EDITOR'S PROFILE of this issue

from a historical perspective …

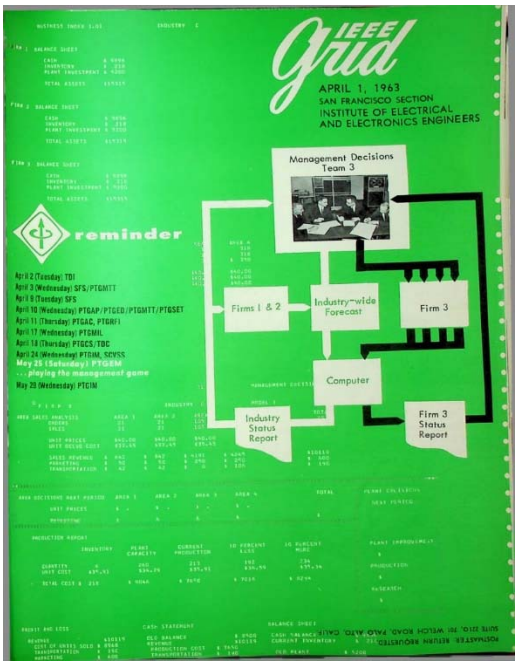
with Paul Wesling, SF Bay Area Council GRID editor (2004-2014)

April, 1963:

Cover: A decision-making simulation is diagrammed, using computer analysis and reports. More is on page 5.

Page 9: The WEEF scholarship fund supports a number of students at schools throughout the west. C. Lester Hogan, VP and general manager for semiconductors at Motorola in Phoenix, is a trustee. "Hogan's Heroes" leave Motorola in 1968 to take over Fairchild. He receives several IEEE and MTT awards.

Page 18: Stanford's Arthur Schawlow, Nobel prize winner for the laser, receives a British scientific honor from the Institute of Physics, which comes with a prize of 50 guineas. He showed up as a guest one day in my physics class, where he popped a Mickey Mouse balloon inside a clear balloon with his new invention.



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https://ethw.org/IEEE_San_Francisco_Bay_Area_Council_History

