SCIENCE 20 November 1964
Vol. 146, No. 3647

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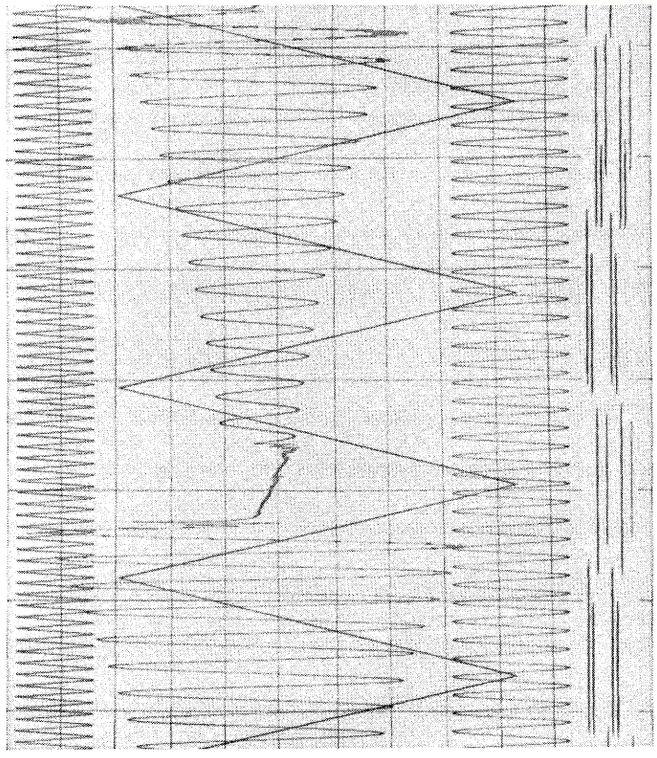

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SCIENCE

LETTERS Galileo: *R. F. McGregor, V. Marasigan, C. Eisenhart, M. Holt*; Grants and University Authority: *L. Levin* 997

EDITORIAL The Globe Trotters 1001

ARTICLES Continental Drift and the Origin of Mountains: *E. Orowan* 1003

Hot creep and creep fracture are crucial factors in the formation of continents and mountains.

Esterase Inhibitors as Pesticides: *J. E. Casida* 1011

Because of favorable biological properties they are displacing other types of established compounds.

Society and Science: *V. R. Potter* 1018

Can science aid in the search for sophistication in dealing with order and disorder in human affairs?

Macromolecules: *H. Mark* 1023

Increased understanding of natural polymers has made possible the synthesis of many useful new ones.

NEWS AND COMMENT Lysenko: Controversy Flares Again—Space: On to Mars 1024

BOOK REVIEWS The Administration of Foreign Policy: *W. Y. Elliott* 1030

Advances in Lipid Research, reviewed by *D. Steinberg*; other reviews by *N. K. Wessells, G. Felsenfeld, I. King, S. S. Goldich, E. J. Rosenbaum, J. E. McDonald, W. Deshler* 1031

REPORTS Noble Gases in Sea Water: *R. Bieri, M. Koide, E. D. Goldberg* 1035

Solar X-ray Spectrum below 25 Angstroms: *R. L. Blake* et al. 1037

Electroconductive Polymers: *J. H. Lupinski* and *K. D. Kopple* 1038

Osmiophilic Reagents: New Cytochemical Principle for Light and Electron Microscopy: *J. S. Hanker* et al. 1039

Radium-226 and Polonium-210 in Leaf Tobacco and Tobacco Soil: *T. C. Tso, N. A. Hallden, L. T. Alexander* 1043

Vibrational Excitation in Some Four-Center Transition States: *S. H. Bauer* and *E. L. Resler, Jr.* 1045

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Crustal Uplift Southwest of Montague Island, Alaska: *R. J. Malloy* 1048

Coupling of Butyl Bromide on Hot Magnesium: *F. L. Lambert* et al. 1049

Rubidium-Strontium Isochron Study of the Grenville Front near Lake Timagami, Ontario: *J. A. Grant* 1049

Resistance to *Erysiphe polygoni* of Red Clover Infected with Bean Yellow Mosaic Virus: *L. N. King, R. E. Hampton, S. Diachun* 1054

Antigens Associated with a Tumor Virus: Rejection of Isogenic Skin Grafts from Leukemic Mice: *E. J. Breyere* and *L. B. Williams* 1055

