EDITOR'S PROFILE of this issue

from a historical perspective …

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

July, 1964:

Cover: Promotion of WESCON'64 in Los Angeles

Page 10ff: The start of a profile of the various WESCON sessions, the first chaired by one of my Stanford professors, John Linvill. In session 1, Norm Pond gives a talk on traveling wave tubes; he goes on to become president of Varian, then founds Intevac, and writes a book "The Tube Guys". In session 12, William Shockley (inventor of the transistor) gave a talk on an avalanche transistor; Clevite had acquired Shockley Semiconductor. In session 18, Ralph Wyndrum gave a talk; he later served as president of the Electronics Packaging Society (my group) and president of IEEE-USA.

grid-bulletin
Joint Publication / Los Angeles and San Francisco, IEEE
JULY 1964

NEW FOCUS ON ELECTRONICS

WESCON '64

AUGUST 25, 26, 27, 28 / LOS ANGELES

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Phase Comparison Receiver This unit takes advantage of the propagation stability of low-frequency waves, allowing comparisons to an accuracy of 5 parts in 10^{10} to be made within one hour. Makes accurate frequency comparisons against carrier-stabilized low, and very low frequency transmissions. For use with local frequency standards accurate to 1 part in 10^6 or better.

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VHF Frequency Meter · Direct reading, with a minimum accuracy and stability of .0001%. No charts, curves, or books required to measure or generate frequencies of 20-1,000 Mcs. Used with external counter, provides accuracies of .00001%. Case or rack mounted.

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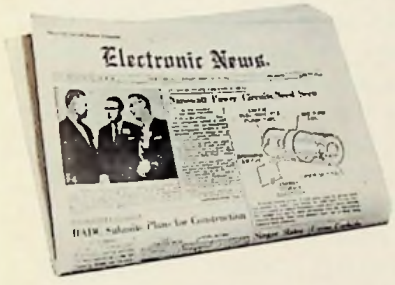
CIRCLE INQUIRY CARD NUMBER 1

Some Plain Talk About Electronics Publications

There are 80 publications which contain various types of information of interest to the electronics industry. Eighty probably seems like a lot to you. It does to us, too.

Of all these publications, there is only one devoted to news coverage of the entire industry. Electronic News.



Why should an engineer read a newspaper serving a technical industry? For this reason: only a newspaper can satisfy the real need for up-to-the-minute technical and business news, so vital to an industry whose technology is in a constant state of flux. And there is only *one*. Electronic News.

In the technical area, Electronic News renders a unique service by reporting technical news and developments immediately and by following their progress each week from ideas to finished reliable products competing for the industrial dollar. In the business area EN's coverage includes everything from price fluctuations to promotions, from Wall Street to Washington, from the Common Market to Japan. To ignore the effect of developments in these areas is to ignore the fact that the electronics business *is* a business, faced with competition and struggling for profit, much as the steel, automotive and chemical industries.

Now, don't get us wrong. We're not saying that Electronic News is the only source of trade information you should read. Not by a long shot. There are many magazines that offer tutorial articles of value to engineers. There are others that deliver partial coverage of electronics in the process of dealing with a wider field, such as the aerospace industry. And still others, like the one you're reading now, keep association members informed of activities and meetings.

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G-B

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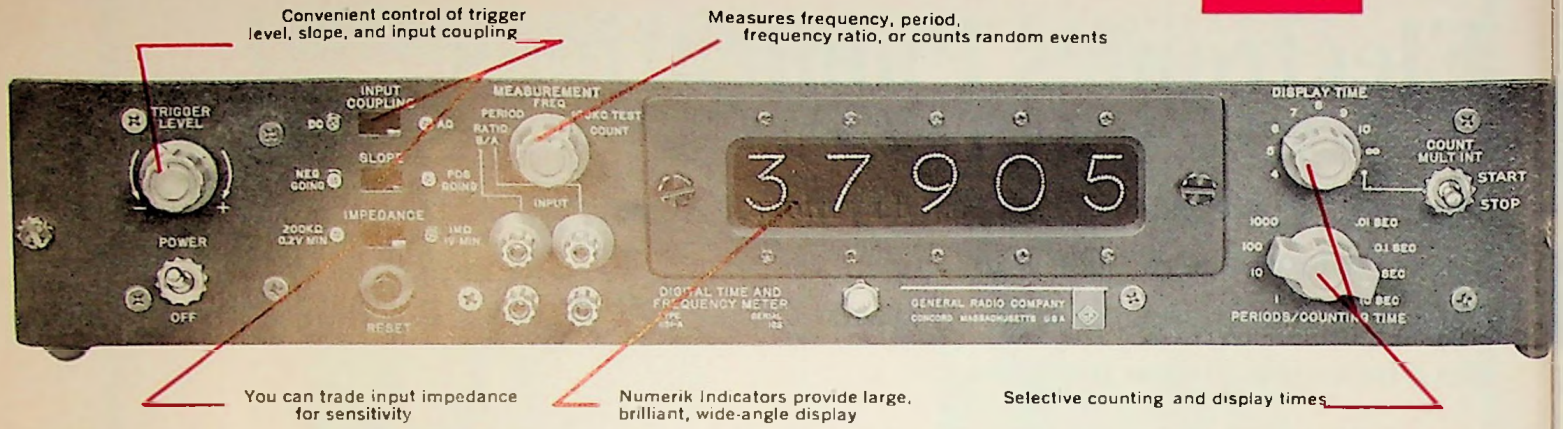

The Type 1151-A Digital Time and Frequency Meter contains all the features most people want in a low-frequency counter: ability to make multiple measurements (frequency, period, frequency ratio, or the counting of events), in-line readout, flexible input circuits, good program, high sensitivity, excellent stability . . . all at a relatively low cost.

This counter's input circuits are, we believe, the best you will find on the market — almost without regard to cost. To achieve optimum performance and maximum flexibility, four input controls have been included: (1) AC or DC coupling, (2) zero-crossing slope for triggering, (3) triggering level, and (4) optional input sensitivity/impedance of 0.2 volt/200kΩ or 1 volt/1MΩ. Equivalent input noise is less than 5 millivolts peak-to-peak, a factor which contributes significantly to the accuracy of low-frequency measurements.

The Type 1151-A has an all new and highly efficient program that eliminates the annoying "zero-resting" time interval found in most low-cost counters. In this new program, all but 0.01 second of the total cycle time is occupied by the measurement and display intervals. The measurement program is completely synchronous with the quartz-crystal oscillator; both the gate and display-time intervals being derived by division of the 100-kc quartz frequency using aperiodic (flip-flop) dividers.

Frequency Measurement:
Range —DC to 400 kc.
Sensitivity — 0.2 volt, peak-to-peak, at 200 kilohms or 1 volt, peak-to-peak, at 1 megohm (1 microampere), switch-selected.
Counting Interval — 10 milliseconds to 10 seconds, extendible by multiplier switch.
Accuracy — ±1 count ± crystal-oscillator stability.

Period Measurement:
Range — DC to 20 kc.
Number of Periods — 1, 10, 100, or 1000.
Sensitivity — 0.2 volt at 200 kilohms or 1 volt, peak-to-peak, at 1 megohm (1 microampere), switch-selected.
Accuracy — ±1 count ± time base accuracy ± noise errors.
Input Noise — 5 millivolts equivalent open-circuit input noise at 1 megohm, less at 200 kilohms.
Counted Frequency — 100 kc.

Ratio Measurement:
Range — B/A, 10 B/A, 100 B/A, or 1000 B/A.
Frequency Range — A input, dc to 20 kc; B input, dc to 400 kc.
B Input — 1 volt peak-to-peak, 100 kilohms.

Display: 5-digit, in-line Numerik register, incandescent-lamp operated.

Display Time: 0.16, 0.32, 0.64, 1.28, 2.56, 5.12, or 10.24 seconds, switch-selected.

Input Impedance: 1 megohm shunted by 40 pf or 200 kilohms shunted by 100 pf, switch-selected.

Input Trigger Level: Adequate to permit triggering on zero-crossings of signals twice minimum amplitude and on brief pulses of either polarity.

Input Trigger Slope: AC or dc coupled, positive- or negative-going.

Crystal-Oscillator Stability:
Short-Term — Better than ½ part per million.
Cycling — Less than counter resolution.
Temperature Effects — Less than 2½ parts per million for rise of 0 to 50°C ambient.
Warmup — Within 1 part per million after 15 minutes.
Aging — Less than 1 part per million per week after four weeks, decreasing thereafter.

Crystal Frequency Accuracy: The frequency is within 10 parts per million when shipped. Frequency adjustment is provided.

Accessories Available: Type 1136-A Digital-to-Analog Converter and Type 1137-A Data Printer operate from output of Type 1151-AP model.

Price: Type 1151-A . . . $1195 in USA
Type 1151-AP (with output for printer or D/A converter) . . . $1250 in USA

Make Your Own Evaluation *. . . Ask for a Demonstration*

Also available is the Type 1150-B Digital Frequency Meter. It incorporates practically all the design innovations found in the Type 1151-A, but its operating modes are limited to measuring frequency over a 10 cps to 400-kc range and to counting events. Priced at $995 for the "B" model; $1050 for the "BP" model.

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CIRCLE INQUIRY CARD NUMBER 3

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WELCOME TO WESCON/64

LOS ANGELES

WILLARD H. FENN

Los Angeles, as in each even-numbered year, again welcomes Wescon. This year's program, even more than in the past, will present a broad spectrum of technical papers and exhibits covering the combined disciplines of the new IEEE. In line with this year's theme, a "New Focus on Electronics" is being created through increased emphasis on invited papers by outstanding speakers, through a functional regrouping of exhibits in expanded facilities, and by the addition of a new feature: the company-sponsored product session.

As in the past, the many Technical Tours, the Future Engineers Show, the Industrial Design Competition, and the many social activities for visitors and their wives will all combine to make this a full and rewarding week.

Willard H. Fenn, Chairman
Los Angeles District, IEEE

SAN FRANCISCO

DR. WILLIAM A. EDSON

Wescon for 1964 is the second Western convention to be sponsored by the IEEE organization. The increased emphasis on power and control systems is indicative of new strength drawn from the former AIEE membership and demonstrates the continuing vitality and adaptability of the Electrical and Electronics industry. In partnership with the Western Electronic Manufacturers Association, the newly formed Los Angeles District of the IEEE has assembled a technical program of unusual quality. We of the San Francisco Section wish to join with them in extending a cordial invitation to attend and participate in this important annual event.

Dr. William A. Edson
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Reducing things to the lowest common denominator is alright for the mathematician and the television producer. But when psychologists and statisticians start doing it, watch out! We just happened across a report called "Inside the Engineer." This intrigued us, at first, because we had mistakenly thought that the engineer was the same mess of skin, bones and ganglia as everybody else. Boy, were we on the wrong track.

Do you realize that you (i.e., the engineer) are completely lacking in diplomacy, have no vanity or moods, talk very little, have very little social intelligence, are uncooperative, have no poise and (this is the one that puts us out of a job) have no sense of humor. On the other hand, you are extremely cautious, lack introspection, conform to everything in sight and are a perfectionist.

If we met somebody like this in a dark alley we'd scream to high heaven and yell for the cops. Which is why we wandered morosely down to the lunch wagon and bought a chopped ham sandwich and a glass of milk and headed off to find companionship. There was Sam Riley, one of Rantec's better engineers, sitting under a tree, completely absorbed in the latest best seller, "How to be an Extrovert Even Though Married."

We sat down and opened up the conversation. "You are a clod, Sam Riley."

"You know," he answered, "you are absolutely right. I am also undiplomatic, socially ignorant, uncooperative, humorless, overly cautious and an uncontrollable perfectionist. The one thing that worries me, however, is that I have an impossible desire to play *My Funny Valentine* on my bassoon."

"You are pulling my leg, Sam Riley."

"I am not pulling your leg. You forget I am a perfectionist. It is vaguely conceivable, however, that I might be indulging in a bit of gentle humour."

Our faith was restored. If you want yours restored and if you know a little something about microwaves, antennas, ferrite devices, filters and such, quit your job and come work for Rantec. How's that for diplomacy!

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MEMO TO AGENCY
FROM: A. CLAVIN
SUBJECT: Four-Port "Differential Phase Shift" Circulators

Note: Shorten for advertisement

A four-port junction can be bi-laterally matched. A three-port junction cannot, unless it is a circulator. ~~Environmental effects such as~~ temperature changes can seriously affect the impedance characteristics of the three-port circulator, but the four-port differential phase shift circulator is little affected, since it reverts back to a matched four-port reciprocal junction. This basic stability of the four-port circulator ~~should~~ make it useful for parametric amplifiers and tunnel diode amplifiers, as well as high-powered isolators where input impedance requirements are particularly critical.

