los Angeles Hilton Hotel. Ray Sanders (Computer Transmission Corp.) is general chairman.

Two pioneers in modern technological management, Dr. George Mueller and Gen. Bernard A. Schriever (Ret.), will deliver major addresses, and a special showing of lunar rock and Surveyor III accessories, returned to Earth by Apollo 12, will be presented by NASA/JPL.

TWO SESSIONS

Two invited-lecture sessions will make up a first-day seminar on Monday, April 27. The first covers "Signal Processing," and the second is on "Real-Time Public Systems Telemetry."

Dr. Mueller, longtime NASA administrator of the manned spaceflight program, will keynote a special general session on Tuesday morning, and General Schriever will discuss applications of aerospace technology to civil problem-solving in the principal address at Wednesday's NTC Awards Luncheon.

DYNAMIC EXHIBITS

A series of "dynamic exhibits" will be operating on the exhibit floor, featuring a variety of "live" and simulated projects. Included are instrumented-animal demonstrations, an out-patient telemetry system, actual management of the Pioneer spacecraft from the exhibit floor, and signals from the North Pacific Buoy Experiment.

Advance registration for all conference sessions is \$19 for IEEE members and \$22 for non-members, and includes a copy of the full conference proceedings. After April 1, these fees become \$21 and \$24, respectively. A special exhibits-only registration, good for all three days of the equipment show, is available at \$2 at the door. Advance registration requests should be addressed to NTC/70 c/o IEEE, 3600 Wilshire Boulevard, Los Angeles 90005, (213) 387-1203.

NTC/70 is sponsored jointly by the IEEE Groups on Aerospace and Electronic Systems, Communication Technology, and Geoscience Electronics.

Program sessions start with the above-noted invited lectures on Monday and the keynote address by Dr. Mueller Tuesday morning. Biomedical and transportation telemetry sessions are scheduled for Tuesday afternoon. Wednesday's program includes sessions on telemetry hardware, civil systems (morning), and data compression and the second biomedical session (afternoon).

Thursday sessions will be on aerospace instrumentation, demodulation and detection, and computer controlled ground systems in the morning, and on-line systems and "special topics" in the afternoon.

"SPECTACULAR 70'S Theme of 1970 Convention

The 1970 International Convention of the IEEE will LAUNCH THE SPECTACULAR 70s with a program diversified enough to please all who attend. The technical sessions will be held at the New York Hilton during the period March 23-26 with one exception — a series of technical applications sessions at the New York Coliseum. Five IEEE Group Sessions will begin on the final day of the general program and extend into Friday.

At the Hilton, the 51 technical sessions will cover basic sciences, including device technology, communications, computers, medical electronics, manufacturing technology, pollution, transportation, power and management.

This year two special evening sessions are planned. A management-oriented Highlight Session, "Planning for Change," to be presented on Monday evening, will feature a discussion by leaders from industry, government, and the academic community on the management criterions and problems in setting organizational goals in a changing world.

The Tuesday evening keynote session, "The Emerging 70s," will present outstanding leaders who will provide an insight into the technological opportunities and problems of the decade of the 70s. Included will be a presentation on the opportunities and problems of society that could be affected by the technology of the next decade.

An outstanding series of Technical Applications sessions will be held in the improved and expanded facilities on the fourth floor of the Coliseum. The subject material will include the design and application of microstrip circuits, microwave semiconductor devices, infrared radiation, time-shared computer-aided circuit design, small computers, interference reduction, and a full day's session on how to get started in the "Hybrid IC" business.



REGISTRATION

You may register at either the New York Hilton or the New York Coliseum. Registration hours at the Hilton are from 2:00 to 8:00 PM on Sunday, March 22, and from 9:00 AM to 5:00 PM daily during the convention except for Monday and Tuesday, when the registration period is extended to 8:00 P.M. because the Highlight and Keynote Sessions are held those evenings. Registration hours at the Coliseum are from 9:00 AM to 8:00 PM, Monday through Thursday.

Registration fees are \$4.00 for all IEEE members and Group Affiliates and members of the military services including civilian employees of Government establishments. Non-members may register for \$8.00. Women may register for \$2.00 if accompanied by a registered guest.

Student Members of IEEE who present the special registration card mailed to them in advance may register free of charge. Without their personal registra-

tion card, they must pay the regular Member registration fee of \$4.00.

High school students may register for \$3.00 if accompanied by a registered adult. For Monday through Wednesday, there is a limit of one student per adult; on Thursday, the limit is raised to three students per adult.

TECHNICAL PROGRAM

The 1970 Technical Program Committee has organized a program of 62 separate sessions. 53 will be presented at the New York Hilton daily from 9:30 to 12:00 and from 2:00 to 4:30 in the afternoon, Monday through Thursday.

As an additional feature for 1970, seven Technical Application Sessions will also take place daily on the Fourth Floor of the New York Coliseum. The times will be 10:30 to 1:00 and 2:30 to 5:00 in the afternoon, Monday through Thursday.



