

EDITOR'S PROFILE of this issue

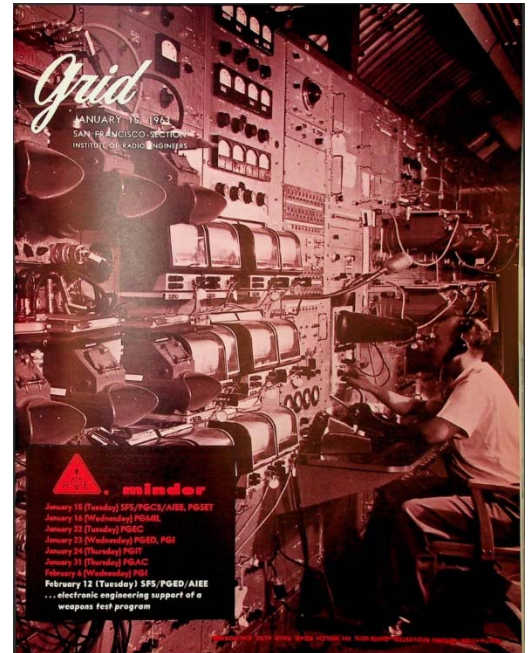
from a historical perspective ...

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

January, 1963 (mid-month):

Cover: The complex of monitoring equipment is shown for measuring and recording nuclear explosions, used by the Lawrence Radiation Labs in Livermore. I had an internship at the Rad Labs the summer between undergrad and grad programs, in 1966. It gets hot in Livermore in the summer: riding my bike out to the Labs in the morning was fine, but the ride back could be sweltering. More on page 8.

Page 13: Barney Oliver, head of HP's research labs, is shown as the luncheon speaker at the Product Engineering and Production Conference in San Francisco. Bud Eldon (mentioned but not shown) was one of the session chairs for the conference.



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

https://ethw.org/IEEE_San_Francisco_Bay_Area_Council_History

At time of scanning, the bound volumes are held by Paul Wesling. July, 2021 Contact p.wesling@ieee.org

Grid

JANUARY 15, 1963
SAN FRANCISCO SECTION
INSTITUTE OF RADIO ENGINEERS



. minder

January 15 (Tuesday) SFS/PGCS/AIEE, PGSET
January 16 (Wednesday) PGMIL
January 22 (Tuesday) PGEC
January 23 (Wednesday) PGED, PGI
January 24 (Thursday) PGIT
January 31 (Thursday) PGAC
February 6 (Wednesday) PGI
February 12 (Tuesday) SFS/PGED/AIEE
... electronic engineering support of a
weapons test program



**Greeting the new year with a new location
in Stanford Industrial Park to expand our
contributions to microwave tube technology
and related electronic devices for the Space Age**

MICROWAVE ELECTRONICS CORPORATION joins a distinguished center of electronic research, development, and production with its new facilities occupied the first week of January. The engineering effort will be directed, as before, toward practical, reliable, and high-quality tubes and devices serving Space Age communications.

With its entry into the microwave solid-state field through development of an operational ruby traveling-wave MASER system (designed especially for the NASA Deep Space Instrumentation Facility at Goldstone, California), MEC will expand its program serving advanced satellite and space communications applications. Research and development engineers, microwave technicians, and experienced production specialists are invited to contact us regarding the challenges of this new exciting frontier.

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The same design, circuitry and construction features of all new transistorized counters are incorporated in this low-priced, general-purpose counter. Time base is derived from the power line, providing 0.1% accuracy—fully adequate for many frequency measurements. The counters have a maximum counting rate of 300 KC. 0.1 v sensitivity permits low-level measurements.

Model 5211A has gate times of 0.1 and 1 second. Model 5211B has an additional gate time of 10 seconds. Otherwise, the instruments are identical. A storage feature, which can be disabled by a rear-panel switch, provides a continuous display, each reading held on the 4-digit neon columnar readout until the count itself changes. The counters provide a 1-2-2-4 BCD code output for systems use or recording devices. Manual gate allows the 5211 counters to be controlled by the front panel, or be operated remotely by contact closure or suitable pulses.

Solid state design and construction provide low power consumption, low heat dissipation, operation over a wide temperature range. The counters are housed in the new modular cabinet for bench and rack mount. Plug-in circuit modules and ready accessibility simplify maintenance. Both models weigh but 10 lbs. and can easily be carried in one hand. Conservative design features, such as the use of decade dividers in the gate generating circuits, provide operational stability and eliminate calibration problems.

Specifications

Maximum counting rate: 300 KC

Display: 4 digits, neon column

Input sensitivity: 0.1 v rms sine wave

Temperature range: -20 to 50°C

Time base: 50 or 60 cps power line

Manual gate: Controlled by front panel function switch, by external contact closure, or by 3 volt peak positive pulses at least 10 μ sec wide at half amplitude point.

Frequency measurement: 2 cps to 300 KC; accuracy ± 1 count, \pm time base accuracy

Ratio measurement: Reads: (f_1/f_2)

Range: f_1 : 2 cps to 300 KC (0.1 v rms)
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Accuracy: ± 1 count of f_1 , \pm trigger error of f_2

Dimensions: 16 $\frac{3}{4}$ " wide x 3 $\frac{1}{2}$ " high x 11 $\frac{1}{2}$ " deep, 10 lbs.

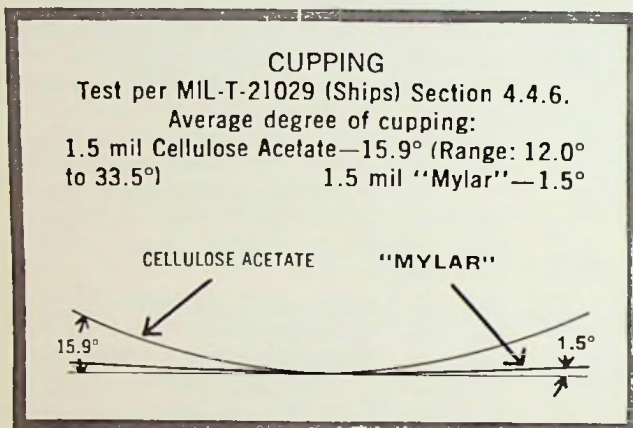
Price: $\text{\textcircled{P}}$ 5211A, \$750.00; $\text{\textcircled{P}}$ 5211B, \$825.

Data subject to change without notice. Prices f.o.b. factory.