BUSINESS INDEX 1.01 INDUSTRY C

FIRM 1 BALANCE SHEET

CASH	$ 9896
INVENTORY	$ 218
PLANT INVESTMENT	$ 5200
TOTAL ASSETS	$15315

FIRM 2 BALANCE SHEET

CASH	$ 9896
INVENTORY	$ 218
PLANT INVESTMENT	$ 5200
TOTAL ASSETS	$15315

FIRM 3 BALANCE SHEET

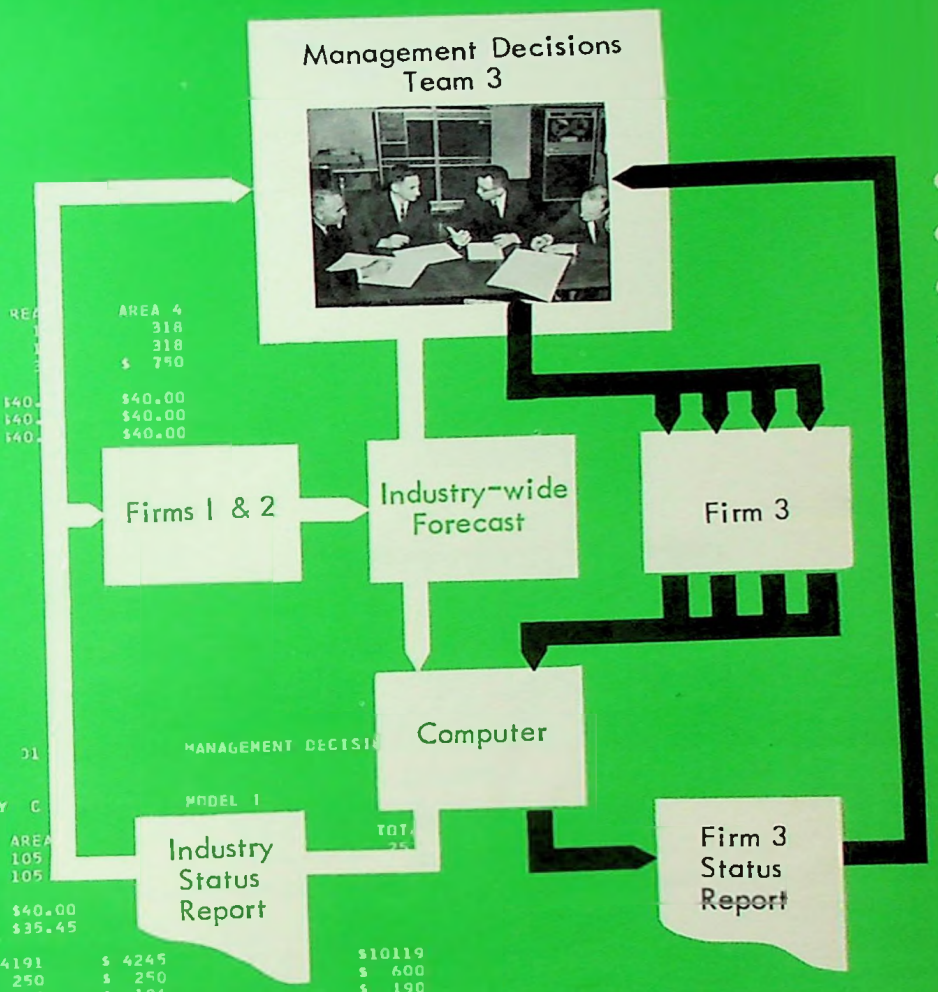
CASH	$ 9896
INVENTORY	$ 218
PLANT INVESTMENT	$ 5200
TOTAL ASSETS	$15315

IEEE Grid

APRIL 1, 1963
SAN FRANCISCO SECTION
INSTITUTE OF ELECTRICAL
AND ELECTRONICS ENGINEERS

reminder

April 2 (Tuesday) TDI
April 3 (Wednesday) SFS/PTGMTT
April 9 (Tuesday) SFS
April 10 (Wednesday) PTGAP/PTGED/PTGMTT/PTGSET
April 11 (Thursday) PTGAC, PTGRFI
April 17 (Wednesday) PTGMIL
April 18 (Thursday) PTGCS/TDC
April 24 (Wednesday) PTGIM, SCVSS
May 25 (Saturday) PTGEM
. . . playing the management game
May 29 (Wednesday) PTGIM



FIRM 3 INDUSTRY C

AREA SALES ANALYSIS	AREA 1	AREA 2	AREA
ORDERS	21	21	105
SALES	21	21	105
UNIT PRICES	$40.00	$40.00	$40.00
UNIT DELVD COST	$37.45	$37.45	$35.45
SALES REVENUE	$ 842	$ 842	$ 4191
MARKETING	$ 50	$ 50	$ 250
TRANSPORTATION	$ 42	$ 42	$ 0

	AREA 4	
	318	
	318	
	$ 750	
	$40.00	
	$40.00	
	$40.00	
	$ 4245	$10119
	$ 250	$ 600
	$ 106	$ 190

AREA DECISIONS NEXT PERIOD	AREA 1	AREA 2	AREA 3	AREA 4	TOTAL
UNIT PRICES	$.	$.	$.	$.	
MARKETING	$	$	$	$	$

PLANT DECISIONS NEXT PERIOD

PRODUCTION REPORT

	INVENTORY	PLANT CAPACITY	CURRENT PRODUCTION	10 PERCENT LESS	10 PERCENT MORE
QUANTITY	6	260	213	192	234
UNIT COST	$35.91	$34.79	$35.91	$36.59	$35.34
TOTAL COST	$ 218	$ 9046	$ 7650	$ 7016	$ 8294

PLANT IMPROVEMENT
$
PRODUCTION
$
RESEARCH
$

PROFIT AND LOSS

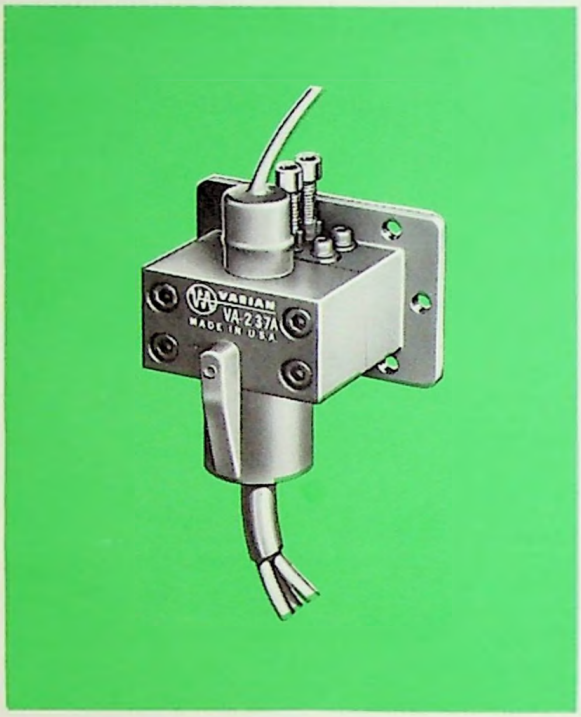
REVENUE	$10119
COST OF UNITS SOLD	$ 8968
TRANSPORTATION	$ 190
MARKETING	$ 600

CASH STATEMENT

OLD BALANCE	$ 8500
REVENUE	$10119
PRODUCTION COST	$ 7650
TRANSPORTATION	$ 190

BALANCE SHEET

CASH BALANCE	$ 9896
CURRENT INVENTORY	$ 218
OLD PLANT	$ 5200



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IEEE Grid

volume 9, number 15

APRIL 1, 1963

Published twice a month except July and August by San Francisco Section, Institute of Electrical and Electronics Engineers

JAMES D. WARNOCK, Executive Editor

Address all correspondence, editorial and advertising material to:
IEEE OFFICE, SUITE 2210, 701 WELCH ROAD, PALO ALTO, CALIFORNIA

Mailing office of publication: 394 Pacific Ave., Fifth Floor. Second class postage paid at San Francisco, Calif.

Subscription: $4.00 (members); $6.00 (others); overseas, $7.00 per annum.

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contents

cover

A management decision-making simulation is shown schematically against a background of an actual computer-generated report from which decisions are made. Assisted by computer reports, a number of management teams can make a series of decisions which affect their firms and the industry in which their firms are engaged. In this way the effects of one or more years' decisions can be observed in one day's decision-making. More on decision-making is given on page 5. Cover layout by Joe Kirk, staff artist at the IBM San Jose Development Laboratory.