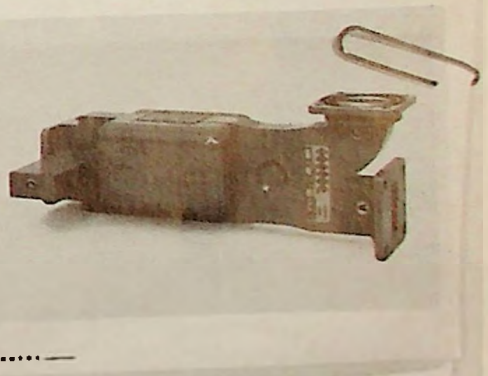
The unit has extremely stable isolation characteristics as well as impedance. ~~The isolation is independent upon the phase shift characteristics and environmental effects influences both ferrite differential-phase-shift elements in a similar way. The result is~~

The power split also enables the unit to handle very high average and peak powers--in excess of 400 KW peak power in the X-band unit.

The unit will provide very low insertion loss for high-power applications as well as for use in low-noise amplifiers.

Rantec has pioneered the development of one-piece construction, which enables this unit to be miniaturized considerably over earlier designs. These techniques have been further refined to enable low-cost production techniques for small quantity procurements. K_u-band and X-band units can be supplied in small quantities for: $295 for K_u and $250 for X.

Emphasize.



SPECIFICATIONS - MODEL CX-204

FREQUENCY RANGE	8.5 - 9.6 GC	POWER HANDLING	400 KW Peak
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LOAD VSWR	2.0 Max.		

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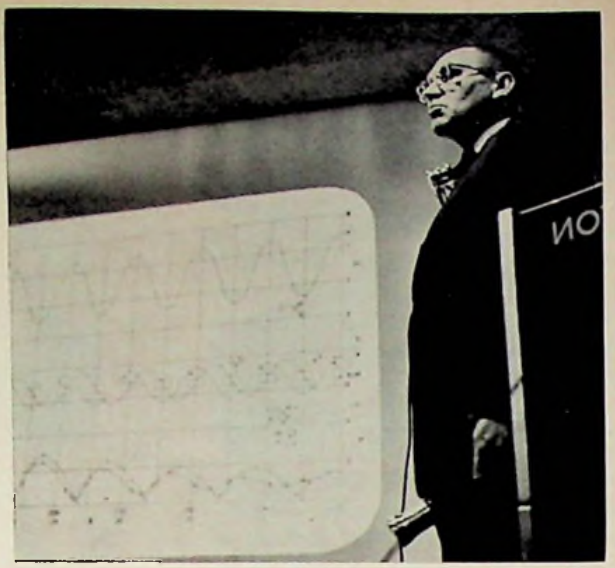


Technical Program . . .

The three phase objective of the Wescon Technical Program this year is (1) to highlight the most advanced hardware programs (2) to balance these "practical" papers with tutorial presentations and (3) to provide a platform for recognized technical experts to explore important questions.

The papers are presented in 20 morning technical sessions, with five additional afternoon sessions on the large-scale subjects. Detailed titles are given below. The regular sessions carry numbers, the special afternoon sessions are lettered. An additional new feature is a program in the power area, bringing the electrical side of the IEEE into focus. The Technical Tours tie into the technical paper sessions.

With Wescon being presented in two locations, closed circuit TV will be utilized in "viewing rooms" so that visitors at the exhibits at both the Sports Arena and Hollywood Park can also watch some of the papers being presented at the Statler-Hilton. This applies to the afternoon special sessions only.

Dr. Robert R. Bennett, Vice-President, TRW Space Technology Laboratories, heads the Wescon Technical Program Committee, 1964. Dr. George F. Smith, Hughes Research Labs, is his Vice-Chairman. Other Committee members include: Floyd Goss, Department of Water and Power, L.A., L. C. Hobbs, Hobbs Associates, Corona Del Mar, Dr. R. D. Middlebrook, Caltech, Pasadena, Dr. Ross E. Graves, Hughes Aircraft, Culver City, Dr. Gilbert McCann, Caltech, Pasadena, and Dr. Max Weiss, Aerospace Corp., L.A.

Special Session A

Microelectronics — The Needs, The Approaches, And The Potentials

Tuesday, August 25

Session Chairman: J. G. Linvill,
Stanford University,
Stanford, California

Microelectronics has already developed to the point where the possibilities are so diverse, the freedom in circuit design so much wider, and the potential effect on the industry so much deeper that it is a major problem to define boundary conditions and choose directions at all levels of endeavor from the most detailed circuit design to the most general company policy. Outstanding speakers will discuss important questions in three subject areas.

A.1 **MILITARY PARTICIPATION — AND OBJECTIVES,** by Richard Alberts, Electronic Technology Division, Air Force Avionics Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio.

A.2 **WHICH APPROACH — AND WHEN?,** by William M. Webster, RCA Laboratories, Princeton, New Jersey.

A.3 **COMMERCIAL APPLICATIONS — THE CHALLENGE,** by Robert C. Sprague, Sprague Electric Company, North Adams, Massachusetts.

Special Session B

Instrumenting The Sea Floor — Why And How

Wednesday, August 26

Session Chairman: R. A. Frosch,
Advanced Research Projects Agency,
Washington, D.C.
Session Organizer: Fred N. Spiess,
Scripps Institution of Oceanography,
San Diego, California

The session will be devoted to an exposition of needs and techniques in sea floor instrumentation, particularly in the fields of underwater acoustics, geophysics and their applications. The participants will present some examples of successfully used methods, problems of equipment installation and recovery, and ideas for future developments in the field.

B.1 **PROBLEMS REQUIRING SEA FLOOR INSTRUMENTATION,** by R. A. Frosch, Advanced Research Projects Agency, Washington, D.C.

B.2 **VEHICLES AND STATIONS FOR INSTALLATION AND MAINTENANCE OF SEA FLOOR EQUIPMENT,** by V. C. Anderson, Scripps Institution of Oceanography, San Diego, California.

B.3 **GEOPHYSICAL MEASUREMENTS WITH SEA FLOOR INSTRUMENTS,** by Hugh Bradner, Institute of Geophysics and Planetary Physics, University of California, Los Angeles, California.

B.4 **BOTTOM MOUNTED NAVIGATION AND TRACKING SYSTEMS,** by D. L. Potter, Defense Research Laboratory, General Motors Corporation, Santa Barbara, California.

Special Session C

Extra High Voltage Direct Current Transmission

Wednesday, August 26

Session Chairman: E. C. Starr
Bonneville Power Administration
Portland, Oregon

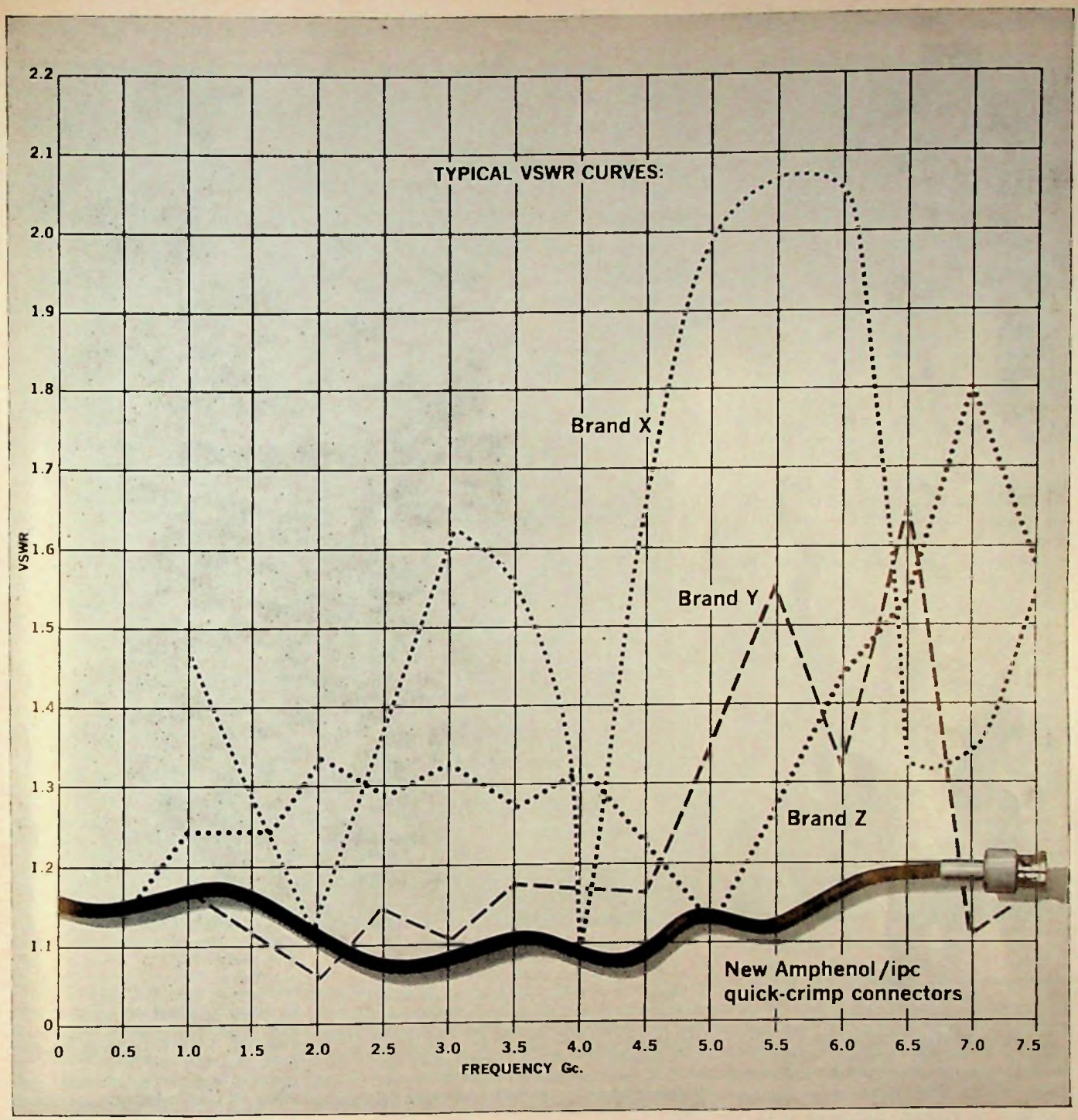
Power transmission over long distances by means of direct current at potentials as high as 1,000,000 volts, presents many engineering problems. Recent investigations are reported in four papers covering the effects of EHVDC on communication, and navigation systems, and the effects of high level direct currents on underground structures.

C.1 **DESIGN AND DEVELOPMENT OF HIGH VOLTAGE PLASTIC BUSHINGS FOR DC TEST FACILITY,** by L. I. Gradasoff, Bonneville Power Administration, Portland, Oregon.

C.2 **BPA'S EXTRA HIGH VOLTAGE DIRECT CURRENT TEST PROJECT MEASUREMENTS AND INSTRUMENTATION,** by M. G. Poland, M. W. Belsher and A. A. Osipovich, Bonneville Power Administration, Portland, Oregon.

C.3 **DIRECT CURRENT GROUND ELECTRODE BEHAVIOR,** by Allen L. Kinyon, Bonneville Power Administration, Vancouver, Washington.

CONTINUED ON PAGE 12



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Technical Program (Cont.)

C.4 **GROUND CURRENT IN HIGH VOLTAGE D-C TRANSMISSION,** by T. Cantwell, P. Nelson, J. E. Webb, Geoscience, Inc., Cambridge, Massachusetts, C. L. Waugh, A. L. Kinyon, R. F. Stevens, Bonneville Power Administration, Portland, Oregon, and A. Orange, U.S. Air Force Cambridge Research Laboratories, Cambridge Massachusetts.

Special Session D

Information Sciences

Thursday, August 27

The purpose of this session is to present recent significant achievements in the fields of communications, data processing and computers and is intended for the practicing engineer rather than the specialist. Professor Fano's and Dr. Cutrona's presentations will be accompanied by real-time demonstrations of operational systems.

D.1 **MULTIPLE ACCESS COMPUTING,** by Robert M. Fano, Massachusetts Institute of Technology, Cambridge, Massachusetts.