HIGHLIGHT AND KEYNOTE SESSIONS

The Highlight Session is scheduled for Monday evening, 8:00 to 10:30, in the Trianon Ballroom of the New York Hilton. "PLANNING FOR CHANGE" will be the subject, with a distinguished panel discussing strategies for adaptive changes in organizations. J. A. Morton, Vice President, BTL, will be moderator; the panelists will speak to specific aspects as follows:

AN INDUSTRIAL VIEW — Mark S. Shepherd, Jr., President, Texas Instruments, Inc.

A GOVERNMENT VIEW — The Hon. R. C. Seamans Jr., Secretary of the Air Force

A UNIVERSITY VIEW — K. S. Pitzer, President, Stanford University

The Keynote Session, an additional feature of the technical program for 1970, will deal with the subject "THE EMERGING SEVENTIES" and will be held Tuesday evening from 8:00 to 10:30 P.M. in the Grand Ballroom of the New York Hilton. Panelists and moderator will represent outstanding experience in their fields and will carry out assignments as follows:

Moderator: H. H. Heffner, Deputy Director of the Office of Science and

Technology, Executive Office of the President

MATERIAL AND DEVICE TECHNOLOGY — Dr. C. L. Hogan, President, Fairchild Camera and Instrument Corp.

COMPUTERS — B. O. Evans, President, Systems Development Division, IBM

TECHNOLOGY AND SOCIETY — The Hon. E. Q. Daddario, Chairman, Subcommittee on Science Research and Development, U.S. House of Representatives.

GROUP-SPONSORED TECHNICAL MEETINGS

Beginning Thursday afternoon and continuing on Friday after the convention, seven technical meetings will be presented by a number of IEEE Groups. All will take place at the New York Hilton.

THE IEEE EXHIBITION

The IEEE Exhibition will be held at the New York Coliseum daily Monday through Thursday. Exhibit hours are 10:00 AM to 8:00 PM. The multimillion-dollar exhibition will again occupy all four floors of the Coliseum, with the

following general location assignments:

First Floor — Production equipment and service organizations (such as publishers and consultants)

Second Floor — Systems and instruments

Third and Fourth Floors — Components (Microwave components located on the third floor)

A free shuttle bus service will again be provided between the Coliseum and the Hilton.

1970 IEEE INTERNATIONAL CONVENTION DIGEST

A CONVENTION DIGEST will again be published, giving synopses of papers presented at the IEEE International Convention. Copies will be available at special booths at both the Hilton and the Coliseum. Prices will be as follows:

DURING THE CONVENTION:

IEEE Members — Single copy \$3.00

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Linden Joins Dalmo Victor

Donald A. Linden has joined Textron's Dalmo Victor Division in Belmont as manager of advanced digital processing. In this newly-created post, Linden will be responsible for the administration of all company independent research and development as well as the establishment and management of an advanced digital processing center.



Donald A. Linden

Linden joins Dalmo Victor following eight years with the WDL Division of Philco-Ford, as manager of systems engineering, manager of divisional research and development program, and as director of advanced technology operations.

A member of IEEE, Linden has authored numerous technical papers.

Stoddard and Chang Promoted

Don J. Stoddard, Jr. has been named chief engineer-receiver engineering and aerospace antennas at Dalmo Victor. Stoddard joined Dalmo Victor in 1950 as a microwave design engineer. In 1954 he was promoted to group leader, antenna design, and in 1958 he was named section manager, antenna design. He was elevated to manager of aerospace antenna engineering in 1966. Stoddard is a senior member of IEEE and belongs to the Antennas and Propagation Group. He was the membership vice chairman for the San Francisco Section in 1965-66 and 1966-67.

Don J. Stoddard, Jr.



Wilbert H. K. Chang

Wilbert H. K. Chang has been promoted to manager of aerospace antenna and microwave component engineering, filling the post vacated by Stoddard's recent promotion. Chang joined Dalmo Victor in 1961 as a senior microwave engineer, and was promoted to section manager of advanced microwave engineering in 1964. Chang is a member of IEEE and belongs to the Microwave Theory and Techniques Group and the Antennas and Propagation Group. He is past chairman of the San Francisco Chapter of the latter and served as vice chairman in 1967-68 and secretary-treasurer in 1966-67.