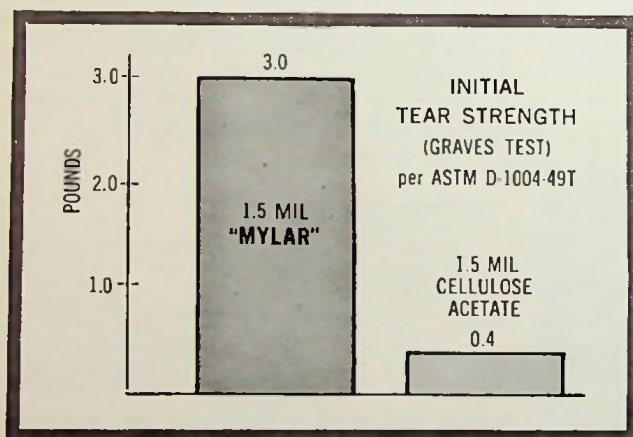
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cover

Instrumentation to measure and record nuclear explosions in a test program is highly complex, as shown by the banks of equipment used by Lawrence Radiation Laboratory, Livermore, to be described at the February joint meeting of PGED, SFS, AIEE, and the joint student branch at San Francisco State. See calendar and p. 8.

section officers

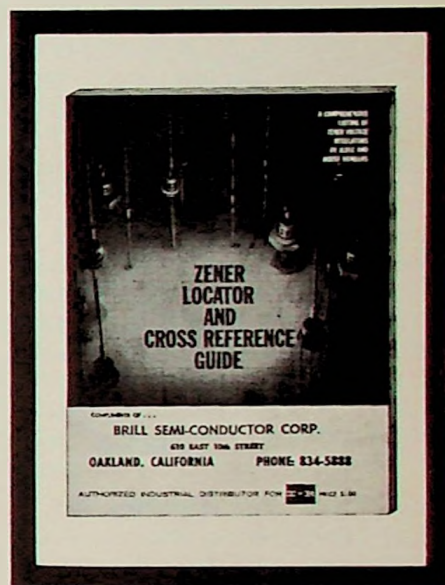
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MEETING CALENDAR

SAN FRANCISCO SECTION

7:30 P.M. • Tuesday, January 15

(Joint meeting with PGCS and AIEE)

"Oblique Ionosphere Soundings and Radio Propagation"

Speaker: Raymond D. Egan, manager, advanced communications, Granger Associates

Place: Auditorium, Crown Zellerbach Bldg., Market and Sansome, San Francisco
Dinner: 6:00 P.M., Mirror Room, 2nd Floor, Veneto Restaurant, Mason and Bay, San Francisco

Reservations: Mrs. Doris Gould, DA 1-1332

(Parking available at restaurant and Zellerbach Bldg.)

SAN FRANCISCO SECTION

6:30 P.M. • Tuesday, February 12

(Joint meeting with PGED, SFS, AIEE, and IRE-AIEE student branch, San Francisco State College)

"Electronic Engineering Support of a Weapons Test Program"

Speaker: Edward H. Hulse, head, electronic engineering dept., UC Lawrence Rad Lab, Livermore

Dinner-Meeting: 6:30 P.M., Cafeteria, San Francisco State College

Reservations: Mrs. Doris Gould, Section Office, DA 1-1332, for information and reservations

PROFESSIONAL GROUPS

Automatic Control

8:00 P.M. • Thursday, January 31

"A Convex Programming Solution of Optimal Control Problems"

Speaker: Prof. J. B. Rosen, Visiting Professor, Stanford University

Place: Electrical Engineering 126, Stanford University

Dinner: 6:30 P.M. Place to be announced

Reservations: Mrs. Pauline Eckman, DA 1-3300, Ext. 268, by noon Wednesday, January 30, 1963

Communications Systems

7:30 P.M. • Tuesday, January 15

(Joint meeting with San Francisco Section, IRE and AIEE, see above)

Electron Devices

8:00 P.M. • Wednesday, January 23

"Advances in the Use of Ceramics in Electron Devices"

Speaker: Don H. Priest, associate director of research, Eitel-McCullough, Inc.

Place: Physics Lecture Hall, Room 100, Stanford University

Electron Devices

6:30 P.M. • Tuesday, February 12

(Joint meeting with SFS, AIEE, and IRE-AIEE student branch, San Francisco State College, see above)

Electronic Computers

8:00 P.M. • Tuesday, January 22

"Electron Beam Recording"

Speaker: Reginald Lamb, production manager, new technical dept., Ampex

Place: Lockheed Auditorium, 3251 Hanover Street, Palo Alto

Dinner: 6:00 P.M., Red Shack, 4085 El Camino Way, Palo Alto

Reservations: None required

MEETING CALENDAR

Information Theory

8:00 P.M. • Thursday, January 24

"Some Theory on Communication Through Unspecified Additive Noise"

Speaker: Dr. William L. Root, University of Michigan

Place: Philco Auditorium, Bldg. 56, 3825 Fabian Way, Palo Alto

Dinner: 6:00 P.M., Sakura Gardens, 2116 N. El Camino Real, Mountain View

Reservations: Mrs. Radl, YO 8-6211, Ext. 2460, 2522, or 2244

Instrumentation

8:15 P.M. • Wednesday, January 23

"A New Look at Scanning Spectrum Analyzers and Panoramic Receivers"

Speaker: Dr. William Robert Kincheloe, research associate, Applied Electronics Laboratory, Stanford University

Place: Physics Lecture Hall, Room 101, Stanford University

Dinner: 6:15 P.M., L'Omelette Restaurant, 4170 El Camino Real, Palo Alto

Reservations: Mrs. Marje Andrews, 321-3300, Ext. 273

Instrumentation

8:15 P.M. • Wednesday, February 6

"The Scientific Measurement Requirements of Space Probes"

Speaker: Dr. Francis S. Johnson, head, atmospheric and space sciences division, West Coast Center for Advanced Studies, Graduate Research Center of the Southwest, Dallas, Texas

Place: Physics Lecture Hall, Room 101, Stanford University

Dinner Reservations and Information: Mrs. Marje Andrews, 321-3300, Ext. 273

Military Electronics

8 P.M. • Wednesday, January 16

"Non-Space Application for Space Computer Technology" (nonclassified meeting)

Speaker: Capt. John H. Van Dusen, U.S. Air Force, staff, Space Research Directorate, Los Angeles

Place: Lockheed Auditorium, Bldg. 202, 3251 Hanover Street, Palo Alto

Dinner: 6:00 P.M., Red Shack, 4085 El Camino Way, Palo Alto

Reservations: General Victor Conrad's office, DA 6-4000, Ext. 2212

Space Electronics & Telemetry

8 P.M. • Tuesday, January 15

"LASERS"

Speaker: Dr. Anthony Siegman, associate professor of electrical engineering, Stanford

Place: Lockheed Auditorium, Bldg. 202, 3251 Hanover Street, Palo Alto

Dinner: 6:15 P.M., Sakura Gardens, 2226 N. El Camino Real, Mountain View

Reservations: Tom Linders, RE 9-4321, Ext. 28394 by noon January 15

SAN FRANCISCO SECTION OF AIEE

Communications Division

7:30 P.M. • Tuesday, January 15

(Joint meeting with San Francisco Section, IRE and PGCS, see above)

SAN FRANCISCO SECTION OF AIEE

6:30 P.M. • Tuesday, February 12

(Joint meeting with SFS, PGED, and IRE-AIEE student branch, San Francisco State College, see above)

remarks from the chairs

Reliability, which once took a back seat when design parameters were considered, is now coming to the fore. Successes and failures in the various missile and space programs, correlated with the amount of reliability effort placed upon them, have caused military and NASA customers to re-evaluate and strengthen reliability requirements.