Reversible Sonic Inhibition of Protein, Purine, and Pyrimidine Biosynthesis in the Living Cell: *V. W. Burns* 1056

Adhesiveness of Spider Silk: *T. Eisner, R. Alsop, G. Ettershank* 1058

Histamine: Differences in Amount Available for Release in Lungs of Guinea Pigs Susceptible and Resistant to Acute Anaphylaxis: *S. H. Stone* et al. 1061

Culture of Insect Salivary Glands in a Chemically Defined Medium: *G. B. Cannon* 1063

Avian Atherosclerosis: Retardation by Pectin: *H. Fisher, P. Griminger, H. S. Weiss* 1063

Formation and Degradation of Cyclic Dextrins by Intracellular Enzymes of *Bacillus macerans: J. A. DePinto* and *L. L. Campbell* 1064

Association of Rapidly Metabolized DNA and RNA: *J. H. Cherry* 1066

Visual Motion Detection in the Cat: *G. Baumgartner, J. L. Brown, A. Schulz* 1070

Separation of the Salivary and Motor Responses in Instrumental Conditioning: *G. D. Ellison* and *J. Konorski* 1071

Electroconvulsive Shock, Retroactive Amnesia, and the Single-Shock Method: *D. J. Leonard* and *A. Zavala* 1073

Comments on Reports: Statistical Models for Predicting Numbers of Plant Species: *D. R. Dawdy* and *T. H. Hamilton* 1074

ASSOCIATION AFFAIRS

4.5 Billion Years of Protein Molecules: What Do We Know Now about How They Are Made? 1076

MEETINGS

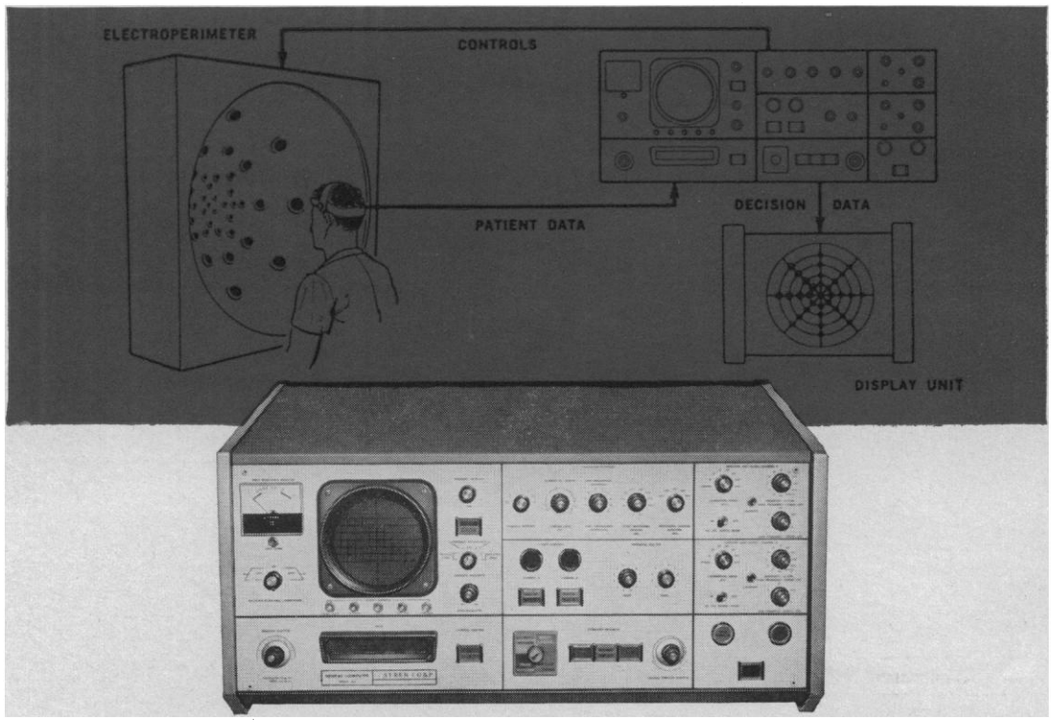
Primate Biology: Planning Meeting: *L. Carmichael* and *A. J. Riopelle*; Fetal Homeostasis: *R. M. Wynn;* Forthcoming Events 1078

DEPARTMENTS

New Products 1093

COVER

Web of the spider *Argiope florida* Chamberlin & Ivie, photographed near Lake Placid, Florida, at dawn when the web was laden with dew. The threads of a web are covered with tiny droplets of a viscid material to which insects adhere when they fly into the web. Moths, by virtue of the loose scales on their wings and bodies, tend not to adhere, but may simply lose some of their scales to the viscid threads, and fly on. Other insects, covered with detachable hairs or powder, may similarly elude capture by the spider. See page 1058.