D.2 **OPTICAL DATA PROCESSING,** by Louis Cutrona, Conductron Corporation, Ann Arbor, Michigan.

D.3 **SEISMIC DETECTION,** by Paul Green, Lincoln Laboratory, Lexington, Massachusetts.

Special Session E

Apollo Electronics — Design And Present Status

Friday, August 28

Session Chairman: George E. Mueller
Associate Administrator
Manned Space Flight
NASA Headquarters, Washington, D.C.

Project Apollo, the U.S. effort to land men on the moon and return them safely to earth imposes a number of interesting performance requirements which have guided the design of Apollo spacecraft electronic equipment. The discussion will include design and development status of representative Apollo electronic hardware, including communications and instrumentation systems.

E.1 **OVERALL APOLLO ELECTRONICS,** by George E. Mueller, Associate Administrator, Manned Space Flight, NASA Headquarters, Washington, D.C.

E.2 **APOLLO SPACECRAFT ELECTRONICS,** by Joseph F. Shea, Manager, Apollo Program Office, Manned Spacecraft Center, Houston, Texas.

E.3 **APOLLO GUIDANCE AND NAVIGATION ELECTRONICS,** by R. Cliff Duncan, Chief, Guidance and Control Division, Engineering and Development Directorate, Manned Spacecraft Center, Houston, Texas.

E.4 **SATURN V VEHICLE ELECTRONICS,** by Hans Fichtner, Chief, Electrical Systems Integration Division, Astrionics Laboratory, George C. Marshall Space Flight Center, Huntsville, Alabama.

E.5 **APOLLO COMMUNICATIONS AND TRACKING,** by Ozro Covington, Deputy Assistant Director, Officer of Tracking and Data Systems, Goddard Space Flight Center, Greenbelt, Maryland.

Session 1

Microwave Tubes

Tuesday, August 25

Session Chairman: John Mendel
Microwave Tube Division
Hughes Aircraft Corporation
Los Angeles, California

Recent developments in high power millimeter wave amplifiers offer new solutions to problems of high resolution radar and space communications. Practical, long life devices are now available to facilitate the concurrent advancement of system hardware. Also of significant interest to space engineers is the achievement of very rugged, high efficiency TWT's for communication satellites. The adaptation of magnetron generators to the purely commercial environment of home ovens opens up a very attractive market for microwave tube manufacturers.

1.1 **SOME NEW RESULTS WITH HIGH POWER MILLIMETER-WAVE TUBES,** by J. F. Heney, Hughes Research Laboratories, Malibu, California.

1.2 **S- AND X-BAND TRAVELING-WAVE TUBE AMPLIFIERS FOR SATELLITE APPLICATIONS,** by A. Lubarsky, J. N. Nelson, R. E. Pospisil, O. T. Purl, L. A. Roberts and G. Wada, Watkins-Johnson Company, Palo Alto, California.

1.3 **A CW MAGNETRON FOR MICROWAVE COOKING,** by W. L. Adikes and W. C. Hickman, Amperex Electronic Corporation, Hicksville, New York.

1.4 **INVESTIGATION OF MAGNETIC TECHNOLOGY FOR PPM FOCUSED LOW-NOISE TRAVELING-WAVE TUBES,** by D. A. Schrumpf, General Electric Company, Palo Alto, California.

1.5 **100 WATT CW TRAVELING WAVE TUBES WITH OCTAVE BANDWIDTHS,** by Norman Pond, Microwave Device Division, Sylvania Electric Products Inc., Mountain View, California.

Session 2

Microelectronics

Tuesday, August 25

Session Chairman: Mort Penberg
Aerojet-General Corporation
Azusa, California

A survey of airborne computer, communication and navigation equipment indicates the quantitative increase in reliability obtainable through the use of microelectronics, as compared to standard off-the-shelf systems; a new integrated circuit fabrication technique minimizes parasitics; improved design and fabrication techniques extend bandwidth and reduce drift of d-c amplifiers.

2.1 **AN ANALYSIS OF THE POTENTIAL AVIONIC RELIABILITY IMPROVEMENT THRU MICROELECTRONICS,** by John R. Lennon, The Boeing Company, Renton, Washington.

2.2 **INTEGRATED HIGH-FREQUENCY D.C. AMPLIFIERS,** by David Roy Breuer, TRW Space Technology Laboratories, Redondo Beach, California.

2.3 **THE MINIMIZATION OF PARASITICS IN INTEGRATED CIRCUITS BY DIELECTRIC ISOLATION,** by D. A. Maxwell, R. H. Beeson and D. F. Allison, Signetics Corporation, Sunnyvale, California.

2.4 **MICRO-INTEGRAL MONOLITHIC DIFFERENTIAL AMPLIFIER REDUCING OFFSET VOLTAGE AND TEMPERATURE VARIATIONS,** by J. R. Nall, H. L. Gorgas and S. Santamaria, Molectro Corporation, Santa Clara, California.

Session 3

Learning Systems

Tuesday, August 25

The session is devoted to systems and devices which achieve the optimum performance through experience rather than through deterministic algorithms. Some theoretical, philosophical, and practical aspects of learning systems will be presented. Results of computer simulation of some new approaches to learning will also be reported.

3.1 **SOME USES AND MISUSES OF BI-COMPUTER PHILOSOPHY,** by M. L. Babcock, University of Illinois, Urbana, Illinois.

3.2 **TRAINING A THRESHOLD LOGIC UNIT WITH IMPERFECTLY CLASSIFIED PATTERNS,** by R. O. Duda, R. C. Singleton, Stanford Research Institute, Menlo Park, California.

3.3 **A MULTI-LAYER LEARNING NETWORK,** by R. A. Stanford, Philco Research Laboratory, Philco Corporation, Newport Beach, California.

3.4 **LEARNING SYSTEMS IN AND OUT OF THE FACTORY,** by R. M. Stewart, Space General Corporation, Pomona, California.

3.5 **GENERALIZED LEARNING THEORY,** by R. E. Jackson, S&ISD, North American Aviation, Inc., Downey, California.

Session 4

Automatic Control

Tuesday, August 25

A balanced program which includes optimal control theory and applications to manned and unmanned spacecraft attitude control. Considerations of redundancy and reliability are included.

4.1 **THE APPROXIMATE TIME OPTIMAL CONTROL OF HIGHER ORDER SYSTEMS USING A GENERALIZED MODEL,** by William C. Evans, Taylor Instrument Company, Rochester, New York, and Gerald H. Cohen, University of Rochester, Rochester, New York.

4.2 **TIME-OPTIMAL CONTROL WITH ADAPTIVE NETWORKS,** by James W. Berkovec, Collins Radio Company, Cedar Rapids, Iowa.

4.3 **A MONITORLESS REDUNDANCY SCHEME FOR HIGHER CONTROL SYSTEM RELIABILITY,** by A. S. Escobosa, Autonetics, NAA, Anaheim, California.

4.4 **OPTIMAL DESIGN OF SEVERAL REACTION JET SWITCHING TECHNIQUES,** by J. L. Hinson and M. D. Sarles, Martin Company, Baltimore, Maryland.

4.5 **COMPATIBILITY OF IMPULSE MODULATION TECHNIQUES WITH ATTITUDE SENSOR NOISE AND SPACECRAFT MANEUVERING,** by James E. Vaeth, Martin Company, Baltimore, Maryland.

Session 5

Electron Devices In The Power Industry

Tuesday, August 25

Session Chairman: Forrest C. Six
The Ralph M. Parsons Company
Los Angeles, California

Larger systems, rapidly advancing technology, and increasingly strong emphasis on efficiency have imposed saphisticated re-

(CONTINUED ON PAGE 14)

The Great Symposium. Without having to leave their desks, leading thinkers of the world soon will convene in continuous assembly. This historic convocation will occur as the computer industry gains experience in processing the vast amount of new information being generated each day by the multitude of research activities scattered throughout the world—information that will be automatically translated into all tongues and made quickly accessible to any respondent, wherever he may be. And so the floodtide of data being generated by man is harnessed by man to turn the giant turbines of his own imagination. And thus does he perpetuate himself.

quirements for communications and control on utility and industrial power systems. The power industry traditionally has employed highly sophisticated automation techniques, whereas the most rapid advances in efficient, reliable communication and control devices have been within the aerospace industry. New applications for aerospace developments are suggested in this session.

5.1 **NEW FUNCTIONS IN STATIC RELAYS FOR TRANSMISSION LINE PROTECTION,** by W. C. Morris, General Electric Company, Philadelphia, Pennsylvania.

5.2 **ELECTRONICS CAN BE EFFECTIVE IN REDUCING DISTRIBUTION CIRCUIT OUTAGE,** by G. G. Auer, General Electric Company, Schenectady, New York.

5.3 **STATIC CONTROL AND PROTECTIVE DEVICES IN ELECTRICAL TRANSMISSION AND DISTRIBUTION,** by J. A. Longley, Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin.

5.4 **A NEW LOOK AT POWER LINE CARRIER SYSTEMS,** by R. V. Rector and M. C. Adamson, General Electric Company, Lynchburg, Virginia.

Session 6

Microwaves

Wednesday, August 26

Session Chairman: I. Kaufman
TRW Space Technology Laboratories
Redondo Beach, California

A broad spectrum of new or improved devices and new techniques are now providing solutions to some old microwave problems. Included are a new electrically tuned microwave receiver, a new idea for very high level microwave to dc power conversion, new information on groove waveguides, a millimeter wave tunnel diode signal generator, and a new concept in thermistor bead power monitoring.

6.1 **GROOVE GUIDE MEASUREMENTS,** by F. J. Tischer and F. W. Someroski, University of Alabama, Huntsville, Alabama.

6.2 **MICROWAVE SUPERHETERODYNE RECEIVER FEATURING ELECTRICAL TUNING AND PRESELECTION,** by R. H. Rector, J. P. Fitzpatrick, J. A. Aldecoa and R. W. Haegele, Watkins-Johnson Company, Palo Alto, California.

6.3 **POWER BEAMING AND HIGH LEVEL MICROWAVE RECTIFICATION,** by Peter P. Keenan, Scientific Research Laboratory, Lockheed-California Company, Burbank, California.

6.4 **MILLIMETER-WAVE GENERATION USING A PACKAGED MICROWAVE TUNNEL DIODE,** by Stanley V. Jaskolski and Koryu Ishii, Marquette University, Milwaukee, Wisconsin.

6.5 **A SINGLE BEAD BROADBAND COAXIAL THERMISTOR MOUNT,** by Edward E. Aslan, FXR, Division of Amphenol Borg, Woodside, L. I. New York.

Session 7

Component Parts

Wednesday, August 26

Session Chairman: Donald L. Stearn
TRW Space Technology Laboratories
Redondo Beach, California

Two papers discuss effects of space radiation environment; two discuss conventional precision electronic parts. Radiation of semirigid encapsulation epoxies may cause drastic pressure changes. Experimental data are presented covering radiation-resistant diode development. Construction and testing of tantalum capacitors and wirewound resistors for high reliability are outlined.

7.1 **EFFECTS OF GAMMA IRRADIATION IN SEMIRIGID EPOXIES,** by F. F. Stucki and D. M. Newell, Lockheed Missiles & Space Company, Palo Alto, California.

7.2 **TOLERANCE OF SILICON TO ELECTRON AND NEUTRON RADIATION,** by Waylon Bryan, Texas Instruments Incorporated, Dallas, Texas.

7.3 **A NEW APPROACH TO THE ATTAINMENT OF THE HIGHEST RELIABILITY IN TANTALUM CAPACITORS,** by John Burnham, Ti-Tal Inc., Santa Monica, California.

7.4 **WIREWOUND RESISTORS — THE STATE OF THE ART,** by Daniel Polin, John Fluke Manufacturing Company, Inc., Seattle, Washington.

Session 8

Pattern Recognition

Wednesday, August 26

Real image data has enjoyed little favor in pattern recognition studies, for reasons of sheer quantity. Nevertheless, serious effort is being made to surmount this barrier. The results are crucial for yielding insight into the peculiar and complex nature of imagery. This session emphasizes studies which employ data of corresponding diversity.

8.1 **EXPERIMENTAL EVALUATION OF A RATIONAL PROPERTY SELECTION TECHNIQUE FOR PATTERN RECOGNITION,** by M. G. Spooner, C. W. Swonger and J. B. Beach, Cornell Aeronautical Laboratories, Buffalo, New York.