Evidence of this greater emphasis and also of the importance of West Coast electronics in the missile and space field is the fact that this year's National Symposium on Reliability and Quality Control is being held in San Francisco on January 22, 23, and 24. The conference, sponsored by IRE through PGRQC, together with AIEE, ASQC, and ASME, will cover the work being done in all fields to enhance reliability.

Such outstanding speakers as James M. Bridges and E. J. Nucci of the Department of Defense; John R. Moore, president of Autonetics; Max Tall, an RCA vice president, to mention only a few, illustrate by their participation that government and industry are both now actively involved in solving reliability problems.

The conference will start Tuesday morning, with a keynote address on current management reliability objectives by L. A. Wood, vice president-general manager of the Boeing aerospace division. A panel discussion, "Are We Closing the Reliability Gap?" will follow, with Maj. Gen. Wyman Austin Davis, Dr. Charles Lipson, Mark Shepherd, John R. Moore, and James M. Bridges participating.

The symposium will then divide into two parallel sessions each morning and afternoon. The techniques and problems of reliability and quality control will be discussed as they relate to all aspects of equipment system design, development, manufacture, and operation. In addition, special sessions will be run for such topics as statistics and mechanical design of electronics.

Everyone involved in the design or use of electronic equipment will gain vital information by attending.

RUDY CAZANJIAN
CHAIRMAN, PGRQC
SAN FRANCISCO CHAPTER



John R. Whinnery

*the worried deans***ANTI-HARD-WORK TREND**

Second in a series of articles contributed by deans of Bay Area engineering schools on a problem of increasing concern to the profession. Dr. Whinnery is a fellow of IRE and was chairman of the San Francisco Section in 1954.

In commenting on the recent decreases in engineering undergraduate enrollments, I must admit that I do not know the reason, and, as the excellent review article in the "Wall Street Journal" of August 27 concluded, say that it is something of an enigma. Recent figures published by the National Science Foundation show that the trend is not simply from engineering to the pure sciences, as many of us once thought. In fact, there seems to be something of a trend away from many of the "hard-working" professions, for very complicated sociological reasons having to do with current home and school environments and current sets of values.

It is, of course, much more to the point to try to decide what may be done about the problem, and although this may be difficult without knowing exact causes, it does seem clear that we should do our best to help in counseling and in distributing the facts about our profession.

It is a profession which has changed and will continue to change the face of our society. There is a wide variety of subject matter and of type of work to suit different interests and temperament. Salaries offered beginning graduates, by nationally published figures, remain the highest of any dis-

cipline graduating and placing appreciable numbers of students. For those interested finally in administration, the whole field of technical administration, not possible without such an education, is opened up along with the purely technical fields.

Many well-meaning and widely publicized self-criticisms of the profession have stressed too much the routine and tedious jobs encountered by some in the profession, but I believe a little reflection would convince one that such parts exist in even the most glamorized of professions, such as medicine and law. The capable engineer has, in fact, a remarkable opportunity to find his level and contribute as much as his ability and imagination allow.

An additional very positive fact, overlooked in many discussions, is the very rapid increase in graduate enrollments. Graduate work is now considered essential for the majority of those able to profit by it. As an example, graduate enrollments at our university have doubled in something less than five years, and I believe this figure is typical of the experience in many universities. This trend will change the character and effectiveness of the profession in a major way, and in the end will be much more significant than the decrease in numbers of four-year graduates.

JOHN R. WHINNERY
DEAN, COLLEGE OF ENGINEERING
UNIVERSITY OF CALIFORNIA

*computer notes***PACIFIC MEET, MARCH 15, 16**

IEEE is the sponsor of the Pacific Computer Conference, originally initiated by the West Coast subcommittee of the AIEE computing devices committee, scheduled for Cal Tech, March 15, 16. Sessions will include nanosecond computer devices and circuits; optical and electrical signal transmission considerations; computer memories and memory organizations; system organizations; cryogenics, magnetic thin films, optical computer techniques; and informal panel discussion groups. For program, preprint proceedings, and advanced registration (\$5.00), write W. S. Dinsmore, Bendix Computer Division, 5630 Arbor Vitae St., Los Angeles 45.



Rudy Kazanjian

REGISTRATION SET

Registration for the ninth national symposium on reliability and quality control to be held at the Sheraton-Palace Hotel, San Francisco, January 22-24, will take place in the Ralston Room, 5:00 to 10:00 p.m. on January 21 and 8:00 a.m. to 4:30 on January 22.

*era news***GROUP THERAPY FOR REPS**

The fourth annual convention of ERA, to be held at the Mark Hopkins Hotel, San Francisco, January 22-25, provides the answers to marketing problems in two distinctive ways which differ markedly from the three previous conventions, according to Charles E. Ault, national president.

"ERA members are well aware of the changes in marketing going on in our industry—the cost squeeze, merger influence, obsolescence, changing technology, and the pressure of tightening competition.

"In workshop sessions members will participate in carefully guided exchanges of information with representatives from all over the country. Here, each will share his knowledge in return for the combined knowledge of the group.

"The predominance of key industry speakers and panelists illustrates the convention emphasis on practical, ready-to-use information."

The conference officially opens at 6:00 p.m. on Tuesday, January 22. Registration will take place on the lobby level of the hotel, from noon to 6:00 p.m. on January 22 and from 8:00 a.m. to 3:00 p.m. on January 23. Business sessions will be strictly limited to ERA members and officially invited guests.

Assignment: New Directions In Electronics

New frontiers in the scientific investigation of the world of sub-nuclear particles are opening with the construction of the new two-mile-long linear electron accelerator at Stanford University. The Stanford Linear Accelerator Center is located on the University's 9,000-acre campus in the foothills of the San Francisco Peninsula. At present in the early stages of development, this accelerator will be the longest and one of the most powerful in the world. Break-through contributions, challenging imagination and ingenuity, are required of many specialized disciplines and technologies. You can participate in this exciting, advanced undertaking if you qualify for these positions:

KLYSTRON ENGINEERS — Senior, to design very high-power klystron tubes, test and evaluate performance. Intermediate, for liaison with klystron vendors at eastern plants.