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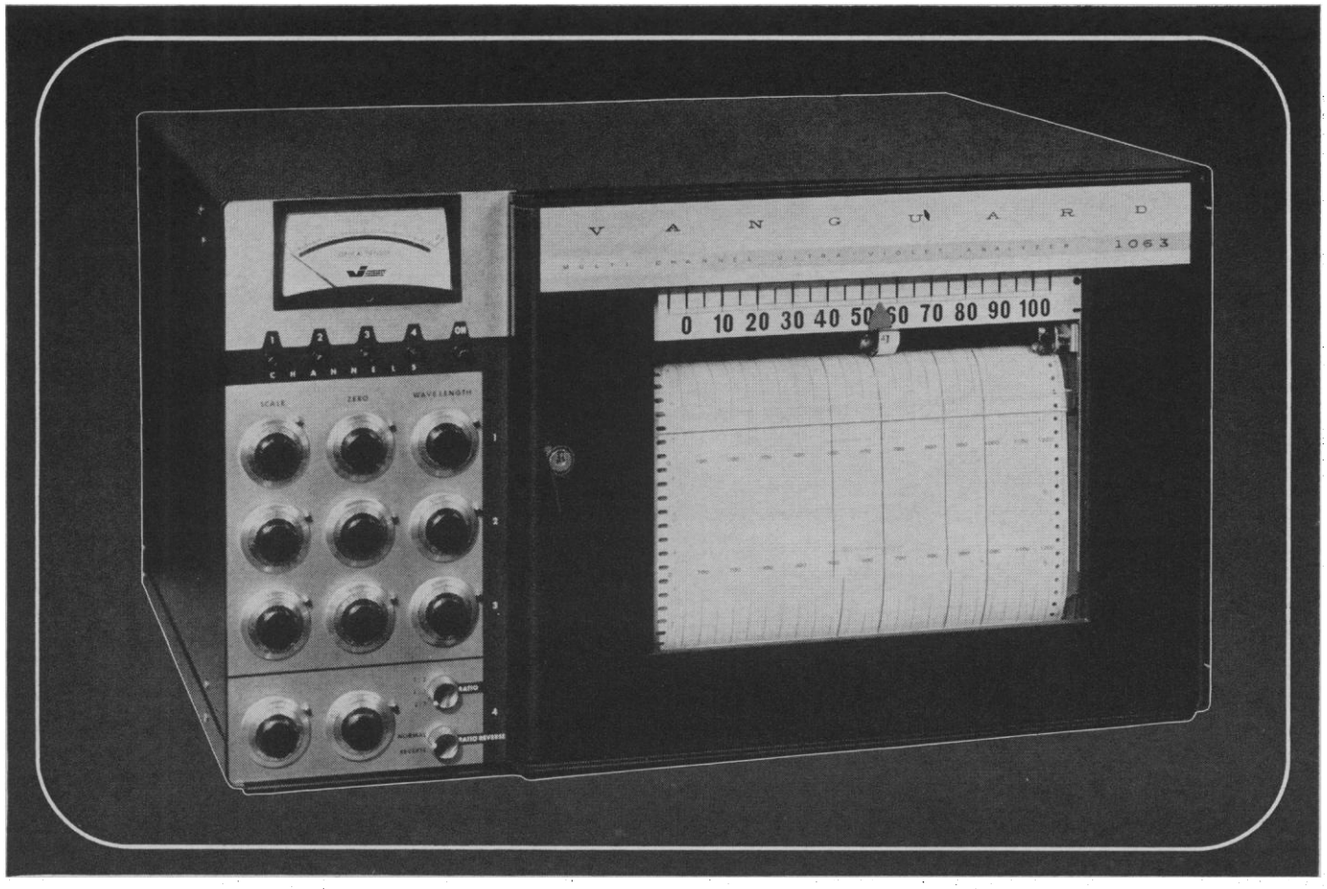
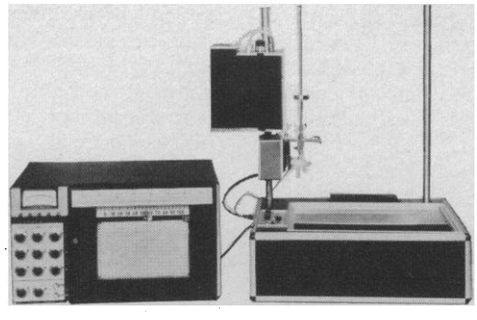


new automatic multi-channel ultra-violet analyzer (od)