IEEE Grid

reporters

EAST BAY SUBSECTION
N. K. (GENE) LITTLE, LAWRENCE RADIATION LABORATORY
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J. M. SWALL, P.G.&E., FRESNO
SANTA CLARA VALLEY SUBSECTION
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MEETING CALENDAR

SAN FRANCISCO SECTION
8:00 P.M. • Wednesday, April 3

(Joint meeting with PTGMTT)
Honoring 1962 Prize Award Winners and IRE/IEEE Fellows
"Spanning the Infrared-Microwave Gap"
Speaker: Dr. Paul D. Coleman, visiting professor, Hansen Labs, Stanford
Place: Physics Lecture Hall, Room 101, Stanford University
Dinner: 6:00 P.M., Red Shack, 4085 El Camino Way, Palo Alto
Reservations: Mrs. Doris Gould, DA 1-1332

SAN FRANCISCO SECTION
5:30 P.M. • Tuesday, April 9

AIEE/IEEE Past Chairmen's Night
"Let's Go With McGuffey" (a talk on the free-enterprise system)
Speaker: Ralph W. Seely, vice president of sales, Columbia-Geneva Steel Div. of U.S. Steel
Place: San Francisco Engineers Club, 15th Floor, 206 Sansome St., San Francisco
Happy Hour: 5:30; Dinner: 6:30; Meeting: 7:30
Reservations: Doug Dodds, EX 2-5353

SANTA CLARA VALLEY SUBSECTION
8:00 P.M. • Wednesday, April 24

"Oceanography—A Field of Expanding Technical Horizons"
Speaker: John H. Clotworthy, general mgr., ordinance division, Westinghouse Electric Corporation, Defense Center, Baltimore, Md.
Place: Lockheed Missiles & Space Company Auditorium, Bldg. 202, 3251 Hanover St. (Stanford Industrial Park), Palo Alto

TECHNICAL DIVISIONS

Communications
8:00 P.M. • Thursday, April 18

(Joint meeting with PTGCS, see below)

Industrial
8:00 P.M. • Tuesday, April 2

"The Modern Cement Plant—Process and Electrical Equipment"
Speakers: Kenneth E. Olsen, chief project engineer, cement and gypsum projects; A. R. "Bud" Olds, electrical engineer, Kaiser Engineers
Place: Room 232, Pacific Gas & Electric Bldg., 245 Market St., San Francisco

PROFESSIONAL TECHNICAL GROUPS

Antennas & Propagation
8:00 P.M. • Wednesday, April 10

Lecture No. 4: "Laser Developments Overseas—Report on Third International Quantum-Electronic Conference, Paris, 1963"
Speaker: Dr. Malcolm Stitch, Hughes Aircraft Co., Culver City
Place: Physics Lecture Hall, Stanford University
Dinner reservations: Darlene Wheeler, DA 6-6200, Ext. 2695

Automatic Control
8:15 P.M. • Thursday, April 11

"Air Traffic Control; the Man-Machine Relationship"
Speaker: Dr. Albert S. Jackson, president, Control Technology, Inc.
Place: Electrical Engineering 126, Stanford University
Dinner: 6:15 P.M., Palo Alto Cabaña
Reservations: Mrs. Pauline Eckman, DA 1-3300, Ext. 268, by noon, Wednesday, April 10

MEETING CALENDAR

Communications Systems — 8:00 P.M. • Thursday, April 18
(Joint with TDC)
"The Duobinary Techniques for Digital Communications"
Speaker: Adam Lender, senior staff engineer, Lenkurt Electric Co., Inc.
Place: Lenkurt Electric Co., Inc., engineering bldg., Brittan Ave. and Industrial Way, San Carlos
Dinner: The Gold Platter, 1000 El Camino Real, San Carlos
Reservations: Sue Manzi, LY 1-8461, Ext. 430

Electron Devices — 8:00 P.M. • Wednesday, April 10
(Tutorial Lecture Series: Joint with PTGAP, PTGMTT, and PTGSET, see above)

Engineering Management — 9:00 A.M. • Saturday, May 25
Program: Management Decision-Making Game (special PTGEM meeting)
Place: IBM, San Jose
Reservations: W. D. Bolton, 227-7100, Ext. 2711; limited to first 36 PTGEM members calling before May 10

Instrumentation & Measurement — 8:15 P.M. • Wednesday, April 24
Lecture No. 4: "Detection of Planetary Life"
Speaker, place to be announced

Instrumentation & Measurement — 8:15 P.M. • Wednesday, May 29
Lecture No. 5: "Instrumentation for Man in Space"
Speaker, place to be announced

Microwave Theory & Techniques — 8:00 P.M. • Wednesday, April 3
(Joint with SFS, see above)

Microwave Theory & Techniques — 8:00 P.M. • Wednesday, April 10
(Tutorial Lecture Series: Joint with PTGAP, PTGED, and PTGSET, see above)

Military Electronics — 8:00 P.M. • Wednesday, April 17
"The Stanford Two-Mile Linear Accelerator"
Speaker: Douglas Wm. Dupen, public information officer, Stanford Linear Accelerator Center, Stanford
Place: Lockheed Auditorium, 3251 Hanover St., Palo Alto
Dinner: 6:30 P.M., Red Shack, 4085 El Camino Way, Palo Alto
Reservations: Vic Conrad's office, DA 6-4000, Ext. 2212

Radio Frequency Interference — 8:00 P.M. • Thursday, April 11
"Electromagnetic Compatibility"
Speaker: H. M. Sachs, director of technical operations, Electromagnetic Compatibility Analysis Center, Annapolis, Md.
Place: Lockheed, Bldg. 104, Sunnyvale

Space Electronics & Telemetry — 8:00 P.M. • Wednesday, April 10
(Tutorial Lecture Series: Joint with PTGAP, PTGED, and PTGMTT, see above)

meeting ahead

MANAGEMENT GAME

A particularly interesting and unusual meeting will be held at 9:00 a.m. on Saturday, May 25, at IBM, San Jose, where PTGEM members will participate in a management decision-making game. The game is designed to permit executives to see in one day the results of their decisions over a one- to two-year span of business operation.