8.2 **COMPUTER RECOGNITION OF HANDWRITTEN FIRST NAME SIGNATURES,** by F. N. Marzocco, System Development Corp., Santa Monica, Calif.

8.3 **AERIAL PHOTOGRAPHIC PATTERN RECOGNITION,** by Neil C. Randall, Philco Corporation, Blue Bell, Pennsylvania.

Session 9

Static Power Conversion & Control

Wednesday, August 26

Session Chairman: A. D. Schonfeld
TRW Space Technology Laboratories
Redondo Beach, California

A high-voltage, high-power static switch using gate-controlled switches in a unique configuration features very short switching times; a 50-watt high-efficiency regulated converter operates from 0.75 to 1.5 vdc; a unique static commutation arrangement is used in a brushless dc motor; advantages, system design consideration's, and voltage regulation techniques relative to 12 and 18 phase semiconductor rectifier systems.

9.1 **A 20KVA DC SWITCH EMPLOYING SLAVE CONTROL OF SERIES OPERATED, GATE CONTROLLED SWITCHES,** by John W. Motto, Jr., Westinghouse Electric Corporation, Youngwood, Pennsylvania.

9.2 **LOW-INPUT VOLTAGE DC-DC CONVERTER REGULATOR,** by P. Ramirez, Electro-Optical Systems, Inc., Pasadena, California.

9.3 **BRUSHLESS DC MOTOR,** by R. D. Kincer and R. K. Hill, Sperry Farragut Company, Bristol, Tennessee.

9.4 **12 AND 18 PHASE SEMICONDUCTOR RECTIFIER SYSTEMS,** by W. Wahlgren, Electro Engineering Works, San Leandro, California.

Session 10

Automation Of Steam Electric Generating Plants

Wednesday, August 26

Session Chairman: John D. Rosenblatt
Bechtel Corporation
Vernon, California

These papers describe an excellent example of a very successful application of computer and electronic systems and components to automate a large complex commercial process. The total aspects of concepts, design, dynamic testing and operating experience are covered. Of special value is the opportunity later to visit the completed, operating plant and to view the systems and equipments described.

10.1 **ENGINEERING ASPECTS OF A FULLY AUTOMATED STEAM POWER PLANT,** by R. L. Emerson, R. A. Norry and L. R. Oquist, Bechtel Corporation, Vernon, California.

10.2 **DESIGN AND EXPERIENCE WITH A COMPUTER SYSTEM OPERATION GUIDE AT THE CANADYS STEAM PLANT,** by M. C. Johnson, South Carolina Electric and Gas Company, Columbia, South Carolina, and R. G. Livingston, General Electric Company, Phoenix, Arizona.

10.3 **COMPUTER SYSTEM ASPECTS OF THE ETIWANDA AUTOMATION,** by R. G. Livingston, General Electric Company, Phoenix, Arizona.

10.4 **BASIC APPROACH AND EXPERIENCE WITH ETIWANDA AUTOMATION,** by R. N. Knapp and A. A. Ward, Southern California Edison Company, Los Angeles, California.

Session 11

Millimeter Waves

Thursday, August 27

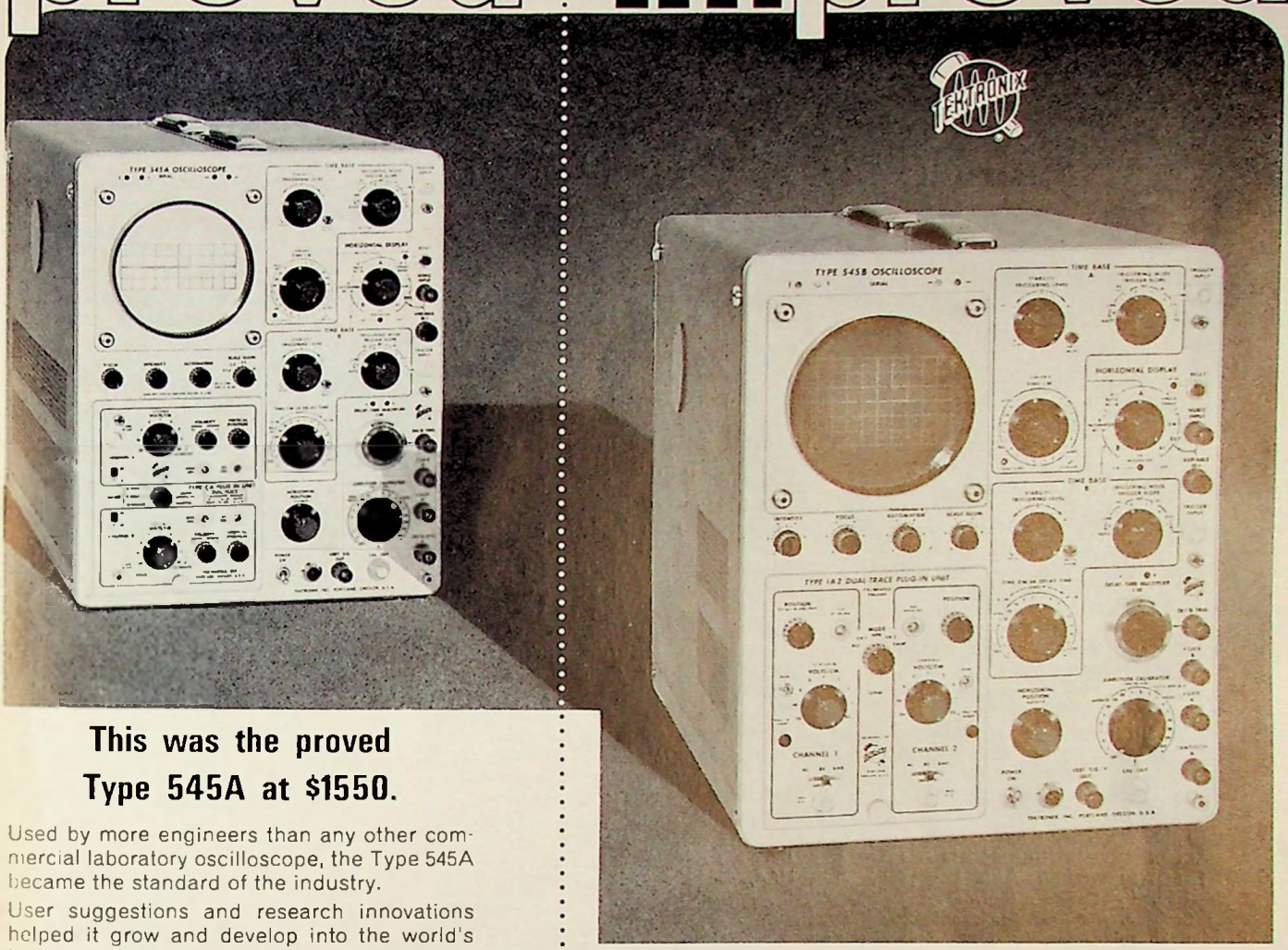
Session Chairman: D. D. King
Aerospace Corporation
El Segundo, California

The development of components for the millimeter portion of the radio frequency spectrum has proceeded gradually over the years. Sufficient progress has been made so that planners have begun to think seriously of systems applications. This session will present a practical cross section view of the progress. Aerospace Corporation's millimeter research facility for systems applications will be described. Examples of important device progress will be given in three separate papers. One deals with 1-mm detectors, one with ferrite devices at 3-mm, and one with a survey of millimeter sources. The session will be concluded with a round-table discussion on the future of millimeter waves.

11.1 **RESEARCH ON THE SUITABILITY OF MILLIMETER WAVELENGTH SYSTEMS FOR SPACE APPLICATIONS,** by B. J. DuWaldt and L. A. Hoffman, Aerospace Corporation, El Segundo, California.

(CONTINUED ON PAGE 16)

proved improved



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Further updating of the "A" Model to implement additional improvements has resulted in a new "B" Model—as the "A" Model was developed from the early Type 545.

So, now, the Type 545A is superseded by the Type 545B. Instrument support will continue to be available for the "A" Model, however, for at least 10 years.

Here is the improved Type 545B at $1550.

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Use all your Tektronix Type A to Z Plug-In Units at equal or better frequency response, or the new Type 1A1 or 1A2 Dual-Trace Plug-In Units for 50 mv/cm at dc-to-33 Mc. The Type 1A1 also offers 5 mv/cm at dc-to-23 Mc dual-trace, and, by cascading the two amplifiers, approximately 500 μv/cm at 2-cps-to-14 Mc.

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11.2 **MILLIMETER WAVE RADIOMETRY UTILIZING LOW TEMPERATURE BOLOMETERS,** by Frank J. Low, National Radio Astronomy Observatory, Green Bank, Virginia.

11.3 **FERRITE DEVICES FOR THE 3 MM BAND,** by Alan J. Simmons and Orville M. Giddings, TRG, Inc., East Boston, Massachusetts.

11.4 **MID-1964 REVIEW OF AVAILABLE MILLIMETER WAVE SOURCES,** by D. C. Forster, Hughes Research Laboratories, Malibu, California.

11.5 **THE FUTURE OF MILLIMETER WAVES,** A Round Table Discussion by the Authors and Chairman.

Session 12

Silicon Devices For High Frequencies

Thursday, August 27

Session Chairman: D. B. Medved
Electro-Optical Systems, Inc.
Pasadena, California

The four papers in the session discuss high-frequency silicon devices. The first paper discusses a transistor which combines field effect with avalanche breakdown to produce a 7 kmc device. A paper on a high-power pulse modulator follows. The last two papers discuss a diode utilizing charge storage for frequency multiplication, and improvements in diodes for tuning purposes.

12.1 **SURFACE CONTROLLED AVALANCHE TRANSISTOR,** by W. Shockley and W. W. Hooper, Clevite Semiconductor Division, Palo Alto, California.

12.2 **A NEW HIGH POWER FOUR-LAYER DIODE AS A PULSE MODULATOR SWITCH,** by Walter Schroen, Kurt Hubner Jacques Beaudouin and R. M. Scarlett, Clevite Semiconductor Division, Palo Alto, California.

12.3 **VARACTOR DIODES AND CIRCUITS FOR HIGH POWER OUTPUT AND LINEAR RESPONSE,** by Gerald Schaffner and John Cochran, Motorola Semiconductor Division, Phoenix, Arizona.

12.4 **LARGE-AREA 200-VOLT PLANAR VOLTAGE-VARIABLE CAPACITANCE DIODES,** by G. L. Schnable, A. J. Certa and L. F. Wallace, Lansdale Division, Philco Corporation, Lansdale, Pennsylvania.

Session 13

Information Theory And Communication

Thursday, August 27

Of interest to both the specialist and those who interface with communications techniques and systems, this session covers a variety of topics including coding and decoding, detection, phase-locked techniques, and fading. A somewhat tutorial flavor will prevail.

13.1 **OPTIMUM DETECTION AND SIGNAL SELECTION FOR PARTIALLY COHERENT BINARY COMMUNICATION,** by Andrew J. Viterbi, University of California, Los Angeles, California.

13.2 **ANALOG COMMUNICATION OVER RANDOMLY-TIME-VARYING CHANNELS,** by H. L. Van Trees, Lincoln Laboratory, Massachusetts Institute of Technology, Cambridge, Massachusetts.

13.3 **CAPABILITIES OF BOUNDED DISTANCE DECODING,** by A. D. Wyner, Bell Telephone Laboratories, Murray Hill, New Jersey.

13.4 **DISTRIBUTION-FREE COINCIDENCE DETECTION PROCEDURES,** by D. G. Lainiotis and J. C. Hancock, Communication Sciences Laboratory, Purdue University, Lafayette, Indiana.

13.5 **ANALYSIS OF THE INTRINSIC SECURITY, BANDWIDTH AND SYMMETRY PROPERTIES OF THREE CLASSES OF CODES,** by A. Brothman, L. M. Horowitz, A. H. Miller, Transitel International Corporation, Paramus, New Jersey and E. H. Brothman, Public Service Company of New Jersey.

Session 14

Instrumentation and Navigation

Thursday, August 27

A digital approach is used in a new instrument. RF techniques are applied to propellant gaging under zero-gravity conditions. Transistor switching is utilized to power gyros. A tutorial paper is included on inertial navigational systems for ground and aerospace applications.

14.1 **DIGITAL COUNTER UTILIZING DYNAMIC MEMORY,** by Donald E. Lehmer, Berkeley Division, Beckman Instruments, Inc., Richmond, California.