INSTRUMENTATION ENGINEERS — All levels, to work on problems of circuit design (solid state and vacuum tubes from dc to nanosecond), digital logic circuits, radiation monitors, transducers and protective circuitry, and nuclear instrumentation.

ELECTRONIC ENGINEERS — Senior, to supervise trouble shooting, procurement, maintenance, calibration and installation of equipment for 25 ft. prototype accelerator.

Intermediate Engineer or Physicist to analyze, solve interference and grounding problems of electronic equipment. Junior, to design circuits and supervise maintenance and repair of 25 ft. prototype accelerator.

VACUUM ENGINEER OR PHYSICIST — Senior, to supervise design, procurement, installation and testing of vacuum system.

MATHEMATICAL PHYSICISTS — Senior, to analyze problems of operational reliability of accelerator.

Senior, to perform analytical calculations on design of I&C system of accelerator.

EXPERIMENTAL PHYSICIST — Intermediate, to initiate, plan and operate experiments on 25 ft. prototype accelerator and evaluate machine performance.

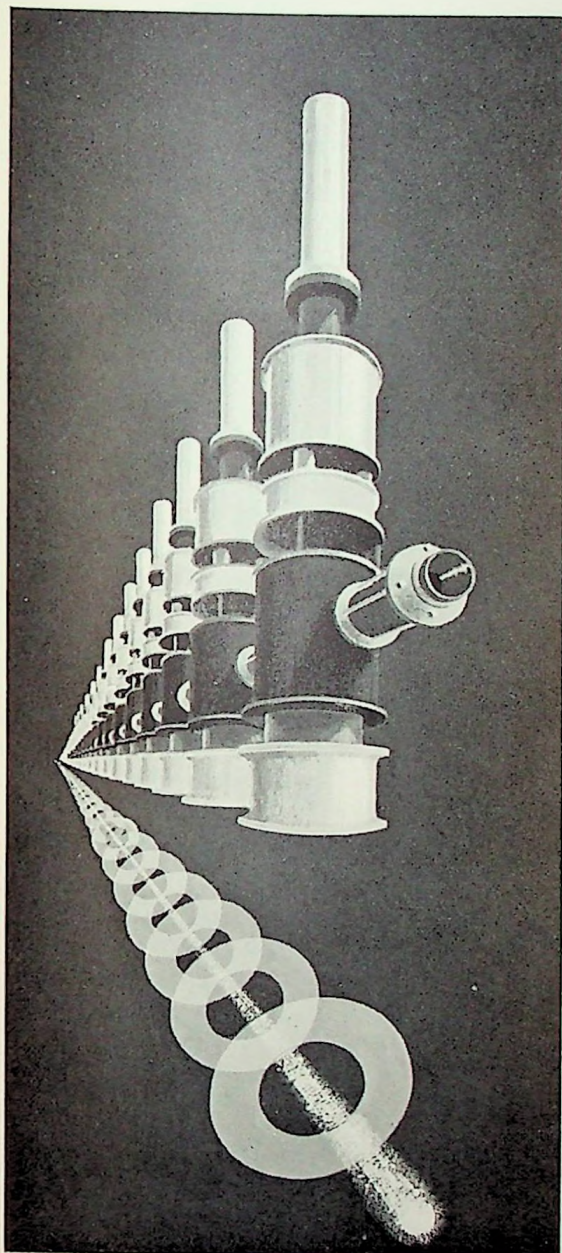
MODULATOR ENGINEERS — Intermediate, to perform tests on high-powered prototype modulator.


MICROWAVE ENGINEERS — Intermediate, to design microwave systems for injection gun.

DATA HANDLING ENGINEERS — Senior, to supervise the design, specifications, purchase, and testing of data presentation equipment.

FOR FURTHER INFORMATION

Please write: Mr. G. F. Renner, Employment Manager, Stanford Linear Accelerator Center, Stanford University, Stanford, California. An equal opportunity employer.



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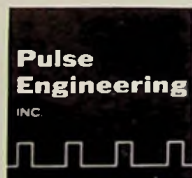
We need you (BSEE, two years in transistor circuits) to participate in the development of transistorized airborne and commercial radiation detection devices and to develop peripheral test equipment.

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There is great opportunity for personal advancement technically and financially. Your participation brings many benefits including profit sharing.

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E. H. Hulse

meeting ahead

SUPPORTING WEAPONS TESTING

In a program for developing nuclear weapons the huge mass of the iceberg that lies below the surface is the large variety and quantity of electronic gear needed to detect, measure, and record the effects of nuclear explosions.

At the February 12 joint meeting of PGED, SFS, AIEE, and the IRE-AIEE student branch at San Francisco State College, Edward H. Hulse, head, electronic engineering department, University of California Lawrence Radiation Laboratory at Livermore, will give a general review of the types of electronic equipment required for nuclear weapons tests and will discuss the branches of electronic engineering specialization needed to design and develop them. His subject will be "Electronic Engineering Support of a Weapons Test Program."

A great deal of electronic engineering is needed to implement a weapons test program. The entire conversion of matter into energy is over in microseconds. High-speed radiation detector devices and nanosecond circuitry are required to transmit the data before the blast wave arrives and destroys it.

Instrumentation for the explosion reaction consists of a large quantity of radiation detectors, banks of oscilloscope cameras for recording data, and a complex timing system to establish the interrelationship of the weapon and the instrumentation.

A 25-minute color and sound film, "The Forward Area in Nevada," only recently cleared for nonclassified showing, will be part of the presentation, a pictorial record of nuclear explosions in the area compiled by the

motion picture department at the laboratory.

Mr. Hulse is a graduate of the university and has been with the laboratory since 1955 as project engineer and department head. He was formerly district engineer and engineering supervisor with Westinghouse Electric Corp. from 1940 to 1955. He is a member of AIEE and, with Richard C. Honey, representing IRE, is co-chairman of the SFS, AIEE/IRE education and student relations committee.

Dinner will be served at 6:30 in the college cafeteria, followed by the presentation in a nearby lecture facility to be announced.

meeting ahead

PULSE COMPRESSION

A new look at scanning spectrum analyzers and panoramic receivers will be given PGI at its January 23 meeting at Stanford by Dr. William Robert Kincheloe, research associate in the applied electronics laboratory at the university.