Each set of executive team decisions causes definite interacting results in the computer-simulated market; the results are returned each half-hour to the executive teams and provide a basis for the next set of decisions. These decisions in turn affect the next set of results, etc. Thus the effects of decisions involving the allocation of funds for inventory, production, sales, advertising, engineering R&D, capital plant improvements, etc., can be promptly seen and evaluated as they affect both the individual business and the entire industry market.

Reservations, limited to the first 36 PTGEM members responding before May 10, can be made by writing or calling W. D. Bolton, IBM, Monterey and Cottle Roads, San Jose 14, 227-7100, Ext. 2711.

Ralph W. Seely

meeting ahead

McGUFFEY RIDES AGAIN

"Let's Go With McGuffey," a talk on the free-enterprise system, will be the subject of Ralph W. Seely, vice president of sales, Columbia-Geneva Steel Div. of U.S. Steel, at the annual AIEE/IEEE past chairmen's night on April 9.

(Continued on page 6)

meeting ahead

NEW DATA TECHNIQUE

An entirely new technique for high-speed data transmission will be discussed at the April 18 PTGCS/TDC meeting by Adam Lender, senior staff engineer in the advanced development laboratory at Lenkurt Electric Co., Inc.

Termed duobinary, where "duo" indicates doubling of the bit capacity of a straight binary system, the technique represents a unique combination of signal design and digital coding. Its speed capability equals that of quarternary systems, yet the duobinary technique exhibits superior performance in the presence of transmission impairments. An important advantage of this technique is that the amount of circuitry required and the degree of complexity are similar to a straight binary system and much less than for a typical quarternary system.

The process is sufficiently general so that it is applicable, for example, to both serial transmission over wire lines and parallel transmission over

Adam Lender

high-frequency radio circuits. An unusual feature of the duobinary technique in data transmission applications is the capability of error detection, which is accomplished in a simple manner without introducing redundancy into the original data. Advantage is taken of the fact that the duobinary train of pulses follows a set of predetermined rules. All bursts of odd-numbered errors are detected, as well as most bursts of even-numbered errors, which violates the duobinary principles.

A review of the current high-speed data transmission techniques will be given, followed by the presentation of the duobinary technique, both from the theoretical and the practical point of view. Finally, a suitable embodiment of the technique will be discussed, as well as the actual performance figures.

Mr. Lender received his B.S.E.E.,

(Continued on page 8)

Olsen *Olds*

meeting ahead

ELECTRIFIED CEMENT PLANTS

The April 2 meeting of the Industrial Division will hear two recognized authorities discuss their favorite subject—the engineering design of cement plants.

The speakers will be Kenneth E. Olsen, chief project engineer, cement and gypsum projects, and A. R. "Bud" Olds, electrical engineer, both from Kaiser Engineers.

Discussion will include the industry trend toward larger machines and a higher degree of automation, with its effect on the ratio of capitalized cost to barrels-per-year of production capacity. Reference will be made, including slides, to the fifth and newest plant of Permanente Cement recently designed and constructed by Kaiser Engineers at Helena, Montana.

MORE SFS

Guests of honor, in addition to Mr. Seely, will be past chairmen and their ladies. The dinner meeting will be held at the San Francisco Engineers Club.

Mr. Seely graduated from the University of Illinois with a B.S. degree in mechanical engineering and is a member of ASME. He started his engineering career with GE at Schenectady, joining the former Consolidated Steel Corp. six years later as assistant welding and metallurgical engineer. He was elected a vice president when the company became a division of U.S. Steel, was named vice president and assistant to the president in 1951, vice president and general manager of Consolidated Western in 1953, and was appointed to his present position in 1955.

meeting ahead

TOWER TO COMPUTER

Dr. Albert S. Jackson, president of Control Technology, Inc., Long Beach, will discuss "Air Traffic Control: The Man-Machine Relationship" at the April 11 meeting of PTGAC.

Automation of the air traffic control system poses many questions that are not yet answered. Underlying most of the basic questions is the broad area of man-machine relationships. Dr. Jackson will discuss the basic concept of automated air traffic control and then detail the terminal area control problem. Problems involved in the basic man-computer relationship will be discussed. The past, current, and future research applications of fast-time and real-time simulation will be covered in some detail.

The speaker has devoted the past four years to studies involving automated air traffic control concepts for the FAA. He directed the TRW Computer Co. air traffic control research project for two years before joining Control Technology, Inc., and managing their work with the FAA.

Albert S. Jackson

He developed the fast-time simulation model currently being used extensively by two divisions of the agency. In that model, both controllers and pilots are represented by IBM 7090 subroutines. He has also had extensive experience in real-time simulation of automated ATC concepts.

Problems involving representation of men in the control loop by computer logic will be discussed. Also covered will be the role of real-time simulation to study man-computer communications and interaction.

Dr. Jackson received his B.S. and M.S. in electrical engineering from Cal Tech and his Ph.D. from Cornell University. He taught at Cornell for

(Continued on page 8)

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Herbert M. Sachs

meeting ahead

ELECTROMAGNETIC COMPATIBILITY

Herbert M. Sachs, director of technical operations, Electromagnetic Compatibility Analysis Center, Annapolis, Maryland, will review the technical program of the Analysis Center at the April 11 meeting of PTGRFI.

The center was established in 1961 to provide the Department of Defense with an analytical capability for determining whether electronic systems will suffer operational degradation due to unintentional interference and to make recommendations to insure, insofar as practicable, the effective operation of such systems in their intended environments.