14.2 **ZERO-GRAVITY PROPELLANT GAGING UTILIZING RADIO FREQUENCY TECHNIQUES,** by R. Garriott, General Dynamics/Astronautics, San Diego, California.

14.3 **A UNIFIED APPROACH TO THE ERROR ANALYSIS OF AUGMENTED DYNAMICALLY EXACT INERTIAL NAVIGATION SYSTEMS,** by J. F. Caligiuri and S. Fagin, Sperry Gyroscope Company, Great Neck, New York.

14.4 **TECHNIQUES OF ENERGIZING AIR CORE ELECTROMAGNETIC SIMULATORS,** by L. J. Johnson and Albert Lucic, Autonetics, NAA, Anaheim, California.

14.5 **TECHNIQUES FOR PULSE OPERATION OF GYROSCOPE MOTORS,** by A. K. Dorsman and H. F. Kinner, Autonetics, NAA, Anaheim, California.

Session 15

Power Communications And Protective Relays

Thursday, August 27

Panel Discussion:

Power system protective schemes require communication channels with varied characteristics. The capability and limitations of the various channels and relays employed to provide these requirements will be discussed. Included will be a presentation on the use of overhead static wires for carrier transmission.

D. A. Gillies,
Bonneville Power Administration,
Portland, Oregon.

A. B. Day,
Idaho Power,
Boise, Idaho.

G. Everett Farmer,
Signal Mountain, Tennessee.

Session 16

Antennas

Friday, August 28

Session Chairman: R. C. Hansen,
Aerospace Corporation
El Segundo, California.

The session covers the gamut of current interests in antennas. A paper on wind tunnel measurements of large dish antennas is highly pertinent to the large antennas being built for deep space tracking. Electrically short VLF antennas for submarine communications are covered in a paper which gives scale model measurements of umbrella loading. Moving to the phased array field, a novel scanning scheme uses a Luneberg lens to excite a transmitting array through a battery of coaxial cables thereby utilizing the excellent scanning properties of the Luneberg lens with the array advantages. Random errors in arrays are also covered. Finally, optical correlation and formation of multiple beams in image space are described.

16.1 **WIND FORCES ON PARABOLIC ANTENNAS,** by H. Hirst and K. E. McKee, Andrew Corporation, Chicago, Illinois.

16.2 **THE CHARACTERISTICS OF ELECTRICALLY SHORT, UMBRELLA TOP-LOADED ANTENNAS,** by A. F. Gangi, S. Sensiper and G. R. Dunn, Space-General Corporation, El Monte, California.

16.3 **OMNI-DIRECTIONAL PHASED SPHERICAL ARRAY ANTENNA,** by Simon M. Pristoop, Aerospace Division, Westinghouse Electric Corporation, Baltimore, Maryland.

16.4 **NEW RESULTS IN THE THEORY OF RANDOM ERRORS IN PHASED ARRAYS,** by Joel L. Ekstrom, Sylvania Electronic Systems, Waltham, Massachusetts.

16.5 **AN OPTICAL TECHNIQUE FOR SIMULTANEOUS BEAMFORMING AND CROSS-CORRELATION,** by D. C. Beste and E. N. Leith, Institute of Science and Technology, The University of Michigan, Ann Arbor, Michigan.

Session 17

Lasers

Friday, August 28

Session Chairman: Theodore H. Maiman,
Korad Corporation,
Santa Monica, California.

Several quite recent developments of practical significance will be presented. The first paper reviews a new class of gaseous lasers which now provide cw output throughout the visible spectrum and into the ultraviolet. A new technique for deflecting and modulating light beams is discussed as is atmospheric propagation. The last paper treats some of the implications of coherence. The session will conclude with a round table discussion of the future of lasers.

17.1 **NOBLE GAS ION LASERS THROUGHOUT THE VISIBLE,** by W. B. Bridges, Hughes Research Laboratories, Malibu, California.

17.2 **ELECTRO-OPTIC GRATINGS FOR LIGHT DEFLECTION AND MODULATION,** by E. I. Gordon and M. G. Cohen, Bell Telephone Laboratories, Murray Hill, New Jersey.

17.3 **PROPAGATION OF LASER BEAMS THROUGH THE ATMOSPHERE,** by F. E. Goodwin, Hughes Research Laboratories, Malibu, California.

17.4 **STATISTICS OF LASER AND THERMAL RADIATION,** by Henri Hodara, National Engineering Science Company, Pasadena, California.

17.5 **FUTURE OF LASERS,** a round table discussion.

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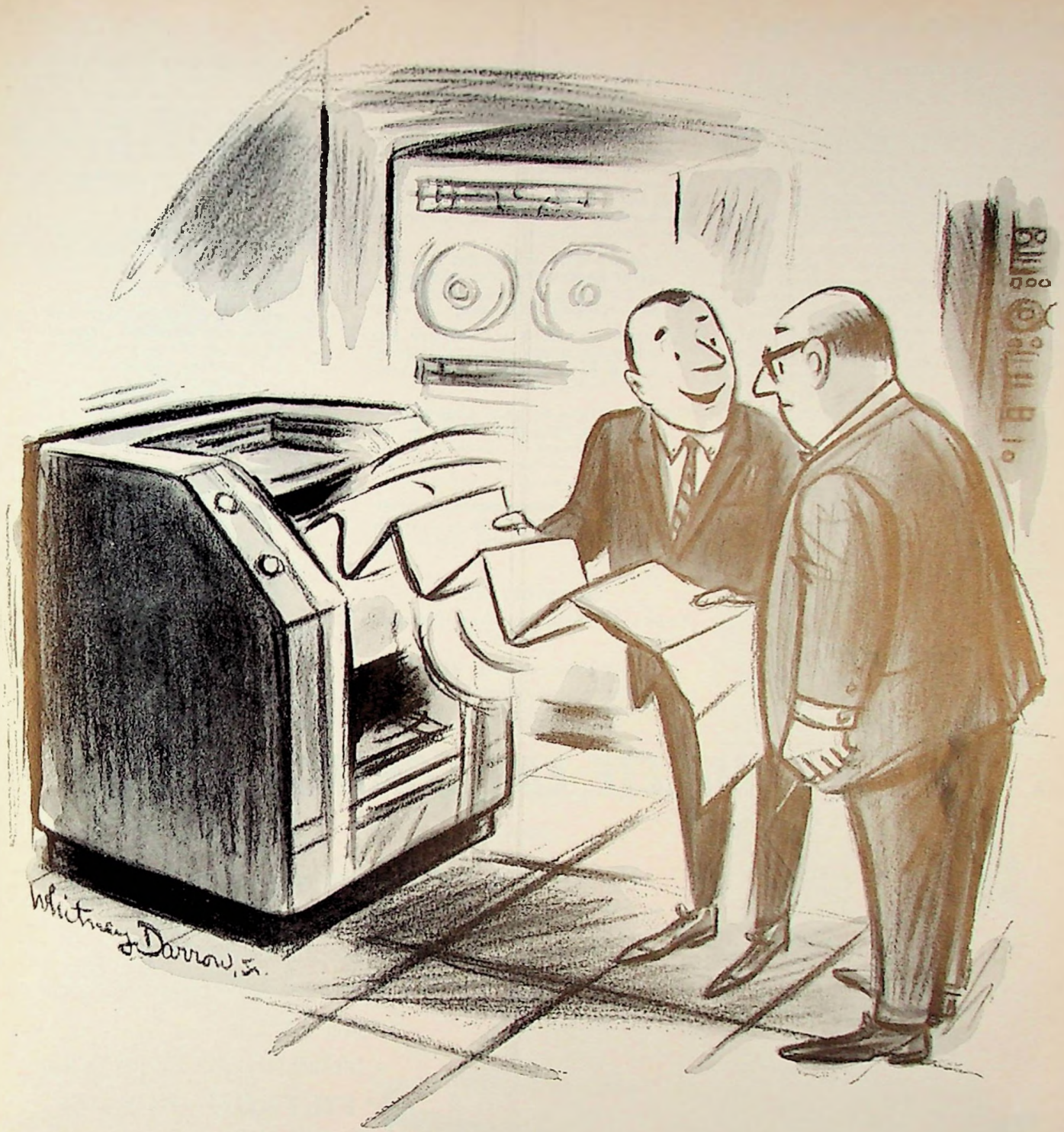

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CIRCLE INQUIRY CARD NUMBER 11

Session 18

New Circuit Elements And Principles

Friday, August 28

Session Chairman: Norton W. Bell,
Bell and Howell Research Center,
Pasadena, California

Design of thin-film distributed RC networks to have a desired input impedance; design of thin-film quartz resonators to form elements of band-pass filters; a new application of an effect in conventional transistors makes possible a simple one-transistor bistable circuit; temperature of a microcircuit chip is controlled by a feedback system whose sensor is a novel bridge using semiconductor elements.

18.1 **THE EXACT REALIZATION OF DISTRIBUTED RC DRIVING POINT FUNCTIONS,** by Ralph W. Wyndrum, Jr., Bell Telephone Laboratories, Whippany, New Jersey.

18.2 **QUARTZ UNI-WAFER FILTER, A THIN FILM DEVICE,** by D. R. Curran, W. J. Gerber, D. J. Koneval and K. A. Pim, Electronic Research Division, Clevite Corporation, Cleveland, Ohio.

18.3 **A ONE-TRANSISTOR FLIP-FLOP,** by B. E. Briley, Automatic Electric Laboratories, Inc., Northlake, Illinois.

18.4 **TEMPERATURE CONTROLLED MICROCIRCUITS,** by B. Weir and T. Prosser, Amelco Semiconductor, Mountain View, California.

Session 19

Data Handling And Communications In Space

Friday, August 28

Session Chairman: Robert Gottfried,
TRW Space Technology Laboratories,
Redondo Beach, California

This session is a blend of the two closely related disciplines of data handling and communications. General coverage of the telemetry and data handling fields is offered, plus a paper relating to communications handover for medium altitude satellite communications systems.

19.1 **SAMPLED DATA PREDICTION FOR TELEMETRY BANDWIDTH COMPRESSION,** by J. E. Medlin, Lockheed Missiles and Space Company, Sunnyvale, California.

19.2 **COMMUNICATIONS HANDOVER FOR MEDIUM ALTITUDE SATELLITE SYSTEMS,** by Andrew Werth, ITT Federal Laboratories, Nutley, New Jersey.

19.3 **APPLICATION OF DATA COMPRESSION TO FLIGHT DATA PROCESSING,** by William L. Morrison, Jr., Lockheed Missiles and Space Company, Sunnyvale, California.

19.4 **THEORETICAL CONSIDERATIONS OF EXTENDED BANDWIDTH FM,** by P. A. Godinez, Leach Corporation, Azusa, California.

Session 20

Power Transmission And Distribution

Friday, August 28

Session Chairman: James E. Connor,
Southern California Edison Company
Los Angeles, California

The continuing demand for electric power requires bulk power transmission systems employing new concepts and techniques for increased reliability. This session will review both analytical and field test data on representative extra high voltage transmission systems presently in either design or operation. In addition, new techniques for the protection of line and substation facilities will be presented.

20.1 **APPLICATION OF PREDISCHARGE CURRENT OF PARALLEL ELECTRODE GAPS,** by C. F. Wagner, Consulting Engineer, Pittsburgh, Pennsylvania.

20.2 **SWITCHING SURGE TESTS ON FULL SCALE 500 KV MODEL TRANSMISSION TOWER,** by A. W. Atwood, Jr., Southern California Edison Company, Los Angeles, California. A. R. Hileman and J. S. Skooglund, Westinghouse Electric Corporation, East Pittsburgh, Pennsylvania and J. F. Wittibschlager, The Ohio Brass Company, Barberton, Ohio.

20.3 **ANALOG COMPUTER STUDY OF SWITCHING SURGE TRANSIENTS FOR THE 500 KV SYSTEM OF THE SOUTHERN CALIFORNIA EDISON COMPANY,** by J. Sabath, Southern California Edison Company, Los Angeles, California, and H. M. Smith and R. C. Johnson, Westinghouse Electric Corporation, East Pittsburgh, Pennsylvania.

20.4 **SWITCHING SURGE FIELD TESTS AT 345 KV (ARIZONA PUBLIC SERVICE COMPANY),** by I. B. Johnson, General Electric Company, Schenectady, New York, and R. H. Hartley, Arizona Public Service Company, Phoenix, Arizona.