For many years the measurement technique has been standard for determining the frequency distribution of signal energy; a large amount of technical literature exists on the subject. Recently it has become clear that limitations on frequency resolution, sensitivity, and speed of scanning that have long been accepted as fundamental in nature do not, in fact, apply when filter techniques similar to those used in pulse compression (chirp) radar are used.

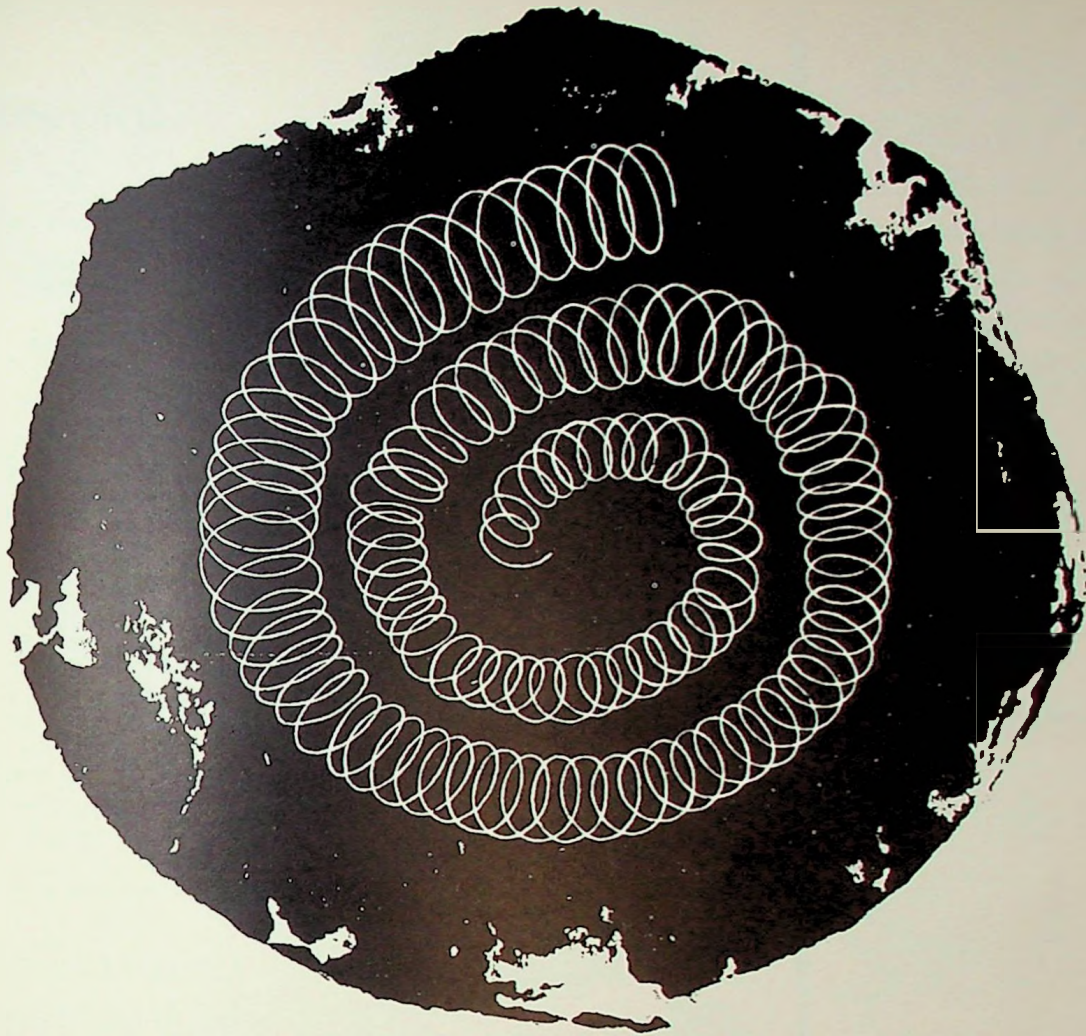
A theoretical investigation has shown, for example, that performance can be made independent of scan rate and can approach that possible with the "comb-filter" type of spectrum analyzer. Ultimate resolution is determined only by the duration of the signal sample, and sensitivity is determined by available signal energy.

Practically, improvement of an order of magnitude is not difficult, and more appears feasible. Several methods of constructing the required filters and experimental results will be described.

pgmil news

DATA ON MEET

For literature on the fourth annual winter convention on military electronics in Los Angeles, January 30-February 1, write the Los Angeles Section of IEEE, 3600 Wilshire Blvd.



Said Svante Arrhenius: *"The change of the logarithm of a chemical reaction rate constant with respect to temperature, is inversely proportional to the square of the absolute temperature."*

The aerospace industry is searching constantly for strong, light-weight, heat-resistant materials. Finely-spun glass fiber, bonded with a plastic binder, is beginning to exhibit superior properties. Until recently the glass fiber has been far more heat-resistant than any binder.

Scientists at Lockheed Missiles & Space Company, however, have developed a compatible binder. This now makes it necessary for the glass-producing industry to evolve a glass to match its superior heat-resistance.

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D. H. Preist

meeting ahead

PROGRESS IN CERAMICS

Fifteen years ago, ceramic in vacuum tubes was confined to internal spacers. Today, a majority of power tubes use ceramic for the envelope and the RF output window. A great deal of effort has gone into the development of sealing techniques and refinement of materials. This effort has carried over into the semiconductor industry.

Advances in the use of ceramics in electron devices will be the subject of D. H. Preist, associate director of research, Eitel-McCullough, San Carlos, at the January meeting of PGED.

The speaker will review present applications and will dwell on progress made in understanding how to use ceramic as a structural element in tubes, where its dimensional stability at high temperatures is outstanding, and where proper handling of thermal stresses is the key to success. Two examples will be discussed. One is the use of ceramic RF output windows for high-power microwave tubes. The other is a novel design of an experimental super power pentode in the 1 megawatt CW class, featuring free use of ceramic as a structural element.

Mr. Preist joined the research staff in 1946 and has been responsible for the design and development of many high-power triodes, tetrodes, and circuits for CW and pulse applications. Later, he was instrumental in the development of the Eimac line of external cavity high-power amplifier klystrons and other microwave tubes, and was responsible for the design of the first super-power klystrons for BMEWS radar.

More recently he has concentrated on research on tubes leading to higher-power levels.