A number of technical activities in progress at the center are aimed at achieving the capability to solve operational interference problems. The discussion will cover the general organization and specific areas of investigation being performed at ECAC, with some emphasis on the interference prediction model that is under development and the types of problems that have been under investigation. It will also indicate the potential capabilities of ECAC in relation to user requirements, in an effort to provide such users with an indication of the types and formats of outputs ECAC can provide them. Current problem analyses and outputs will be presented.

Prior to joining ECAC, Mr. Sachs was responsible for the supervision of programs in the area of electronic interference at Armour Research Foundation, Chicago. He has done considerable work in the fields of radio and radar interference reduction, and was also engaged in projects involving mobile communication system countermeasures, wide-band magnetic recording, shock-wave instrumentation, and automation.

Mr. Sachs has also had more than six years of industrial experience in the design of radio, television, and communications equipment, plus three years' military experience. Illinois Institute of Technology awarded him the B.S.E.E. in 1948 and the M.S.E.E. in 1958. He has authored 15 technical papers on the topics of communications, interference, and countermeasures and has served as chairman for the 3rd and 7th Armour conferences on radio interference reduction.

wema news

WEEF: $21,000

Twenty-seven colleges and universities in 11 Western states have been given scholarship grants totaling $21,000 for the next school year by the Western Electronic Education Fund.

Grants varying in amount from $500 to $1,400 were allocated to the individual schools to encourage students to enter the field of electronic engineering or one of its related scientific fields, according to W. Frank Cavier, Hewlett-Packard Co., chairman of the board of trustees.

Selection of scholarship winners and the method of determining the awards are left to the discretion of each participating school.

The program has grown steadily since its inauguration in 1952, when member companies of the Western Electronic Manufacturers Association contributed $2,000 for scholarships at 8 Western universities. Last year 65 students at 27 Western schools received financial assistance from the fund.

Trustees of the fund, in addition to Cavier, are Dean A. Watkins, Watkins-Johnson Co., Palo Alto; C.

(Continued on page 13)

MORE PTGAC

six years and was in charge of the computer area for the school of electrical engineering. He is the author of "Analog Computation" (McGraw-Hill) and is currently serving as chairman of the PTGHFE administrative committee.

MORE PTGCS/TDC

M.S.E.E., and E.E. degrees from Columbia University. He was with Bell Laboratories, Murray Hill, N.J., for six years working on high-speed digital data communication systems. He then went to ITT Federal Laboratories, where he was a project engineer in the digital systems laboratory. He is a member of the IEEE, the PTGCS, and the PTGIT.

The meeting will be followed by a tour of Lenkurt's new engineering building and laboratory facilities.

Malcolm Stitch

meeting ahead

LAST IN LASER SERIES

The fourth and concluding lecture in the laser tutorial series is scheduled for Wednesday, April 10. Dr. Malcolm Stitch of Hughes Aircraft Company will come to the Bay Area for presentation of a digest of the Paris 1963 Quantum-Electronic Conference as it applies to lasers.

Dr. Stitch developed the first very high temperature microwave spectrometer and then headed a group to exploit the new instrument. A series of papers on this subject, with attention to alkali halides, was incorporated in his doctoral dissertation.

While at Varian, he was concerned with the development of extremely high-Q stalos, as well as a consultant on microwave spectroscopy.

At Hughes he has headed work on gas masers, atomic frequency standards, and maser noise investigations. He directed the program which led to the first known coherent light (COLIDAR) ranging system for use against non-cooperative targets.

He is an author of about two dozen technical papers, a well-known lecturer (including MIT special session on optical masers), and his semitechnical articles are in wide demand.

Dr. Stitch will digest the Paris meeting (of which he is official editor), including some half-dozen papers originated by recent research at Hughes.

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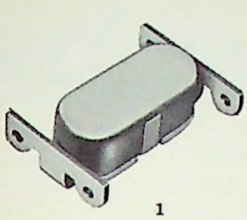
(Typical units shown; many other types available)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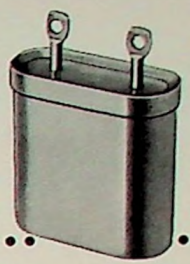
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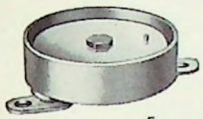
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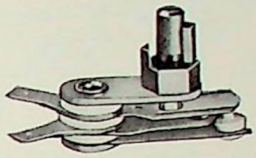
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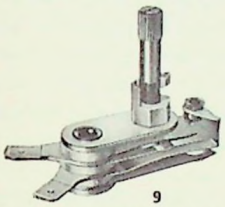
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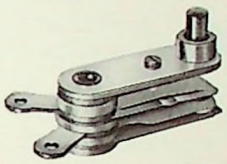
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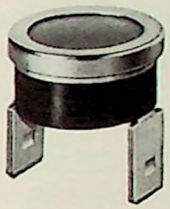
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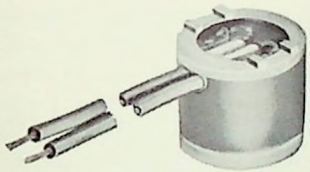
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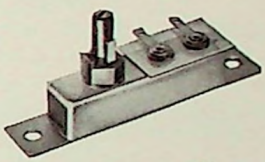
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16

1, 2, TYPE C† semi-enclosed (1), hermetically sealed (2). Small, positive acting with electrically independent bimetal strip for operation from –10° to 300°F. Rated at approximately 3 amps, depending on application. Hermetically sealed type can be furnished as double thermostat "alarm" type. Various terminals and mountings. Bulletin 5000.