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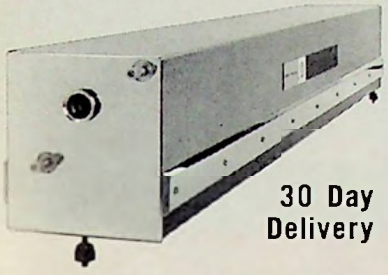

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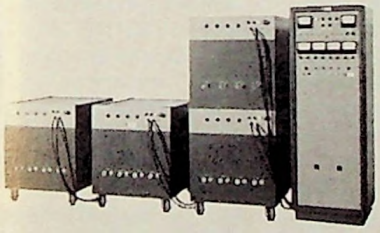

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CIRCLE INQUIRY CARD NUMBER 14

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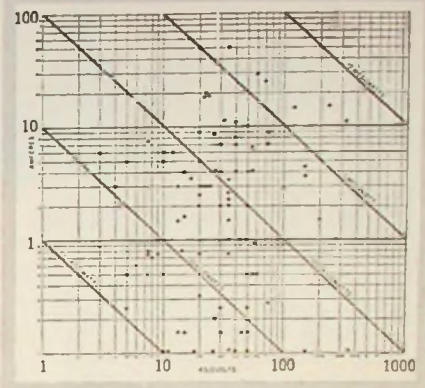
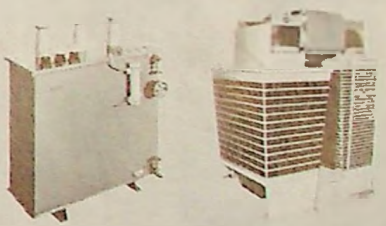


High-voltage DC Power Supplies

Your special requirement may be a field proven standard design with us, and we can easily build you another copy fast, at low cost, and with performance assured. The above chart shows some of the hundreds of designs we've built. If your exact rating is not shown, the odds are that we still have a standard design for it. We've built for all types of Commercial and MIL requirements. Send us your "special" requirement.



High-voltage Transformers-Reactors

Years of experience also enables us to offer field-proven standard designs for your special requirements for magnetic components. Our capabilities:

RECTIFIER PLATE TRANSFORMERS — COMPONENT TANKS
- Separate or integral components
- Fluid filled: to 70 kv, 2000 kva
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- To 350 kv and 200 MW peak, 2000 kw ave

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CIRCLE INQUIRY CARD NUMBER 15

Exhibits . . .

Wescon will feature a dramatic new format as to exhibits in its 1964 format, as a result of a careful study made on the 1963 show. This study revealed two major facts: That visitors *plan in advance* to visit most of the booths they are interested in, and secondly, that visitors are primarily interested in products and services *related to their own jobs.* Statistically 74% of the visitors concentrate on a planned schedule of visiting, decided upon ahead of time; 72% of the hours spent in visiting booths are pledged to looking at new products and important developments with a direct relationship to their jobs.

For this reason, Wescon has departmentalized the show into 9 categories:

- Components
- Data Processing & Conversion
- Automatic Control
- Measurement
- Production Equipment
- Communications & Detection
- Air & Space Systems
- Audio & Closed Circuit TV
- Publishers

Of the two show areas — Hollywood Park and the Sports Arena, Components, Automatic Control and Data Processing & Conversion will be shown at Hollywood Park Race Track. The rest of the categories will be shown at the Sports Arena.

This eliminates the old Wescon tent, which was unsuitable both for exhibitors and visitors.

Hollywood Park is only 5 minutes from International Airport, 20 minutes from the Sports Arena. The Sports Arena is only five minutes from major downtown hotels. The two locations will be linked with a rapid free bus shuttle system which will give the visitors excellent service between the two locations.

Exhibit Hours Are:

Tuesday, August 25, 9:30 AM to 6:30 PM (Followed by Cocktail Party at Hollywood Park)

Wednesday, August 26, 9:30 AM to 9:30 PM

Thursday, August 27, 9:30 AM to 6:30 PM

Friday, August 28, 9:30 AM to 6:30 PM

There will be an international exhibit for foreign consuls, trade commissions, etc. at Hollywood Park, adjacent to the Clubhouse Restaurant.

Wescon is held on alternate years between LA and San Francisco. In 1962 there were 1230 booths in Wescon. This year the figure will be about 1240. Attendance in Los Angeles ran about 46,000 in 1962, and should run higher in 1964.

Wescon has been in constant touch with its exhibitors throughout the year, since the first call for assignments and had designed a useful booklet "What Makes a Winner at Wescon", which gives helpful hints on better display practice. As a result, attendees should find a show designed more to their needs this year.

The Chairman of the Exhibit Committee is Ben Warner, Jr., Packard-Bell. He has two Vice-Chairmen, one for each of Wescon's two locations. Edward Watts, Instruments Specialists, Inc. and Robert Guss, Beckman Instruments.

Committee members include: Mel Sturgis, Engineered Electronics Co., Joe Brown, Collins Radio, Fred Weisel, Babcock Relays, Frank O'Brien, TRW Electronics, Ralph Hippert, Cannon Electric Company, Ed Williams, The Farr Company, Gene Grahn, DMI Division, Presentation Industries, Kenneth Jordan, Jobson, Jordan, Harrison & Schulz, and Paul Bertness, Microdot, Inc.

It is the job of the committee to monitor the exhibit areas to assure compliance with the rules. However, the objective of the Exhibits Committee is not to act as a rigid censor, but merely to help exhibitors get the most out of their valuable time and money, without hindering the operation of any neighboring exhibitor. To

Two Exhibit Locations

HOLLYWOOD PARK

SPORTS ARENA

this end, the rules are as permissive as possible.

It is also the job of this committee to activate suggestions for further show studies which, in future years to come, will help visitors and exhibitors get still more out of Wescon, just as the 1963 West Associates study helped this year's show. Results of this study will be publicized in Wescon mailings, in exhibitor meetings during and between Wescon on both the east and west coast, and through general editorial media.

Another special feature this year to spotlight the importance of the exhibits will be billboard displays at strategic points, and a complete advertising campaign which will carry out this year's theme "New Focus on Electronics" and stimulate show attendance.

Facilities Committee Directs Wescon Army

By far the largest committee operation in Wescon takes place behind the scenes, where the Facilities Committee provides the people, the equipment, the transportation the signs and posters needed to facilitate the movement of 45,000 individuals between the various show locations and points within each location.

Over-all direction of the Facilities Committee this year is in the hands of William W. Wilson, Neely Enterprises, assisted by two general Vice-Chairmen, Benton Bejach, Borg Warner Controls, and Harry A. Mayer, General Electric Company. Einar Ingebretsen, original Chairman of this committee turned over the assignment to Mr. Wilson upon his transfer to Lockheed Sunnyvale.

ROCKETDYNE

Technical Tours . . .

From the Santa Susanna mountains to Redondo Beach, from the plains near San Bernardino to the Anaheim Basin—the seven Technical Tours in this year's Wescon stretch to all points of the local compass.

To out-of-town visitors the tours offer a secondary attraction of a well-rounded visit of the area, if all are taken. For local attendees, they offer a chance to poke into unknown parts of huge LA County and surrounding territory.

Tours will cover Autonetics Division of North American (Anaheim), California Institute of Technology (Pasadena) Jet Propulsion Laboratories (also Pasadena) Rocketdyne Division of North American, (Santa Susanna mountains beyond the San Fernando Valley) Southern California Edison's Etiwanda Steam Plant (near Fontana) Space Technology Laboratories (in Redondo Beach near the ocean) and the University of Southern California in central LA, almost within walking distance of the Sports Arena where the exhibits will be held.

ETIWANDA STEAM STATION
UNITS 3 & 4

OLIN HALL, UNIVERSITY OF SOUTHERN CALIFORNIA

AUTONETICS — PRODUCTS

CALTECH

SPACE TECHNOLOGY LABORATORIES

JET PROPULSION LABORATORIES

Future Engineers Show . . .

Twenty-seven Future Engineers, representing a dozen western states, will participate in Wescon's Future Engineers Program this year. Contributing a most significant part of Wescon, these Future Engineers will compete for major scholarships, both in exhibiting and in a technical seminar.

The Future Engineers are selected from among High School students who participate in various science fairs throughout the Sixth Region IEEE. Wescon pays the way for at least one student and one instructor from each of the Sections in the Region. Some Sections pay for the attendance of more than one student.

As to the show, they present their exhibits in a special area at the Sports Arena, known as the Future Engineers' show. This "show within a show" is open to all Wescon visitors. It also is the one show area which is open to the youngsters at all times. The main Wescon exhibit is open to the public including children only on the last afternoon of the show.

Exhibits in the Future Engineers' show are planned and built by the students themselves with the advice of the instructors, and show considerable ingenuity in execution.

The hours of the Future Engineers show are exactly the same as for the regular Wescon exhibits, with the exception of Wednesday, Aug. 26th, when the exhibits are closed for judging from 9 AM to 11:45 AM.

These hours are:

Tuesday, August 25, 9:30 AM to 6:30 PM
Wednesday, August 26, Noon to 9:30 PM
Thursday, August 27, 9:30 AM to 6:30 PM
Friday, August 28, 9:30 AM to 6:30 PM

All visitors to Wescon should take a moment to visit the Future Engineers show and encourage the young aspirant-engineers.

Student activities at Wescon are by no means limited to the exhibit itself. The headquarters for the students is the Figueroa Hotel. On Tuesday night, Aug. 25, they will be hosted in a tour of the city, a Tanner tour which will cover all major points of interest.

On Wednesday the Future Engineers will have to stay close to the exhibits for judging and participating

Hospitality and Visitors' Services Committees Assist WESCON Show

Two committees that do a special job for Wescon are the Hospitality Committee and Visitor's Services. The former committee must maintain a central location for society officials and others who conduct sponsor's business at the show, and see that special guests who are concerned with Wescon, but not active in the electronics field, such as city officials, government officials and honored guests are made to feel welcome. This year the job of Hospitality Chairman is held by William J. Moreland, Conrac Division, Giannini Controls Corp. Charles C. Olsefsky, Space and Information Division, North American serves as Vice-Chairman.

The Visitors' Services Committee will maintain seven locations during Wescon to cover questions of out-of-towners and others who have special problems connected with the show. These locations are: Los Angeles International Airport, The International Hotel, The Ambassador, Statler-Hilton, Biltmore, and, of course, the Sports Arena and Hollywood Park.

There is to be a Captain in each area, in charge of the booth, and individuals who are adept at dealing with the public, armed with complete information on the city, its hotels and eating places, and specialized information on Wescon, such as shuttle bus schedules, registration times, etc.

This year the Visitor's Services Committee consists of: Robert C. Tetherow, Arnold Engineering, Chairman, Charles R. Fetty, WESTRON, Vice-Chairman, and the following as members. Arvin Bell, Arvin Bell Company, Joe Costello, Costello & Co., Jack Vega, Kittleson, Co., Robert Walters, IMC Magnetics Corp., Tom Werner, Rheem Electronics, Dwain Short, Western Control Equipment Co., Tom Mathews Electronic Specialty Co., Jack Guy, Tech-Ser and Roland Olander, Roland Olander Company.

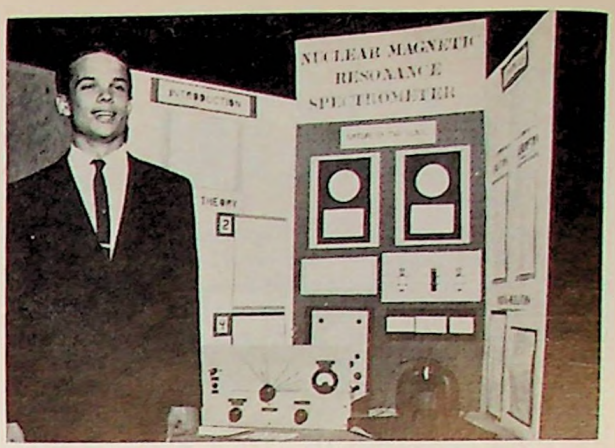
Eta Kappa Nu Luncheon Honors Lee DuBridge

An added feature at Wescon this year is a Joint Wescon-Eta Kappa Nu Luncheon, honoring the induction of Dr. Lee A. DuBridge to Eminent Membership in Eta Kappa Nu, the national honorary electrical engineering association. It will be held on Tuesday, August 25, 1964 at 12:30 PM at the Garden Room of the Statler-Hilton Hotel. Price is $4.75 per

CONTINUED ON PAGE 31

(R) Richard Bradley, Folsom High School, Folsom, California, will be displaying his Nuclear Magnetic Resonance Spectrometer at the 1964 Future Engineers Show.