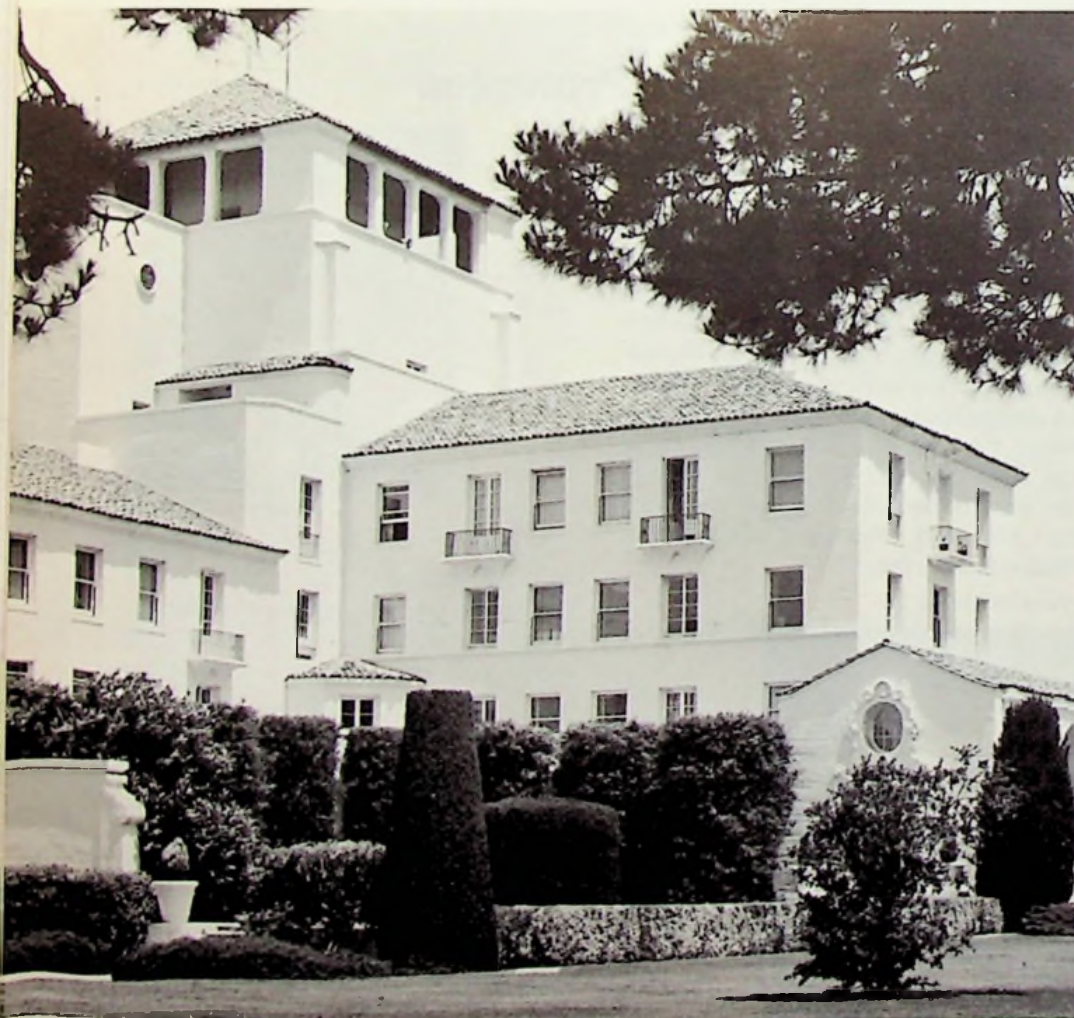
Spring Afternoon in Monterey

The annual joint meeting of the Naval Postgraduate School Student Branch and the Santa Clara Valley Subsection of the IEEE will be held at the Naval Postgraduate School in Monterey, California (the old Del Monte Hotel) on Saturday, April 11, 1970. Wives and guests are welcome.

The program will commence with luncheon at 12:00 in the La Novia Room of the Commissioned Officers and Faculty Club located in Herrmann Hall. The luncheon fare entree will be "Seafood Louie" for \$2.10 per person.

After luncheon, the program will continue with a brief welcome followed by guided tours of several of the school's technical facilities. These will include visits to 1) the Fleet Numerical Weather Center, 2) an anechoic chamber, 3) a hybrid/graphic computation center, 4) a linear accelerator, 5) a digital computer center, and 6) the aeronautical engineer's "Red Baron" demonstration. Several of these visits are being arranged so that visitors can actually work with the equipment.

A view of Herrman Hall, the administration building for the Naval Postgraduate School at Monterey. Prior to being acquired by the U.S. Navy, this beautiful building was the famous Del Monte Hotel.



The program will conclude with a cocktail party from 4:00 PM until 5:00 PM. No plans have been made for the evening but several Santa Clara Valley people intend to stay overnight at motels in the Monterey area.

Visitors arriving on Highway 1, via Salinas or Marina, leave the freeway at the exit marked "Naval Postgraduate School" and "Monterey," turn right on Aguajito Road and right again on 10th Street. Entry to the Postgraduate School will be via the 10th Street gate only.

Early reservation requests for the meeting are desired and they cannot be accepted later than Wednesday, April 8, 1970.

Reservations may be obtained in the Monterey Bay area by contacting LCDR. R. R. Owens, SMC 2290, NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF. 93940 or by phone, telephone (408) 646-2231. In the San Francisco Bay area, reservations can be made by telephoning Mrs. Pat Fregosa, (408) 291-4434.