3, 4, TYPE M*† semi-enclosed (3), hermetically sealed (4). Snap acting bimetal disc types for electronic applications from —50° to 300°F. Rating: 3 to 10 amps at 115 VAC and 28 VAC/DC. Semi-enclosed with virtually any type terminal; hermetically sealed with pin or solder terminals, wire leads, various mounting brackets. Bulletin 6000.

5, 6, TYPE MX† semi-enclosed (5), hermetically sealed (6). Snap acting miniature units to open on temperature rise for missile, avionic, electronic and similar uses. 2° to 6°F differentials available. Rated at 3 amps to 1 amp, depending on duty cycle, at 115 VAC and 28 VAC/DC. Semi-enclosed types with metal or ceramic bases; hermetically sealed in circular or CR7 cans. Various terminals, mountings, brackets, etc. Bulletin 6100.

7, 8, TYPE S*† adjustable (7), non-adjustable (8). Positive acting with single stud or nozzle mounting. Operation to 600°F. Rated at 15 amps at 115 VAC, 7 amps at 230 VAC. Spade, screw or formed terminals, various adjusting stems, etc. Bulletin 1000.

9, TYPE SA*† adjustable, or non-adjustable. Snap acting with electrically independent bimetal. Also single-pole, double-throw. Single stud or nozzle mounting. Rated at 1650 watts at 115-230 VAC only. Spade or screw terminals. Bulletin 2000.

10, TYPE SM*† manual reset. Electrically same as Type SA except for manual reset feature. Bulletin 2000.

11, 12, TYPE A*† semi-enclosed (11), hermetically sealed (12). Insulated, electrically independent bimetal disc gives fast response and quick, snap action control for electronic and apparatus applications from –50° to 300°F. Lower or higher on special order. Rating: 4 to 15 amps, depending on duty cycle, at 115 VAC and 28 VAC/DC. Various enclosures and mountings, including brackets. Bulletin 3000.

13, POTTED TYPES A* & G*. For refrigeration, air conditioning, or applications requiring a sealed thermostat, the Types A and G are available with lead wires and epoxy sealed. Type G is shown. Various mounting brackets. Bulletin 3000 for Type A, Bulletin 3500 for Type G.

14, TYPE R*† sealed adjustable, sealed non-adjustable. Positive acting for operation to 600°F. Rated at 15 amps at 115 VAC, 4 amps at 230 VAC. Screw terminals. Bulletin 7000.

15, TYPE W*† adjustable, or non-adjustable. Snap action bimetal strip type for operation to 300°F. Depending on duty, rated: 5 to 10 amps, 115 or 230 VAC. Screw or nozzle mountings; spade or screw terminals. Bulletin 4000.

16, TYPE G* exposed, or enclosed bimetal disc types, or epoxy sealed for moisture and dust resistance. Snap action for positive and instantaneous opening or closing of electronic and avionic circuits to 300°F. Various mountings and terminals. Bulletin 3500.

Illustrations, for general information only, do not necessarily show size comparisons. Fully dimensioned and certified prints on request. Manufacturer reserves right to alter specifications without notice.

***Refer to Guide 400 EO for UL or CSA approved ratings.**

†These thermostats covered by patents issued or applied for. A-3762A

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P. O. Box 1007 • Mansfield, Ohio

STEMCO®

THERMOSTATS

ATTENDEE APPRAISAL OF TECHNICAL SESSIONS AT 1962 WESCON

In anticipation of its largest attendance and in continuing search for ways of improving an already significant contribution to the electronics industry, last August Wescon arranged for an independent survey of opinions held for the technical convention, an integral and important portion of the annual show—now one of the largest in the nation.

The Wescon board asked Facts Consolidated, marketing research division of C-E-I-R, Inc., to undertake a critical appraisal among the 46,152 registered attendees in Los Angeles the week of August 21.

The study followed a similar opinion survey also conducted by Facts Consolidated in 1960, largely based on reasons why people attend Wescon and benefits derived therefrom (which also included a separate study among exhibitors).

Main findings of the new report, received by the directors at their annual winter meeting, have been released by Wescon Manager Don Larson. The results show a healthy and continuing interest in the convention, with half the respondents contributing specific suggestions for improvement that the Wescon planners are taking into account.

A selective sampling of 603 registrants was used in the survey. Their profile indicated age under 40, a college degree, status of professional engineer, and employment in manufacturing or research and development. Fifty-four percent of the respondents were interviewed at the Sports Arena, site of the exhibit portion of the show, and 46 percent at the Statler Hilton, where the technical sessions were held.

Forty-three percent were IRE members, 59 percent had attended two or more Wescons, and 56 percent attended the regular technical sessions.

Sixty-five percent of the under-40 bracket were Wescon "repeaters" (two or more times), 81 percent of them college graduates with 29 percent having advanced degrees.

Company reasons predominate

The reasons for attending Wescon apparently are weighted toward company rather than individual reasons—89 percent of the respondents ascribed attendance to their company needs. Thirty-four percent said company and individual reasons were of equal importance. Only 11 percent had purely personal interest in attending. Sixty percent said they make some kind of report to their companies upon returning from Wescon.

With the above assurances of a high level of professionalism, Wescon considers the responses especially meaningful.

A preponderance of the responses, particularly among the "repeaters," indicated that the main reason for coming to Wescon is "to keep up with the electronics industry" (76 percent of the interviewees). Among the other reasons commonly given for attendance at Wescon were the desire to see and discuss the exhibits and the products demonstrated thereby, the desire to attend the technical sessions, and the desire to see and talk with associates.