(L) Bruce Lites, Highland High, Albuquerque, was 1963 Future Engineers Exhibit winner. Dr. Frederick E. Terman is shown with the young scientist at the time of the awards luncheon last year. Bruce was the recipient of a $1000 scholarship for his outstanding science project.



in the evening show hours, as do the regular exhbitors. But Thursday will be a star day for the Future Engineers. In the morning those who have submitted papers will present them at a Future Engineers' Symposium in the Sports Arena Meeting Room. This Symposium is open to all Wescon visitors. It takes place from 9:30 AM to 11:15 AM.

After the Symposium the students will move to the University of Southern California for a Students' Luncheon, restricted to students, their parents and their instructors. They will enjoy a steak luncheon and hear John Moore, President, Autonetics, as a principal speaker. Mr. Moore is himself a former teacher, a college professor from St. Louis.

That afternoon, the students will be hosted by the Pacific Telephone Company on a tour of company facilities and then be given a free dinner by the phone company.

That evening the group moves out to the NBC Television studios in Burbank to tour the establishment. If there are any shows being taped at the time, the students will be invited to watch the process.

On Friday, August 28th, the students will be on duty at their exhibits to host a guided tour by the Women's Activities. The tour takes place from 10-11 AM. The Women's Activities group has also assigned volunteer hostesses in the Future Engineers' show area during show hours to help the students, parents, instructors and visitors get the most out of the displays.

The Future Engineers committee, which has planned this event includes:

Chairman, Charles Edwards, Bendix, Vice-Chairman, Ernst Schreiber, Pacific Telephone.

Committee members include: C. T. Koerner, Pacific Telephone, Dr. Leonard Gardner, Consulting Scientists, R. C. Mackey, UCLA Engineering, John Thatcher, Jet Propulsion Labs, Joseph Cryden, Hughes Aircraft, N. L. Brotzman, Pacific Telephone Company.

Cocktail Party . . .

Hollywood Park, the home of Swaps and other famous four-legged animals gives way to the two-pedaled kind, for the annual Wescon Cocktail Party, Tuesday, August 25.

Expect to see R. E. Darringer, Pacific Scientific Co., Chairman of the event, and his Vice-Chairman, Jack Beamish, Litton Industries, dressed in appropriate garb, a tout's outfit. Darringer will prevail upon other well-known industry personnel to masquerade as a Runyon character or a would-be Willie Shoemaker. All this in an attempt to create the usual friendly atmosphere prevelant at these annual functions.

Hollywood Park's Clubhouse, usually the scene of wild-eyed two-dollar bettors, will find itself in the unusual position of dispensing highballs through the mutual windows instead of the American Totalisator Company's tiny wager chits.

Wescon takes the gamble out of drinking by offering the 2,000 or so expected attendees three drinks plus hors d'oeuvres (no relation to the four-leggers), for a mere $5.50. Extra drink tickets are available after entering the Club House. The cocktail party's post time is 6:30 PM with the finish line being crossed at approximately 8:30 PM.

For those wishing to leave the driving to someone else, Wescon has conveniently provided bus service back to the Statler Hotel or Sports Arena as late as 9:20 PM.

The Cocktail Party is the one Wescon event that allows the visitor to renew old acquaintances, talk business, view the industrial design exhibits, or just relax in the beautiful surroundings. This opening day get-together is a must for finding out who's at Wescon. Put it on your agenda.

Ladies Program . . .

This year its the "dramatic" look for the Ladies who visit Wescon and attend the various events scheduled for them — all the way from a luncheon with the glamorous Hedda Hopper to a night at the Hollywood Palladium, which has been specially reserved for Wescon visitors on that night.

Events begin with a musical program on "Merrie England" in honor of Shakespeare's four hundredth birthday at the Pasadena Playhouse on Tuesday, August 25, at 1:45 PM. While the program honors Shakespeare, the emphasis will be placed more on fun and pleasure than high dramatic numbers, with all the life and gaiety of the England of "Tom Jones" of a later period.

The performers are the John Biggs Consort, a talented ensemble noted for the warmth of its music and the versatility of the performers. Especially outstanding in the group is Salli Terri, a recording artist of renown,

CONTINUED ON PAGE 30

The Turf Club at Hollywood Park will be the site of the 1964 Wescon Cocktail Party. Paying an advance visit to the club's facilities are 1964 Wescon board of directors (L-R) Ralph A. Lamm, convention director; Edward C. Bertolet, chairman; S. H. Bellue, chairman of the executive committee; and Hugh P. Moore, show director.

Banquet . . .

An evening of pure fun, no serious speakers, is what to expect at the Annual Wescon Banquet, Thursday, August 27.

For what could be more entertaining than a banquet at the world famous Hollywood Palladium, followed by dancing to the ten-member Lawrence Welk orchestra.

Although Welk will not personally appear due to summer committments, his orchestra and the Lennon Sisters will perform. In addition, a special one hour show is included featuring a majority of Welk's TV performers.

John Guarrera, Guide Manufacturing Co., Chairman, and John O'Halloran, O'Halloran Associates, Vice-Chairman of the Banquet Committee, have promised to have a well-known Hollywood personality act as master-of-ceremonies.

Festivities begin at 7:00 PM with no-host cocktails, 8:00 PM with dinner and dancing. Cost is $9.00, with table seating limited to eight, in order to insure comfort. Reservations for individual seats or tables should be directed to the Wescon Business Office, 3600 Wilshire Blvd., Los Angeles, 90005.

The Hollywood Palladium has been a landmark in Southern California for years. It was completely modernized a few years ago, and since has featured the week-end attraction of the Welk Orchestra. The Palladium is well known for its food, having catered the mammoth "Dinner for President Eisenhower" at the Pan Pacific Auditorium, serving 7200 guests. President Johnson and the late President Kennedy have spoken at the Palladium, as well as hundreds of other political leaders, business executives and stars.

Although billed as "social affairs" the past few Wescon Banquets featured "long-winded" speakers. Thus, the dancing and entertainment commenced late in the evening. Not so this year. The new tack taken by Wescon will limit the talks, including the presentation of the Industrial Design and Region Six Awards to no more than one-half hour.

Marketing Men May Set Record at Annual DMR Conference

The day before Wescon opens, another conclave will take place in Los Angeles: The Distributor-Manufacturer-Representative Conference.

Scheduled for Monday, August 24, the DMR Conference expects nearly 500 electronics marketing men for their 10th Annual meeting. Herb Becker, Herb Becker Company, Chairman of the day-long event, expects to break previous attendance records.

This full-day marketing forum allows western electronics distributors to meet with spokesmen for Wescon exhibiting manufacturers and their sales representatives.

Those invited to attend include all the electronics distributors in the western states, all Wescon exhibitors who market through distributors or who wish to do so, and all western electronics sales representatives associated with Wescon exhibitor companies.

The Convention Center of the Ambassador Hotel will be used exclusively by the Conference, emphasizing again that Wescon has spread its wings over all Los Angeles.

Participating distributors are assigned one or two conference tables at no charge. The manufacturer and his representative meet the distributor at his table for a 20-minute conference period. At the end of each session, a buzzer signifies time for visitors to move on to their next appointments. The conference day is broken into 20 such sessions.

For impromptu business confabs outside the regular schedule, a large area in the Ambassador Ballroom has been reserved. It will also be the scene of an all-conference luncheon at noon, which has no scheduled speaker.

Included in the low price of $7.50 is conference registration, coffee

CONTINUED ON PAGE 28

DMR CONFERENCE CONT. FROM PAGE 27

breaks, continental breakfast and lunch.

Details of the conference are being arranged by Becker's committee, of which Homer Nielsen, Kierulff Electronics, is Vice-Chairman.

Committee members, representing major areas of electronic interest throughout the West, include W. Bert Knight and R. V. Weatherford as advisory members. By area, they are:

Robert Gunn, Bert Moore, Los Angeles; Frank Zurek, Harold Shomler, San Diego area; Carter W. Dunlap, James Burres, San Francisco; Glenn Higgins, Herb Kahn, Phoenix; Don G. MacDonald, Dale G. Weber, Portland area; Lyle Rose, Ken Raymond, Denver area; Lloyd Norberg, Fred Backer, Seattle area; and Harris F. Tarumoto and Bill Kolans, Hawaii.

Museum and Hollywood Park to House Product Design Award Winners

The Wescon Industrial Design Awards Program, an event that annually recognizes the esthetic, visual appeal of a product, will again be a dramatic part of Wescon.

Of the more than 130 products submitted for judging, only nineteen products were chosen by the jury. The professional judges included, Harry Greene, President, Meredino/Greene and Associates, Inc., Pasadena, David Malk, Manager, Industrial Design, Beckman Instruments, Fullerton, Robert Malone, Editor, Industrial Design Magazine, New York, Salvatore Merendino, Head, Industrial Design Department, USC, and Jack Stringer, Manager, Industrial Design Department, IBM-GPD, San Jose.

A month-long public showing of the products selected will take place July 25 to August 19 at the Los Angeles Museum of Science and Industry. At that time, a further, more detailed judging of the actual products will take place. The same judges will select those products considered worthy of the "Award of Excellence," and possibly one "Pacesetter", if, in their unanimous opinion, one product is outstanding. All products will be displayed throughout Wescon week at Hollywood Park.

Former Pacesetter's which will be on display at this years' showing, are the 1962 winner Honeywell H-800 Console and the 1963 winner, Machtronics, Inc's Video Tape Recorder.

The awards will be presented on Thursday, August 27, at the Hollywood Palladium, as a feature of the Wescon Banquet. Milton Immermann, of Walter Dorwin Teague Associates, will present the awards to the Indus-

trial Designer or an officer of the recipient companies.

Chairman for this years event is Philip J. Quinn, Faust/Day Advertising, assisted by Vice-Chairman, George Akin, F. I. Industries.

Industrial Design Award entries are limited to products of Wescon exhibitors, WEMA members, or companies exhibiting in booths of authorized representatives. Products must be components, instruments, systems or other electronic products of the type that normally is exhibited at Wescon.

Products must have been marketed prior to June 1, 1964 and show evidence of conscious industrial design effort and originality.

The products will be displayed in the Club House area of Hollywood Park, making it accessible to Park visitors viewing exhibits or at the Annual Wescon Cocktail Party.

Advance Registration a First of Wescon '64

This year for the first time, visitors to Wescon will be able to register in advance — using the cardboard insert IN THIS MAGAZINE. The Grid-Bulletin is proud that Wescon has chosen its July issue for this advance registration. No other magazine will carry such a card this year.

The registration fee for Wescon is $2.00. By sending in the card with the money, both the registration card (white badge) and plastic inquiry card will be prepared for the visitor ahead of time. At the show the visitor will be able to enter directly and start his visits to the various booths, with no waiting, no forms to fill out, no money to pay at the door. This advance registration material will be mailed to the individual. There are no plans for a will-call on registration.

For those who do not register in advance, all possible efforts are being made to speed up the process and shorten this delay as much as possible.

Visitors may register at the Statler-Hilton (Mezzanine) the Sports Arena and at Hollywood Park. They will fill in information cards at these locations, pass to the cashiers to pay the fee, and proceed on inside the show where a plastic inquiry card will be made. The plastic cards, about the size of the Diners' card are useful for leaving one's name at the exhibitor's booth so that literature may be sent after the show. This eliminates much

CONTINUED ON PAGE 30

LADIES PROGRAM CONT. FROM PAGE 24

who has won the coveted "Grammy Award" for her singing. She also teaches at UCLA, coaches singing, is a student of folk songs going back to the 16th Century, and holds a Master's degree from USC. She has sung with and been a soloist for the Roger Wagner Chorale.

The program will consist of the musical performance, refreshments, and a brief tour of the Playhouse in Pasadena. It is located at 39 S. El Molino Ave., in that city. It is air-conditioned. Visitors may go via air-conditioned bus or travel in private cars. The buses leave the Statler-Hilton at 1:45 PM and will bring back the travelers by 4:30 PM in time for the regular Wescon Cocktail Party to be held at Hollywood Park, 6:30 PM. The cost of the Pasadena afternoon is $3.00. $5.00 if bus is taken.

On Tuesday, August 26 comes the Hedda Hopper luncheon in the Biltmore Bowl. Miss Hopper will give her audience an inside look at the world of show business as she sees it from ringside. Price is $7.50 and there will be a social hour preceding the luncheon itself. The musical program includes Lauren Rhodes, violinist and Betty Rhoades, harpist. The Bowl itself is one of the glamor spots of Los Angeles, well worth a visit from out-of-town attendees and from local wives who haven't been to the Biltmore recently.