Laser Experiments and Techniques

Professor Arthur L. Schawlow will speak on "Some Experiments and Techniques with Lasers" at the March 19th meeting of the Electron Devices Group. Professor Schawlow is the Chairman of the Department of Physics at Stanford University. The meeting will be held at Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. The 8:00 PM meeting will be preceded by cocktails at 6:00 and dinner at 7:00.

Professor Schawlow received the Ph.D. degree from the University of Toronto in 1949. After two years as a postdoctoral fellow and research associate at Columbia University, he became a research physicist at Bell Telephone Laboratories. In 1960, he was a visiting associate professor at Columbia University. Since the fall of 1961, he has been Professor of Physics at Stanford University. In 1966, he assumed his present position as Chairman of the Physics Department.



Prof. Schawlow

His research has been in the fields of optical and microwave spectroscopy, nuclear quadrupole resonance, superconductivity, and lasers. With C. H. Townes, he co-authored the first paper describing lasers. For this work, Professor Schawlow was awarded the Morris N. Liebmann Award by the IEEE and other honors.

Seattle Hosts Regions 6

The 1970 IEEE 6th Region Conference theme 'West into the 1970's' becomes most appropriate as we enter the New Year. Everyone is interested in planning for the new decade. We all know that the West is where things will happen.

Plan now to attend the Conference and learn first-hand some of the new ideas that 1970 will bring to your field of Electrical and Electronic Engineering.

Not incidentally, come visit the Northwest and enjoy the social activities and field trips planned for your pleasure.

Remember the dates May 26-28, 1970, at the Washington Plaza Hotel, Seattle.

John V. Andrews, Senior Engineer for the San Francisco Bay Area Rapid Transit District will discuss the developments in the near future which lead to the actual movements of the transit trains and the collection of fares. He plans to cover the broad spectrum of BART activities for the Industrial and General Applications Group at their March 12 Dinner Meeting.

Mr. Andrews, member of the IEEE, Institute of Rapid Transit, and the Association of Public Safety Communication Officers, is a graduate Electrical Engineer from the University of Pittsburgh. He spent the eleven years preceding his employment by the BART District in 1966 with the General Electric Company in various assignments which included advanced engineering of rapid transit systems, design of manipulators, optical, tracking and missile guidance systems. He is now part of the District's Electronics and Communication Section.

The meeting will be held Thursday evening, March 12, at the Great Eastern Restaurant, 649 Jackson Street, Chinatown, San Francisco. Cocktails at 6:30 will precede a Chinese family-style, table of ten banquet-dinner, prior to the 8:15 program. IGA members, guests, are encouraged to make reservations by Monday, March 9. Call Byrd Thysell, 5557-2025.

What Lies Ahead for BART?



This is an artist's conception of the aerial transit structure now being erected by the Bay Area Rapid Transit District for its new 75-mile rail rapid transit network. Shown on the aerial structure is the train design already approved for the BART system.

Multi-Processors: A New Language and Organization

The Computer Chapter has regularly held its meetings at Stanford University. This month we have asked one of the outstanding graduate students in the Digital Systems Laboratory of the EE Department to present one of the current research projects. The meeting will be held March 24 in Room 134, McCullough Hall at Stanford at 8 PM. Details concerning the dinner preceding are in the calendar at the front of the GRID.

The speaker will discuss a new class of programming language (Single Assignment Languages) and a new multi-processor implementation.

The advent of multi-processing systems makes it possible for a computer to execute more than one instruction at a time from the same program. The new language is designed for the most efficient allocation of the multi-processors computing resources without complex "look-ahead" logic. Single-assignment languages are programming languages having the property that each variable is

assigned a value only once during execution of a program. A single-assignment language called SAMPLE, designed for parallel processing, will be discussed.

In addition to the description of the language, a multi-processor, multi-bank memory system will be described for the parallel implementation of SAMPLE. The system can coordinate many independent processors in the execution of a single program by means of links in a central memory which describe the sequential dependencies of the program. Each subprocess within the program is released for execution as soon as all the required input data is ready.

The speaker will be Mr. Donald D. Chamberlin of Stanford University. Mr. Chamberlin received his BS from Harvey Mudd College and his MSEE from Stanford University. He is currently in the Ph.D. program in the EE Department at Stanford. He has held engineering positions during the summers at Hewlett-Packard, Cupertino Division.

Microwave Electronics Course

A survey course covering the newest and most important microwave tubes and solid-state devices will be presented by the University of California Extension for the March 31st through June 16th academic quarter at Menlo-Atherton High School.

This survey course will discuss operating principles, performance limits, representative devices and typical applications of microwave transistors, klystrons, traveling wave tubes, crossed field tubes, magnetrons, avalanche diodes, Gunn and LSA devices, ferrite circulators, YIG filters, and microwave integrated circuits.