Interest in the technical program

The survey indicated that 56 percent of the total respondents actually attended the technical sessions, attending an average of 2.6 sessions. Seventy-two percent of the IRE members attended an average of 2.7 sessions each.

Ranking highest in interest among those who participated in the technical sessions, in descending order of appeal, were solid-state devices, computer theory, circuit theory, and communications systems. Engineering management ranked well within the first ten of the 22 program categories.

The fact that least interest was expressed in a session concerned with ideas for improving technical conference programs is considered significant to the criticisms registered.

More than 70 percent of those who did not attend the technical sessions plead varying time problems: "No time/too busy" (32.2 percent); "Couldn't get time off from work" (18.7 percent); "Couldn't get here in time," "Only had a few hours." Only a relatively small portion of the non-attendees indicated that they had no interest in the technical sessions.

Of the 469 persons who agreed to rate the technical sessions, 23 percent (the highest percentage of responses) found the papers "informative . . . a good way to increase knowledge of field . . . introduced valuable concepts . . . helpful in new ideas."

"Generally favorable" reactions were recorded by an additional 12.4 percent. Nine percent found the sessions "only average" and 11.1 percent were critical of the papers as being "too long" and some of the ideas presented as "premature" or "not well organized."

The Facts Consolidated report states, "The special afternoon sessions were unquestionably popular in every way except attendance." The best attended and with the most interest was that on lunar exploration.

Biology and electronic research, weather satellites, and data processing and advanced power propulsion systems were of next and almost equal interest.

Highest interest in the special sessions came from men having post-graduate degrees. Ratings of the special sessions averaged slightly higher than did those for the regular technical sessions. Among those who attended both, there was a slightly higher percentage of preference expressed in favor of the special sessions (34 percent) over the technical sessions (30 percent). Thirty-six percent stated no preference.

Constructive comment

Among the constructive comment to the interviewers were suggestions for scheduling sessions to avoid conflicts and parallels; more effort on the part of authors to prepare and speak well; more intense reviewing and screening of papers, avoidance of duplication; a number of pleas for a centralized location to combine the convention and trade show; broader coverage of such as basic research and management matters.

One conclusion of the Facts Consolidated report: "The focus on 'above average' attendance at the Technical Sessions is on those with the highest academic training and members of the IRE. While 'below-average' in attendance, management registrants who do attend are the most diligent. It is clear that the Technical Sessions attract a high level group over all."

June 4-5—**Fifth Nat'l Radio Frequency Interference Symp.** Philadelphia, Pa. Exhibits: none.

June 4-6—**ASM Milwaukee Metalworking Exhibition and Conf.** "Cost Saving Through Better Materials Engineering." Milwaukee Auditorium, Milwaukee, Wis. Exposition Mgr., William J. Hilty, American Society for Metals, Metals Park, Ohio.

June 4-6 — **NEP/CON, the Nat'l Electronic Packaging and Production Conf.** New York Hilton. Program: Jack McGrath, Theodore C. Gams & Associates, 250 Elizabeth Ave., Newark, N.J. Exhibits.

July 9-11—**PTGAP Symp. on Space Telecommunications.** Central Radio Prop. Lab., NBS, Boulder, Colo. Exhibits: none.

MORE WEEF

Lester Hogan, Motorola Inc., Semiconductor Products Division, Phoenix; and Professor Ellis King, University of California at Los Angeles. WEMA President Emmet G. Cameron, Varian Associates, Palo Alto, and Executive Vice President E. E. Ferrey are ex-officio members of the board.

Trustees are IRE/IEEE members serving as individuals with the 6th Region director assisting in their selection. Funds come from contributions of manufacturers and representatives in addition to support from WESCON.

Schools selected to receive 1963-64 grants in each state are: University of Arizona, Arizona State University, California Institute of Technology, California State Polytechnic College, Loyola University, San Diego State College, San Jose State College, Stanford University, University of California, University of California at Los Angeles, University of the Pacific, University of San Francisco, University of Santa Clara, University of Southern California, University of Colorado, University of Denver, University of Idaho, Montana State College, University of Nevada, University of New Mexico, Oregon State University, Reed College, University of Utah, Utah State University, University of Washington, Washington State University, and University of Wyoming.

A record audience awaited Professor Schawlow at the first lecture of the series

meeting review

PUMPED LASERS

An operational laser should possess the important characteristics of being directional, monochromatic and powerful, Professor Arthur Schawlow of Stanford stressed in his February 27 lecture, "Optically Pumped Lasers —Cesium Vapor to Solid State." This was the first of a four-part spring laser tutorial series.

Increased directionality has been achieved by utilizing reflecting mirrors mounted externally. These mirrors may be flat, or slightly convex to give less critical adjustment.

Three-level maser operation depends upon the relative rates of relaxation to achieve continuous lasing action. Decay time for the third energy level in ruby is, for example, fast with respect to the second level. This allows continuous photon pumping into the third level. Nonradiative decay to the second state takes place quickly. Lasing action then occurs from the second state to the first. Continuous wave operation has been achieved in this manner with ruby, neodymium, dysprosium, and trivalent uranium. Initial results gave 1 mv con-

tinuous power; 1 watt is now achieved. (See Fig. 1.)