On Thursday, August 27, the focus swings to a three part Fashion Show in the Wescon Ladies Headquarters, the Wilshire Room of the Statler-Hilton Hotel. From 10 to 11 AM a wig show will be presented by the designer Michelangelo. From 11:00 to 11:30 there will be a cosmetic demonstration by I. Magnin and Company, a leading high fashion department store of New York and Los Angeles. From 11:30 to 12:30, the focus shifts to swimwear, a fashion show presented by Rose Marie Reid, world-famous swimsuit designers. There is no charge for these three events.

That evening the Wescon Banquet will be held at the Hollywood Palladium, with dancing to the music of Lawrence Welk and his company including the Lennon sisters. Cost is $9.00 per ticket, company tables available at $72.00. This will be a purely social affair, with no formal speaker planned. The Palladium is one of the most beautiful public rooms in the city, has been the host to presidents, governors and other visiting dignitaries for years.

On Friday, the Ladies travel by the regular shuttle bus to the Sports Arena to visit the Future Engineers Show. These are the students from High Schools from all points in the ten Western States who have come to Wescon to display their fledging knowledge of electronics and compete for prizes both with their exhibits and in papers presentations. The tour starts at 9:30 AM, with the shuttle bus departure from the Statler-Hilton. The ladies may also visit the regular Wescon exhibits at this time, and return by any one of the shuttle buses which are free, and which leave on a 5 minute schedule from the Sports Arena. There is no charge from any of this program.

Beginning at 11 AM at the Statler-Hilton, the Ladies Committee has prepared a "Focus on Relaxation" swimming party and suntan fiesta at the poolside of the Statler-Hilton. Dressing rooms will be available — there is no charge for this get-together.

All in all the Ladies Program offers these unique features without crowding to the schedule to the point where the visitor cannot tour L.A. on his own, fulfill other Wescon commitments, or just stay in her hotel room away from the crowds. Headquarters room for the women's program is the Wilshire Room of the Statler.

The Women's Activities Committee is under the Chairmanship of Mrs. Dana Johnson, with Mrs. Burgess Dempster as Vice-Chairman. Other members include: Mrs. S. H. Bellue, Mrs. Edward Bertolet, Mrs. Donald C. Duncan, Mrs. Willard Fenn, Mrs. Floyd Goss, Mrs. Ralph Lamm, Mrs. Douglas Maure, Mrs. Hugh P. Moore and Mrs. Walter Peterson.

CORRECTION:

Women's Activities

Please note that the "Special Preview — Abraham Lincoln" play originally announced for the Ladies Program at the Pasadena Playhouse will not be held. This change was due to circumstances beyond the control of the program planners, but occurred after the advance mailing on Wescon went out. However, there will be a musical event held at the Pasadena Playhouse, same day and time. See story on Women's Activities for details.

WEMA Luncheon Features Haggerty

On Wednesday, August 26, in the Golden State Room, Statler-Hilton, the Western Electronic Manufacturers Association will hold its annual corporate luncheon with P. E. Haggerty, president, Texas Instruments as speaker. Haggerty has been president of the IEEE, and served the Institute in many capacities, as well as being an outstanding industry figure. Price for the luncheon is $6.00 per person. It is open to all Wescon visitors; begins at 12:15 PM. WEMA, together with the Sixth Region, IEEE, sponsors the Wescon show.

REGISTRATION CONT. FROM PAGE 29

of the expense and trouble of handing out literature at the show, which is costly to the exhibitor, physically awkward for the visitor to handle, and wasteful to both, if literature does not get back to the visitors' office. Each booth has a stamping machine for the processing of the visitor's card.

It is the job of the Registration Committee to make the whole process as painless as possible. To this end, locations for registering at Wescon's three spots are carefully studied, and traffic flow planned to expedite crowd movement. Nevertheless there is always a problem of "first morning" registration crowds, which the committee must allow for.

The following will serve on this important committee this year: Chairman, Ted L. Golmis, Hughes Aircraft Co., Vice-Chairman, John Barker, North American Aviation, Space and Information Systems Division.

Ray France, Litton Guidance and Control, is the Technical Advisor. Dennis L. Wilson, also North American S&ID, is Facilities Sub-Chairman. Hollywood Park Chairman will be James Kay, General Precision-Librascope, assisted by Jack Dankowski, Hycon, Vice-Chairman. Arlow Sampson, National Cash Register, will be the Chairman at the Sports Arena, with Bob Shaw, Collins Radio, Vice-Chairman.

WESCON Loves Kids!

But the show is so big and so busy, we have to make special rules covering the junior citizens. Youngsters between the ages of 10 and 18 are welcome to Wescon on Friday (28) as long as they bring dad or mom with them. On all other days, the show is closed to children. Sorry.

ETA KAPPA NU LUNCHEON
CONT. FROM PAGE 22

person. The Luncheon is open to all Wescon visitors. E. L. Mleczko, president, L.A. Alumni Chapter Eta Kappa Nu will be master of ceremonies. Dr. Richard J. W. Koopman, national president will preside over the induction ceremony with the assistance of all national officers and directors.

Classified Advertising

Advertising Rates:

$35.00 a column inch, non-members. $25.00 a column inch, if IEEE member. Classified advertising space is non-commissionable. No cuts or special type. No space limit.

The classified advertising deadline for the August Grid-Bulletin is July 20, 1964. Write or Call: Jeanne Mohit, Los Angeles IEEE Business Office, 3600 Wilshire Blvd., Los Angeles, Calif., 90005. Phone: 387-1203, or Ernesto Montano, San Francisco IEEE Business Office, 701 Welch Road, Palo Alto, Calif. (415) DA 1-1332.

Positions Available

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Requires degree in Electrical Engineering.

ELECTRICAL ENGINEER II
Requires degree in Electrical Engineering and 2 years electrical generation and distribution system experience.

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Civil Service Commission
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ELECTRICAL ENGINEERS

Registered in Calif.

2 LEVELS

EE ($940-$1170 per mo.) requires 2 yrs.' exper. as a registered EE.

Associate EE ($842-$1048 per mo.) requires 1 yrs.' exper.

Interviews to be held in L.A., sometime during Aug. 25-28.

Secure additional information about the required experience and an official application form now. Completed application must be received before 5 p.m. on Friday, July 31, 1964.

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CIRCLE INQUIRY CARD NUMBER 29

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nbridge Division, Cambridge, Maryland

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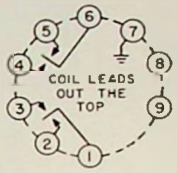
Types 2557 and 2757

Double pole double throw high performance choppers; long life (5000 hours), high shock (100G), low noise (Type 2557 is rated 5 microvolts rms into one megohm load), wide temperature range (−65° C to +100° C), available at 60 cycles (Type 2557) or 400 cycles (Type 2757).



s 2500 and 2700

Low noise high performance SPDT choppers; long life (5000 hours), high shock (100G), high vibration (30 G to 2000 cycles), and wide temperature range (−65° C to +100° C). Type 2500 has 3 uv rms noise or less into 1 meg. The Variable Offset Contribution being low resolution is below 1 uv.

NEW for the Wescon

Model AP1 New magnetic circuit breaker, withstands 75 G shock, 20 G vibration, ruptures 750 amperes at 115 volts AC, handles up to 230 volts, has time delay for motor loads, ratings up to 20 amps AC and DC.

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t test performance
l over 25,000
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This is the lowest cost high performance (0.1% linearity) FM/FM discriminator available today. Complete with band pass filter, low pass filter, output amplifier and power supply. You add only the signal.

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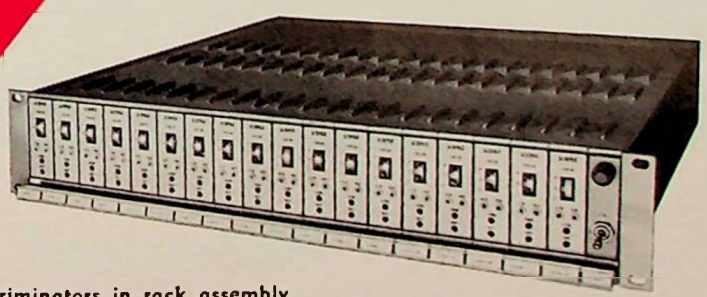
FM/FM
TELEMETRY DISCRIMINATOR



FDS30 Discriminators in rack assembly

Eighteen discriminators side by side in a standard relay rack mounting, had space left over, so we used it for a switch panel. Any and all standard IRIG channels, or constant band width channels, available.

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Seminole Division, Fort Lauderdale, Florida

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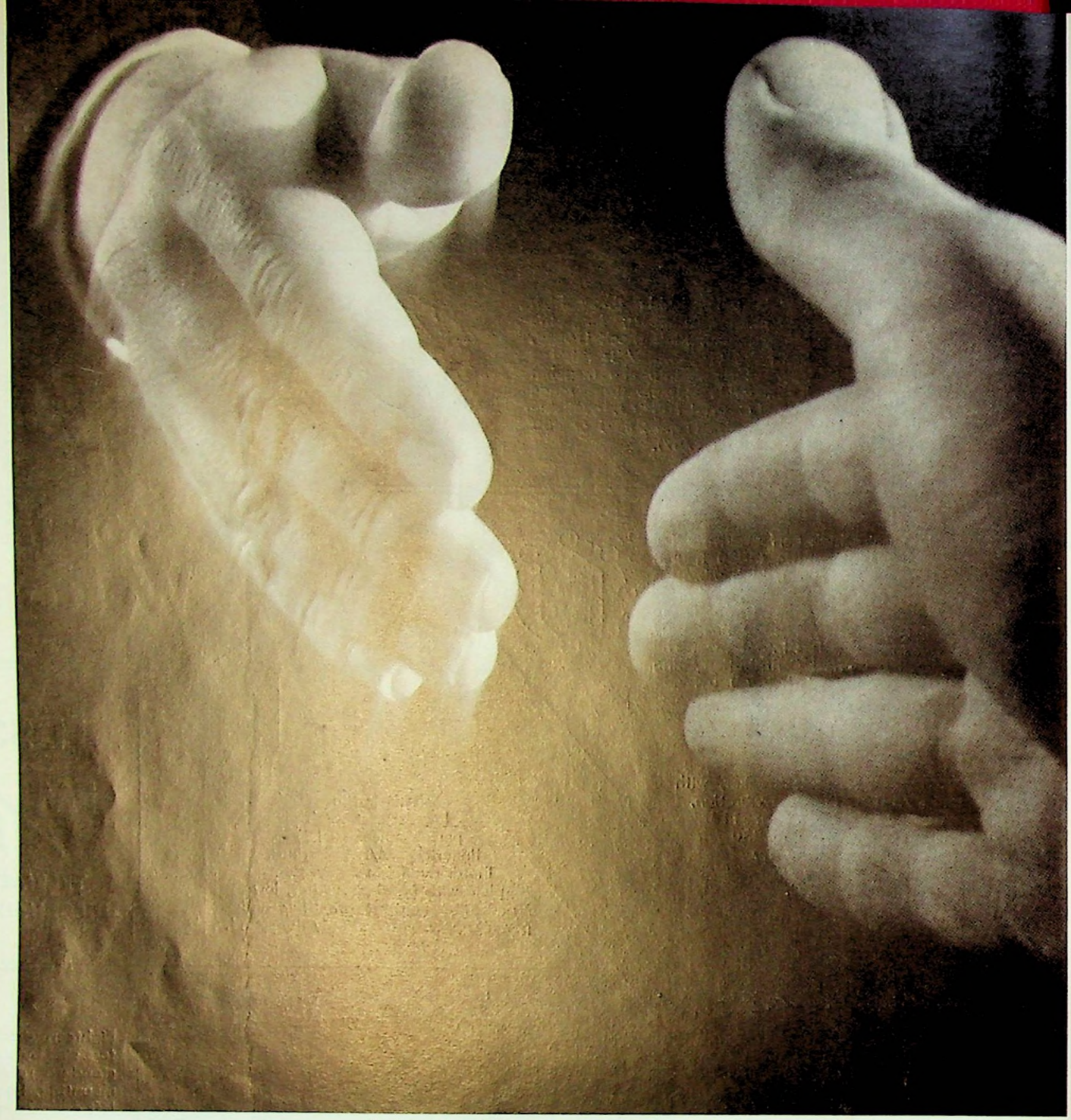

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