Vanguard's Model 1063 Automatic Multi-Channel Ultra-Violet Analyzer provides the investigator with heretofore unavailable versatility. This instrument presents a recording of the optical density of the effluent from a chromatographic column at three different wavelengths. In addition, it provides a recording of the ratio of the optical density of the effluent at two of these wavelengths. Two of Vanguard's logarithmic converters are used in each channel to provide a recording linear with optical density. The ratio is recorded as the logarithm to provide a compact scale. ■ Space-saving design—Model 1063 measures only 27¾" wide, 15½" high and 21¼" deep ■ Precision plane diffraction grating monochromator of highest quality ■ Matched quartz cuvettes designed for minimum hold-up and mixing ■ Completely transistorized for dependable, maintenance-free operation ■ Detection system completely self-contained and light-shielded.



Model 1063 with Model 1011 Automatic Fraction Collector. Model 1063 is compatible with all Fraction Collectors.

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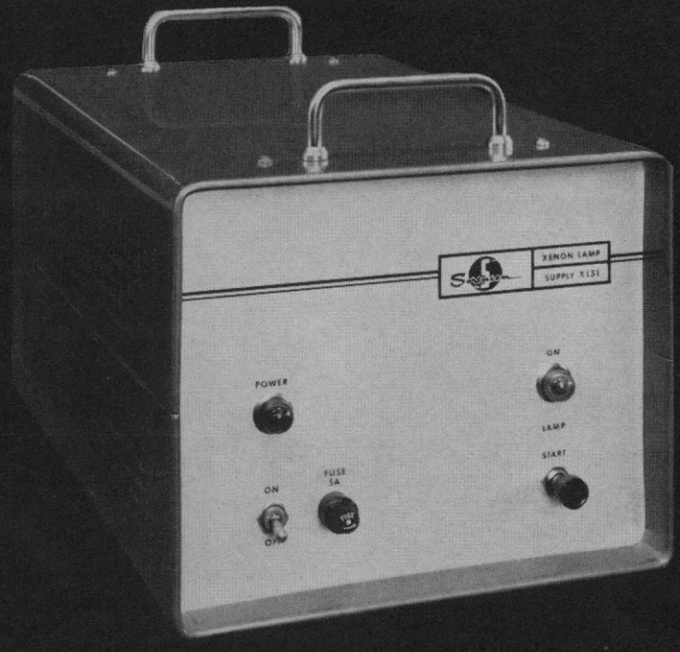

Sorensen's new XLS-1 xenon lamp power supply

The new Sorensen XLS-1 xenon lamp power supply assures high reliability and no lamp downtime by using a pulse ignition circuit instead of relays and spark gaps. These supplies deliver constant current (± 1%), with line voltage variation of 100-130 VAC or 200-260 VAC.

The precise light stabilization produced by the Sorensen XLS-1 power supply permits use of the xenon arc lamp in many applications. Some of these are: spectrometers, precision optical systems, spectro-phosphorimetry, spectro-projection systems, solar simulation, spectro-photography and modulated light communication systems.

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ELECTRICAL SPECIFICATIONS

Input: For model XLS-1A voltage is 100-130 VAC single phase, Current 4A AC maximum; Frequency 60 CPS ± 1% • For model XLS-1B, frequency is 50 CPS ± 1% • For model XLS-1C, frequency is 50 CPS ± 1%, input voltage is 200-260 VAC single phase, and current is 2A AC maximum.

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For full information call your local Sorensen representative or write: Sorensen, A Unit of Raytheon Co., Richards Avenue, South Norwalk, Connecticut. Or use reader service card number 200.