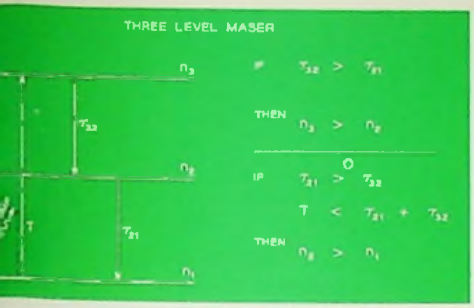

Figure 1

Lasers have been built to cover most of the range of the electromagnetic spectrum. This is a range of from 28 μ to 0.31 μ, or 90:1. The gap still remaining to be filled, between the longest wavelength laser and the microwave range is 25 μ to 500 μ, a ratio of 20:1.

High power from early pulsed lasers produced more than 10 kw for $\frac{1}{2}$ millisec, or a few joules. Experimenters using conventional techniques have reported outputs of 350 joules. By using double pulsed lamps which reach temperatures of 10,000° K on the second pulse, it has been possible to greatly increase pumping energy.

(Continued on page 18)

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MORE LASER REVIEW

By inserting an isolator of a mechanical shutter or a polarizer, a "Q spoil" technique has been developed which prevents lasing action until it is desired. When the shutter is opened, little happens for 80 to 100 nanosec. Then for a period of 10 nanosec almost complete sweeping of the laser occurs. If this output is then used to trigger another fully charged laser, additional amplification will be achieved. Thus far it has been possible to deliver megawatts of power for 10^{-8} seconds using these techniques. Eventually peak powers of 10^{6} megawatts for 10^{-11} seconds should be achieved. In conducting these experiments it was found cemented polarizers became damaged and could not be used because of the high power levels. (See Fig. 2.)

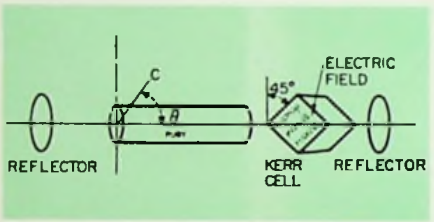

Figure 2. Schematic diagram of the pulsed reflector laser.

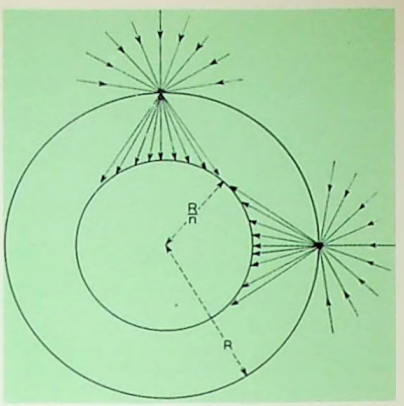

Figure 3. Rays of light incident on the side wall of a dielectric cylinder are refracted toward the axis.

A method of increasing charging efficiency of ruby rods was described using a sapphire coating. Light impinging on the outer surface is refocused to the ruby rod surface, giving a gain in pumping efficiency. (See Fig. 3.)

Reference was made to the January, 1963, issue of the IEEE on Quantum Electronics, the Optical Society of America supplement No. 1 on Optical Masers, Advances in Quantum Electronics, and "Lasers" by Bela A. Lengyel.

TOM LINDERS

IT IS REPORTED:

Laser originators, Stanford Physics Professor Arthur L. Schawlow and Provost C. H. Townes of MIT have been awarded a British scientific honor, the Thomas Young Medal and Prize of 50 guineas from London's Institute of Physics and the Physical Society.

William E. Land has been named director of quality assurance at United Control Corp.'s Redmond, Wash., plant after experience with Bendix and General Motors.

Dr. Nevin K. Hiester, head of SRI's chemical and high-temperature technologies dept., is general chairman of the international symposium on high-temperature technology at Asilomar, Sept. 8-11, under SRI sponsorship.

Robert N. Palmer has joined Varian Associates as a senior engineering manager in product engineering in the megawatt-range twt program, after 23 years with Sylvania.

Dr. Frank Stanton, head of CBS, has been elected a director of SRI.

the section

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Damron

Huynen

Following are the names of members who have recently been transferred to a higher grade of membership as noted:

Senior Member
S. S. Damron
J. Richard Huynen

Member
H. N. Massey
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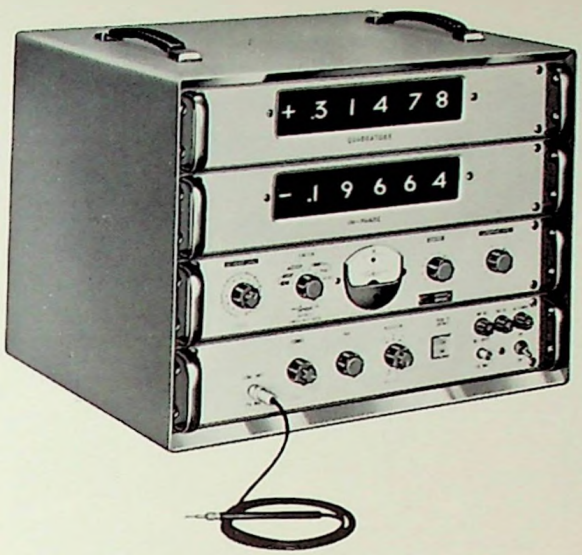

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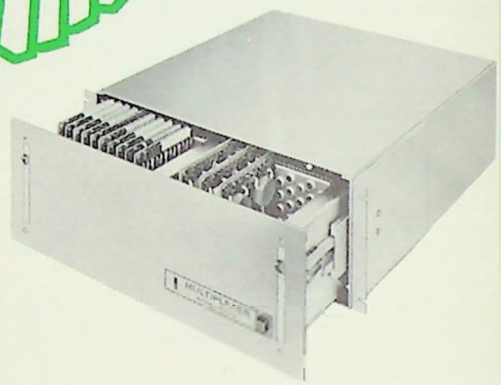

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