The course, Microwave Electronics 806, will be taught by Allan W. Scott, who is a Senior Scientist in Varian's Traveling Wave Tube Division. Classes are from 7 to 9:30 on Tuesday evenings, beginning on March 31st.

For further information, call the University of California Extension office or Mr. Scott at Varian (326-4000, Ext. 2508).

Anechoic Chambers and Chamber Measurement Techniques

The talk to be presented at the Wednesday, March 18, 1970, Antennas and Propagation meeting will consist of two parts. The first part, presented by William H. Emerson, will compare the various types of antenna measurement ranges. The advantages as well as the limitations of the elevated outdoor range, the rectangular anechoic chamber, the radome-covered vertical range, the anechoic range terminal and the tapered anechoic chamber will be dis-



Fred Brownell

cussed. The second part, presented by Fred P. Brownell, will describe the techniques for measuring the performance of anechoic chambers. Current measurement techniques will be contrasted to earlier methods used to determine chamber backscatter characteristics as well as reflection values related to antenna radiation pattern measurement.

Microelectronics Course

The six-session microelectronics course sponsored by the Parts, Materials & Packaging Group will be in its final sessions on March 3rd and 10th. Because of the continued high interest and demand for this microelectronics course, a repeat of the six sessions is being organized to begin about mid-April and will run through May. The exact dates and course outline will appear in the April GRID.

The Microelectronic course which is currently in session was completely sold out by advanced registration. If you wish to attend this new lecture series you should register early. The registration fee is \$10.00. For advanced registration or information about the course please contact Ed Hilton, Secretary-Treasurer, Hewlett-Packard Co., 5301 Stevens Creek Blvd., Santa Clara, 95050, phone 246-4300, ext. 2370.

Mr. Emerson is currently project manager for absorbent materials and anechoic chambers at B. F. Goodrich Sponge Products Division of Shelton, Connecticut. Since 1946, he has been engaged in a wide variety of activities associated with materials to absorb elec-



Wm. Emerson

tromagnetic radiation. He received his education at Dartmouth College. Mr. Brownell is manager of the Microwave Lab at B. F. Goodrich where his responsibilities include the development of anechoic chamber test techniques and model chamber studies. He received his BS and MS degrees from Utah State University.

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

In Memory of Dr. Andreasen

The IEEE and The GRID regret to announce the death of Dr. Mogens G. Andreasen on December 12, 1969. His passing will be especially felt by the members of the Group on Antennas and Propagation, to which he has made many significant contributions. This Fall he served on the local chapter's program committee, helping to organize the on-going tutorial series on computer-aided antenna engineering. He gave the second lecture in this series at the November GAP meeting.

Dr. Andreasen was Manager of Electromagnetic Research at Technology for Communications International, Mountain View. He has been foremost in the area of electromagnetic radiation and scattering from wires and special- and general-shaped bodies. For many years he has been engaged in applying the digital computer to solving these elec-

A Practical Session on Transmitter Combiners

The Vehicular Technology Chapter meeting on Monday, March 16, at 8:00 PM will feature Mr. John Hall, Manager of Applications Engineering, Communications Products Group, SCM Melabs. Mr. Hall will speak on the uses of Transmitter Combiners, a system of ferrite circulators, hybrid couplers, and filters for combining two or more transmitters onto one antenna. This will be a practical session on Transmitter Combiners – what they are, what they do, and how



John Hall

to design them into communication systems. Those attending will learn how to maximize the number of transmitters on existing antenna sites while reducing the possibility of interference from third order intermodulation products. A must for two-way communications people.

Also on the program will be a tour of the Melabs facility at 3210 Porter Drive in Palo Alto.



Dr. Andreasen

tromagnetic problems and has become an authority in this activity. He was primarily responsible for creating several sophisticated programs for these applications. He has published extensively in the IEEE Proceedings and the Transactions.

He will be greatly missed by his friends and colleagues who extend their deepest sympathy to his family.



Power Group Tours Rad Lab

A field trip to Lawrence Radiation Laboratory at the University of California in Berkeley has been arranged for the power group meeting March 10.

Following a short talk on the laboratory in its auditorium at 7:30 PM, technicians in the areas we visit will explain the operation of equipment. These points of interest include exhibits of bubble chamber, cosmic ray display, spiral reader, Frankenstein, Bevatron control and generator room, and a typical research station.

The laboratory grew out of the invention of the cyclotron by E. O. Lawrence in 1929 and now has a staff of 3,000. It is supported by Atomic Energy Commission funds of about \$40 million per year and provides major research facilities for 125 faculty members and 400 graduate students in physics, chemistry, biomedicine, chemical biodynamics and materials science.

The laboratory's four major accelerator buildings are herein shown: the 88-in. cyclotron, lower right; the 184" cyclotron, dome, upper right; the Bevatron, large circular building, center; and the Heavy Ion Linear Accelerator (HILAC), left, slightly above center. Physics is housed in the inverted U-shaped white complex, right center; Chemistry in the two large structures just beyond Physics. Other facilities are on the campus, just below the facilities shown. In the upper left hand corner is the Lawrence Hall of Science.