Anthony E. Siegman

meeting ahead

SIEGMAN/LASERS/PGSET

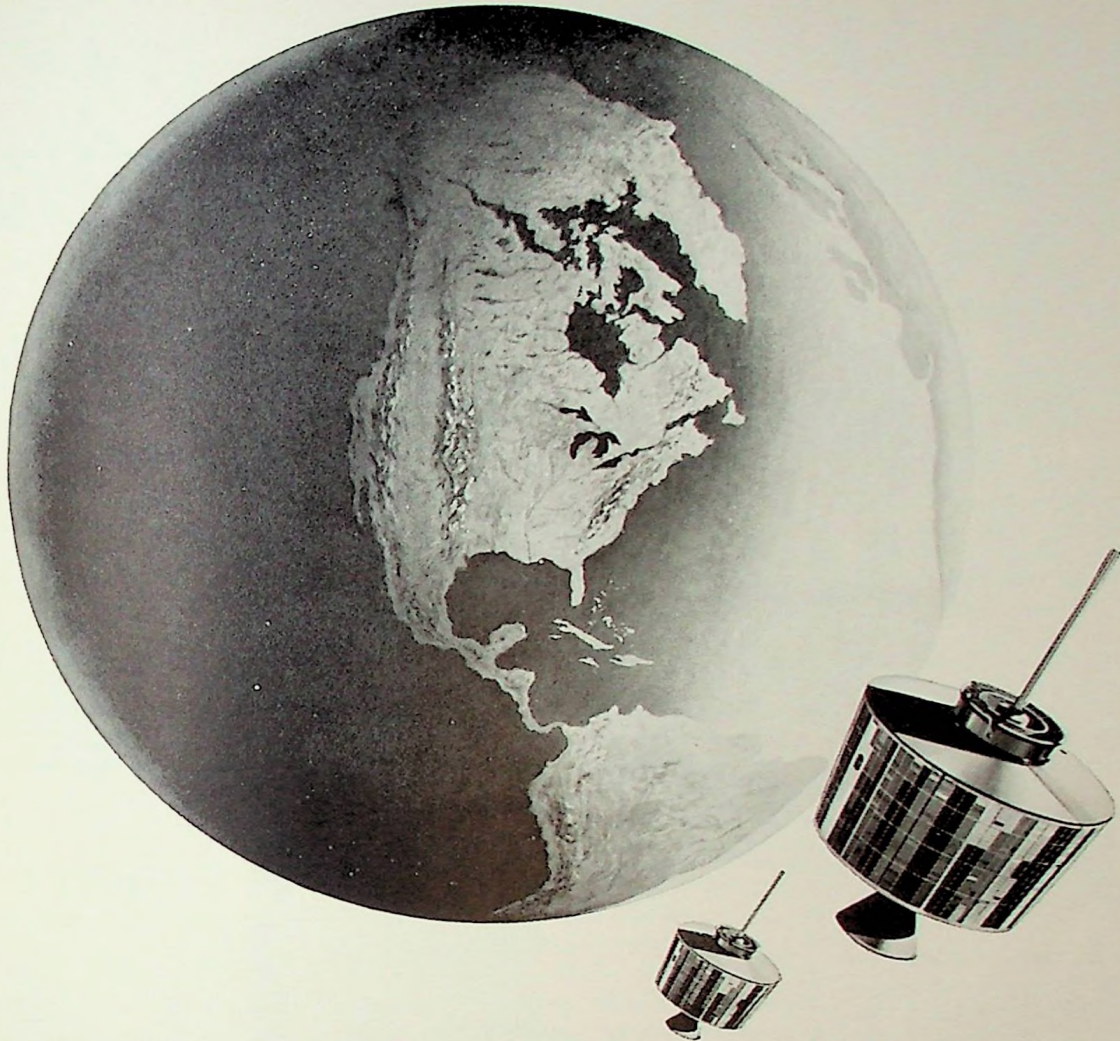
Dr. Anthony E. Siegman, who will address PGSET on "Lasers" at the January 15 meeting, is associate professor of electrical engineering at Stanford University whose special fields are microwave devices, quantum electronics, and masers. He received the doctorate at Stanford in 1957 after degrees at UCLA and Harvard. He has been consultant to Lockheed, Watkins-Johnson, and SRI, and is the author of 22 technical papers. He is a member of IRE.

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meeting review

PEP FOR ANALOG COMPUTERS

PGPEP was hosted by the Berkeley division of Beckman Instruments, Inc., in November, when T. E. Scatchard, director of manufacturing, arranged a program that started with dinner for 55 members and visitors, included a technical presentation by Charles Single, and finished with a tour of the analog computer manufacturing facilities.

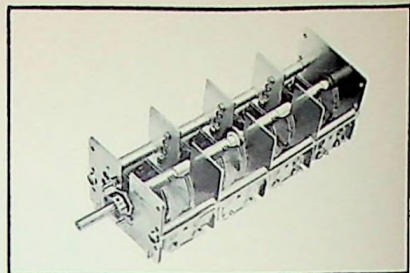
Mr. Single, manager, computer engineering, introduced his discussion of product engineering for analog computers with a brief description of digital computers on a comparative basis with analog machines. He noted that the digital computer business had reached a level of approximately 100 million dollars, with the major applications in business operational functions, while the analog computer business approximated 20 million dollars—all in scientific applications. In detailing the main difference in these two technologies, he pointed out that the analog machine in its operation is an electrical model of the system in which a problem exists. By electrical activation of this electrical model within established boundary values the solution to a particular problem could be quickly determined.

The analog computer is constructed of building blocks, Mr. Single noted, such as operational amplifiers, multipliers, quarter-square multipliers, diode function generators, servoset potentiometer assemblies, power supplies, and the problem setting control panel. These building blocks are assembled into systems that operate as high as one thousand cycles per second and as low as one cycle per fortnight. In such operation a phase shift through the system of 0.1 degree at 100 cps corresponds to a 0.2 percent loss in accuracy in the output.

It was stated that one of the unique challenges in the product engineering of large analog computation systems is minimization of electrical interactions between the hundreds of building blocks that may be assembled into a 100-foot-long bay of a scientific machine.

The first Beckman large-scale analog computer was delivered in 1955 and featured a 6-tube operational amplifier with point-to-point wiring, with a sales price of approximately

(Continued on page 15)



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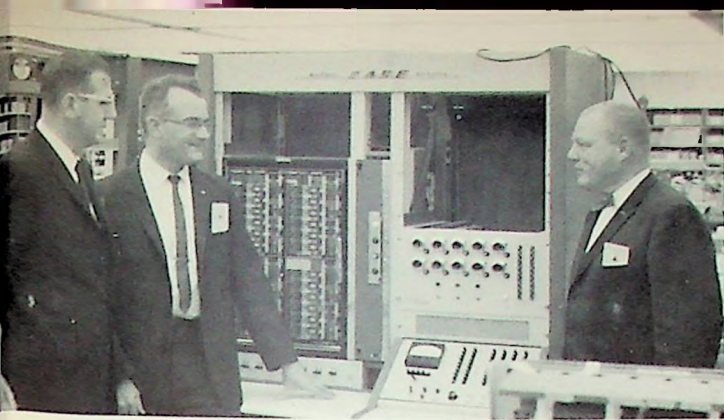
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Olof Lundbeck, PGPEP chairman, Charles Single, and T. L. Scatchard, director of mfg., Beckman, discuss the product engineering of an analog computer at the November meeting.