Dinner reservations are necessary at least three days in advance so that the laboratory's cafeteria will be prepared. Phone yours by March 6 to Paul Breitenbach on 843-2740, ext. 5261 or Elmo Huston on 434-0260. Dinner will be served at 6:30, but the customary social hour will not be possible.

To get there, cross over the Bay and go north on East Shore Freeway to University cliff-ramp. Take University Avenue east to the end, then turn left one block to Hearst Avenue. Turn east again and go uphill to the laboratory cafeteria parking lot.

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Computer-Aided Circuit Design

This month's meeting of the Circuit Theory Chapter features expanded presentations of two papers from the 1970 International Solid State Circuits Conference at Philadelphia.

BIAS-3

William J. McCalla will describe BIAS-3, a computer program for the nonlinear dc analysis of both analog and digital bipolar transistor circuits. Given a circuit description the program formulates and, by an iterative procedure, solves equations for dc node voltages and transistor operating points, and calculates the incremental small-signal input resistance and voltage gain at these operating points. Resistor and transistor temperature dependence are characterized by the specification of nominal values and first- and second-order temperature coefficients.

With the aid of several circuit examples illustrating these features of BIAS-3, the solution algorithm used by the program will be discussed. A comparison of the BIAS-3 algorithm with those used by several other programs will be made. Finally, the implementation of the algorithm into a CDC Fortran IV program of approximately one thousand statements requiring less than 11000 decimal words will be discussed in terms of program organization and structure.

Mr. McCalla received the BS and MS degrees in electrical engineering from the University of California, Berkeley, where he is presently working on his Ph.D. degree. His research has centered on computer-aided circuit design and desensitized frequency-selective circuits.



William J. McCalla

Monolithic Broadband Amplifiers

Bruce A. Wooley will present an automated design and optimization program which has been implemented for monolithic broadband dc amplifiers. DC conditions, device geometry, and all passive elements are adjusted to provide the maximum small-signal bandwidth consistent with a specified low frequency

gain and quiescent power dissipation. The program consists of three major subsections — a frequency response analysis program, a response sensitivity analysis program and a function minimization program.

The design program has been used to optimize the small-signal performance of a complete monolithic differential amplifier, a series-series feedback triple with emitter-follower level shifting. For a gain specification of 34 dB and a total dissipation of 84 mW, a maximum bandwidth of 75 MHz results with typical integrated circuit processing.



Mr. Wooley received the BS degree, as the University Medalist, and the MS degree from the University of California, Berkeley. He is presently an Acting Assistant Professor in the Department of Electrical Engineering and Computer Sciences at the University of California, Berkeley, where he is completing his Ph.D. research in the areas of semiconductor electronics and the computer-aided design of integrated circuits.

Tour of KPIX

Donald Lincoln, Assistant Chief Engineer of Television Station KPIX, will conduct a tour of this major network TV station for the Aerospace and Electronic Systems Chapter. It will include a system description of the overall station which is comprised of the following subsystems: sound, video, personnel communications, equipment assignment control, power distribution and program queuing. An old studio undergoing refurbishment, and an up-to-date modern studio will be toured along with limited viewing of a live telecast. Telecine (film to television conversion) equipment, a Video Tape Center and a Master Control Center will also be illustrated.

This tour will be limited to twenty people. An additional tour will be established if required by popular demand. For tour reservations, call R. Winslow or Pat Hoppe, 326-4350, ext. 6143.

Golden Gate Subsection Honors Oldtimers

The annual "old timers night" will be held March 16, at the San Francisco Engineers Club with the Golden Gate Subsection acting as host. This year's meeting will feature electrical engineers who were pioneers in the utility industries.

C. W. "Brodie" Leihy, 40 years engineering editor and publisher of Electrical West, will act as program moderator and will introduce prominent electrical engineers who will tell it as it was then

From Federal Pacific Electric:

Joseph Thompson, founder and president of Pacific Electric until merger with Federal Electric to form Federal Pacific Electric. Honorary chairman of Federal Pacific Electric until his ultimate retirement.

From Pacific Gas & Electric Co.:

Art Scott, Bunny Dexter and Clyde Baugh, three pioneers whose contribu-



C. W. Leihy



Charles A. Powell



Joseph Thompson

-- in the early days of the industry.

The panel will include the following pioneers in our industry:

From Westinghouse Electric Corp:

Charles A. Powell, AIEE National president 1943-1944, prior Westinghouse manager of Headquarters engineering until retirement and later member of faculty of M.I.T. until 1954, co-author of the Westinghouse "Electric Transmission & Distribution Handbook."

Almon Copley, First Westinghouse resident electrical engineer in early 1920's and later engineering manager, Westinghouse Pacific Coast Region, until his retirement in 1954.

tions helped make this utility a great one.