—W. D. Fuller photo



Bud Eldon was chairman of the man/hardware session at the recent national PEP conference in San Francisco, which featured papers by (l. to r.) John Brinda, Jr., and Nicolai J. Buchaca, both of Philco; Bronson B. Baker, Lockheed; Ralph W. Schwarze, Advanced Automation Associates; and Jack M. Duer, Nortronics.

—J. D. Harrell, Western Machinery & Steel World photo



Jack Trinkaus, chairman, national administrative committee, PGPEP; Bernard M. Oliver, vice president, research & development, Hewlett-Packard; and Arthur P. Kromer, general chairman of the PEP conference, following Dr. Oliver's luncheon address.

—J. D. Harrell, Western Machinery & Steel World photo

Jerry Dover, current PGMIL chairman, presented a memento to Walter Prise, immediate past chairman, at a recent meeting of the group.



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meeting review

OVERCOMING DRAG

The December meeting of PGAC was held at Stanford University, the speaker for the evening being Ben O. Lange of Lockheed Missiles and Space Company, who gave a very interesting talk on his Stanford thesis topic, "Drag-Free Satellites: An Application of Contactor Control in a Rotating Reference Frame."

As Mr. Lange envisages it, a satellite could be made drag-free by enclosing within it a proof mass, which is thus shielded from the effects of atmospheric drag and solar pressure. The satellite is then caused to chase the proof mass so that its motion also becomes free of drag effects.

Such a satellite could be put to many interesting uses, such as measurements of the upper atmosphere, geodetic measurements, and various relativity experiments.

Once atmospheric drag and solar pressure have been removed, various small accelerations on the proof mass become important. These include

vehicle gravitational attraction, accelerations due to stray electric charges, and accelerations due to the effects of the sensors needed to detect the position of the proof mass. The largest of these is of the order of 10^{-10} g's. The effects of these accelerations can be minimized by spinning the satellite with the spin axis normal to the orbit plane. In this case, most of the effects are averaged out, and the orbit would be displaced by about 10 feet in a year.

If the satellite is spun, it becomes subject to gyroscopic drifts. With the contemplated configuration, these drifts are of the order of 10^{-14} radians per second.

The optimal control of the satellite to chase the proof mass using minimum fuel was determined by Pontryagin's Maximum Principle. This optimal solution, as usual, involves some fairly complicated nonlinear switching on and off of the satellite's correction jets. To simplify the control, a quasi-optimal linear switching scheme was proposed and a diagram of the instrumentation was presented.

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After a question-and-answer session primarily concerned with constructional details of various building blocks, guests toured the manufacturing facility and observed various computer constructional details as well as check-out operations on a computer ready for delivery to Boeing.

A particular feature of this professional evening was a dinner prepared in the Beckman cafeteria and served to the members and guests by a number of the female members of Mr. Scatchard's staff. A second feature was the use of a chartered bus to transport members and their guests from the West Bay Area to the Beckman plant and return after the meeting.

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MEET THE SAN MATEO STAFF



Dave Peters
Regional Manager

Dave is one of the oldest (in experience) Moxon Men, having joined the firm in 1957 B.Sp. (Before Sputnik). Before coming north to head up the San Mateo office, he was one of the top Moxon Sales Engineers covering the San Fernando Valley and Southern Coast which included the important Pacific Missile Range and Vandenberg Air Force Base.



Gene Ward
Sales Engineer

Gene recently joined the Moxon organization after four years at MELABS where he was branch engineering manager. He has had extensive experience in microwave instruments and systems, and holds an EE degree from the University of California.



Gary Schmidt
Service and Inside Technical

A welcome addition to the San Mateo office is Gary, who joins Moxon after four years with Neely Enterprises in customer and field service. In addition to acting as application engineer Gary will also set up a local service department.



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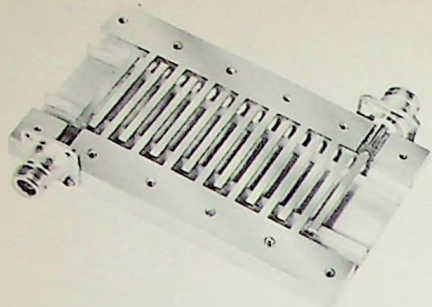
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MANAGEMENT SEMINAR

Intensive inquiry and analysis of specific electronic management areas will be the rule at a special WEMA workshop seminar, set for January 31 and February 1 at the Cabaña Hotel in Palo Alto.

Six "participating sessions," tailored specifically to provide practical information to management, will be guided by discussion leaders who are experts in their respective fields, according to Albert C. Beeson, WEMA management development director.

Registrants may choose any one of the six areas, and then pursue that subject in depth throughout both days.

Areas to be covered will include selection, training, and compensation of manufacturing employees; export sales for small companies; labor problems affecting nonunion as well as union plants; tailoring the engineering program to encourage greater creativity; federal bargain hunting in prime contracts and its effect on subcontracts; and the return-on-investment concept as a tool of management.

IT IS REPORTED:

Dan T. Kennedy has been named manager of the newly formed Velonex division of Pulse Engineering, Inc., Santa Clara manufacturer of mag-

Discussion leaders for the various topics include many of the Bay Area's leaders in management techniques: Emmet G. Cameron, executive vice president, Varian Associates; Phillip L. Gundy, executive vice president, Technical Systems, Inc.; William G. Heflin, general manager, Beckman & Whitley; Leonard F. Beckers, president, California Economics Research Corp.; Hugh Kennedy, manager, engineering services, Granger Associates; Joseph Metzger, director of industrial relations, Ampex; and John Lauritzen, labor attorney.

Seminar sessions will run from 9:00 a.m. to 5:00 p.m. each day. Subjects will be limited to 15 participants, and registrations will be accepted on a first-come, first-served basis.

Additional information and registration forms may be obtained from either of the WEMA offices in Palo Alto or Los Angeles.

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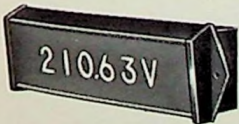
Raymond L. Pole, branch manager of the Richard A. Strassner Co., announces the representation of National ResisTronics Corp. (formerly National Resistance Corp.), which, after three years of development, is now producing micro-miniature integrated SirKit wafers and r/c networks.

Thomas Thomason has joined the Systron Engineering Department of Systron-Donner Corp., manufacturer of diversified electronic instrumenta-

tion, as special projects manager in engineering and production capability pertaining to test instrumentation and data acquisition systems.

Dr. Lester C. Van Atta has been named chief scientist of Lockheed Missiles and Space Co., succeeding Dr. Roy A. Smelt, now vice president and general manager of the nuclear space programs division in charge of the RIFT program. Dr. Van Atta comes to Lockheed from Hughes Aircraft Co., and will be chief scientific advisor to the company president, L. Eugene Root. He is a former director and a fellow of IRE, a director of WESCON, and has held many government and university posts at Princeton, MIT, and the Naval Research Laboratory.

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MEMBERSHIP



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

Senior Member

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Mark A. Gallant

Member

C. M. Hart
R. S. Lewis
R. D. Stine, Jr.

Associate

L. I. Haigler

Following are the names of individuals who have been elected to current membership:

R. A. Cutter	N. A. Mortillaro
P. H. Davis	E. K. Sittig
P. L. Dudley, Jr.	R. S. Taifel
L. D. Haug	A. Tojo
M. L. Ingalsbe	R. R. Village
P. A. Kuckein	S. I. Yi
C. D. Labmeier	

Following are the names of IRE members who have recently entered our area, thereby becoming members of the San Francisco Section:

G. T. Advani	L. L. Hundley
F. F. Angel	A. Y. Jaddan
J. E. Bugg	F. V. Jorgensen
N. E. Broderick	E. K. Kietz
M. Brown	D. H. La Forge
T. H. Bugbee	C. E. Mendenhall
W. T. Burke	D. J. Leistico
R. M. Cadwell	H. H. Lowenthal
K. E. Coffin	R. D. Ponsness
P. H. Conklin, Jr.	M. C. Poppe, Jr.
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D. A. Conrad	E. R. Scott
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R. C. Eden	M. D. Sohigian
P. C. Ely, Jr.	A. H. Thompson
J. J. Fitzgerald	F. J. Van Poppelen
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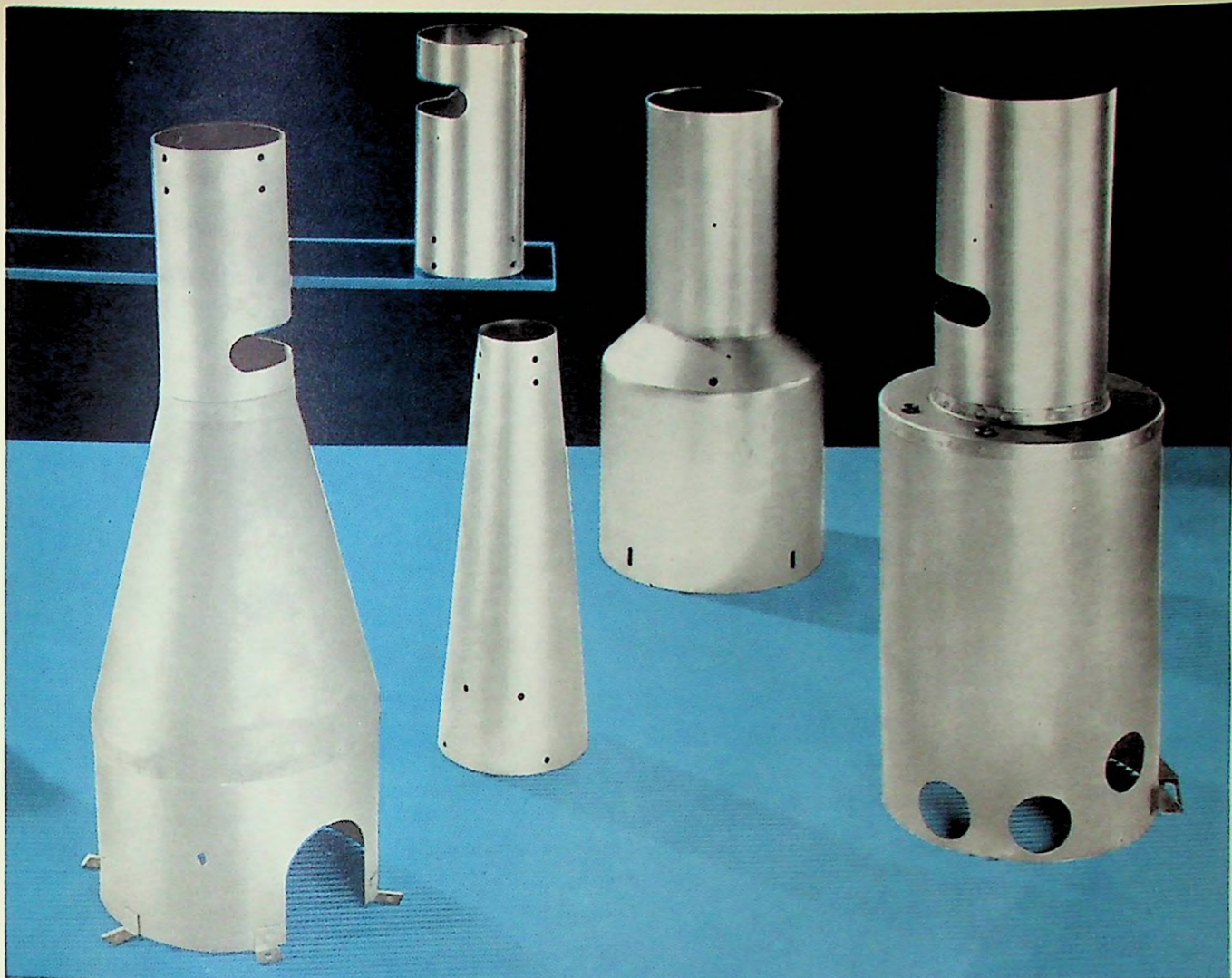
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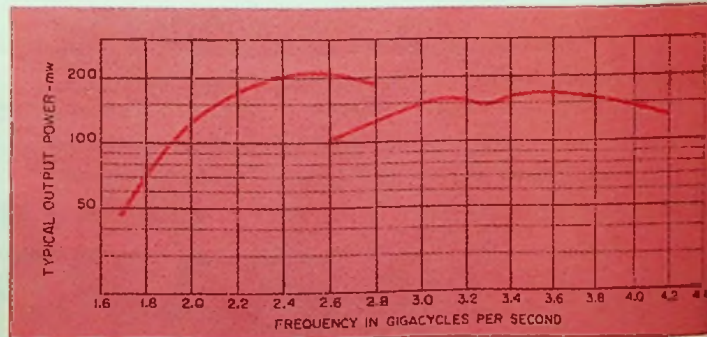
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