From Pacific Telephone and Telegraph Co.:

Donald I. Cone, well-known and respected engineer.

The East Bay and Santa Clara Subsections and the San Francisco Section will be co-hosts to this outstanding meeting. Everyone is invited to join us in honoring our industry pioneers.

Meeting will be at San Francisco Engineers Club March 16, with cocktails at 6:30, dinner at 7:00 and meeting at 8:00 PM. Please call for reservations: Artwell Electric, 467-1880.

Auto-Regressive Sources by Prof. Gray

"Information Rates of Auto-Regressive Sources" is the topic to be presented at the Information Theory Chapter meeting on March 19. The speaker, Robert M. Gray, will define the rate distortion function and will discuss its possible relevance to data compression. Recent lower bounds on the information rate of a class of sources with memory-time discrete autoregressive sources -- will be stated and discussed. These bounds will be shown to hold with equality for sufficiently small average distortion in two special cases: the possibly non-stationary Gaussian autoregressive source and the binary symmetric Markov source. Prof. Gray will pre-

sent an interesting similarity between this problem and innovation processes.

Robert Gray has been an Assistant Professor at Stanford since 1969. He is in the Information Systems Group of the Electrical Engineering Department. He received the BS and MS degrees in electrical engineering from M.I.T. in 1966 and the Ph.D. in 1969 from USC. Prof. Gray has done work in the areas of sequential decoding, phase lock loops, and rate distortion theory.

The 8:30 PM meeting at SRI will be preceded by a 6:15 dinner at Ming's of Palo Alto. Reservations required. See calendar for details.

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Design of a Medical Information System

A significant fraction of the rapidly-rising cost of health care is for information processing. Medical information systems are being developed to reduce the clerical burden on health care personnel. Such systems require an economical data input procedure which is acceptable to busy doctors and nurses. The Lockheed approach emphasizes interactive data input via CRT-lightpen terminals. A developmental Medical Information System using this technique is being installed in El Camino Hospital.

After cocktails and dinner at The Bold Knight restaurant in Sunnyvale, the Systems, Science & Cybernetics Chapter will hold its March 26 meeting at 8:00 in Lockheed Building No. 534, 590 East Middlefield Road (at Logue Ave., one block east of Ellis St.), Mountain View. The facility houses the dual 360-40 computers which support the on-line information system as well as Lockheed's off-line hospital Business Office System.

Mr. Gordon T. Uber and his associates in Lockheed's Medical Systems Development organization will describe their Medical Information System and will illustrate the data content and user interaction using on-line terminals. After the presentation the audience may use the terminals themselves and ask questions of the speakers, who will be available to discuss the system design and implementation.

Mr. Uber entered the computer field in 1955, joining Lockheed in 1960. He conducted experiments at the Mayo Clinic in 1966-1968 on the entry of medical orders and reports by physicians and has published several papers on this subject. See Calendar.

Winn Senior Member off Rolm Tech Staff

Curt Winn has been named a senior member of the technical staff of Rolm Corporation, Cupertino. Winn will be responsible for programming and application engineering for Rolm's severe environment general purpose mini-computer, the "ruggednova."

He was formerly a department manager for systems engineering with Electromagnetic Systems Laboratories, Inc., Sunnyvale. Winn has earlier experience as a section head of the equipment engineering lab of Sylvania Electronic Defense Laboratories in Mountain View. He is a member of IEEE and holds a M.S.E.E from the University of California.

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Robert J. Macdonald of DCA Reliability Laboratory, Inc., will describe the independent parts testing laboratory's role in military and commercial industry at the March 12 Reliability Group meeting. Mr. MacDonald has participated in screening programs for the IDCSP satellite, Mariner, and Pioneer programs.

The meeting will be held on Thursday, March 12, at 8:00 PM in room Ph104, Stanford University. Members and guests are invited to meet the speaker at the Stanford View Restaurant on El Camino Real in Palo Alto: Cocktails at 6:00, dinner at 6:30. Reservations for the dinner are suggested. Call Gil Bowers (962-4111) or Lew Finch (743-1577).

ICC-70 in S.F.

Increased emphasis is being placed on exhibits of specialized communications equipment at the 1970 International Conference on Communications (ICC-70) to be held in San Francisco, June 8-10, 1970. 60 exhibit spaces are available in the Plaza Ballroom of the San Francisco Hilton, headquarters hotel for ICC-70.

Sponsored by the Communication Technology Group of the IEEE, with the cooperation of other interested groups, the conference is expected to attract over 1500 of the world's top communications specialists. A full technical program is being arranged for the three days of the conference, with varied paper content to interest all types of communications engineers.

Companies interested in exhibiting at ICC-70 may obtain detailed information from W. F. Main, Exhibits Chairman, ICC-70, P.O. Box 273, Los Altos, Calif. 94022.

A Confrontation Between Student Engineers and Managers

"Why isn't engineering doing more for society?" "How can my work be socially constructive?" "What will my professional life be like?" Questions such as these may be asked by engineering students at a Forum sponsored by the Engineering Management Chapter on March 11. The answers they receive from the audience of engineers and engineering managers may not be entirely acceptable to them.

It is said that the aspirations, attitudes, and expectations of graduating engineers in the 70's will be different from those of the 60's and several orders of magnitude removed from the new engineers of the 50's. The Forum, conducted by Dr. W. R. Kincheloe, Assistant Chairman of the Electrical Engineering Department at Stanford University, will indicate how extensive the changes are and whether there really is an engineering generation gap.

The Forum will begin at 8:00 PM at the Kozy Grotto, 210 Hope Street, Mountain View (directly across from the Post Office). A pre-meeting dinner of sirloin steak for \$4.00 including tax and gratuity will be served at 6:30 PM. No reservations are required.

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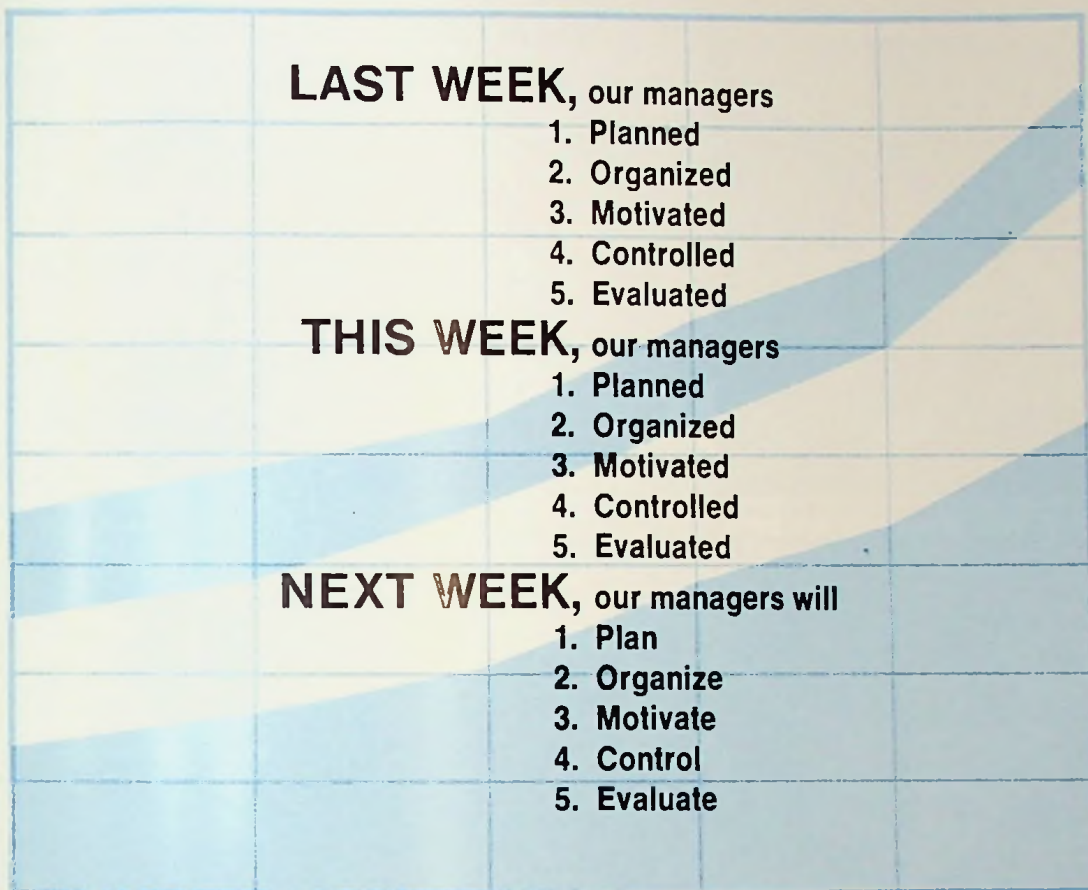
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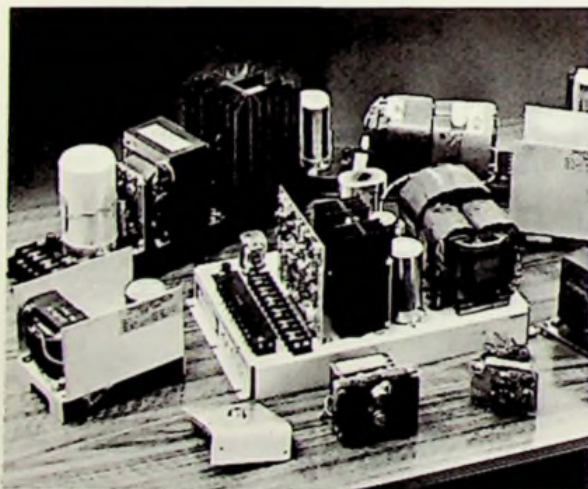
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