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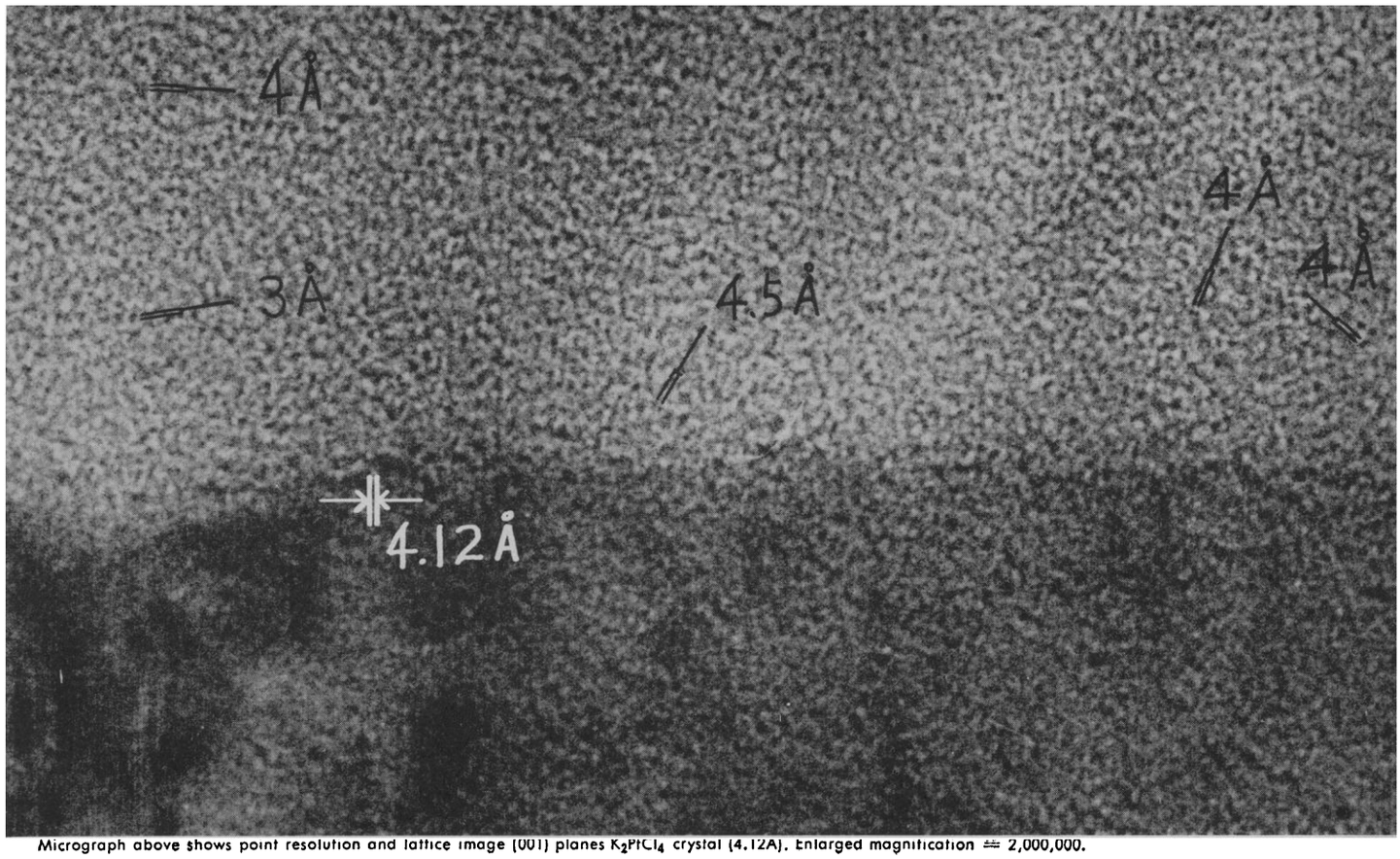


Micrograph above shows point resolution and lattice image (001) planes K_2PtCl_4 crystal (4.12A). Enlarged magnification ≐ 2,000,000.

No. 3 in a Series

ADVANCES IN ELECTRON MICROSCOPY

As research in the life sciences and solid state physics accelerates, ultra high resolution electron microscopy assumes an increasingly important role as a source of fundamental new information. Recently, scientists at the Hitachi Central Research Laboratory have announced new discoveries in electron optics which are being incorporated in their latest designs. The five electron micrographs below of a tiny (0.05 micron) hole in collodion film were taken at equal intervals during a four minute period. They demonstrate the remarkable performance of the new Hitachi HU-11B Electron Microscope.

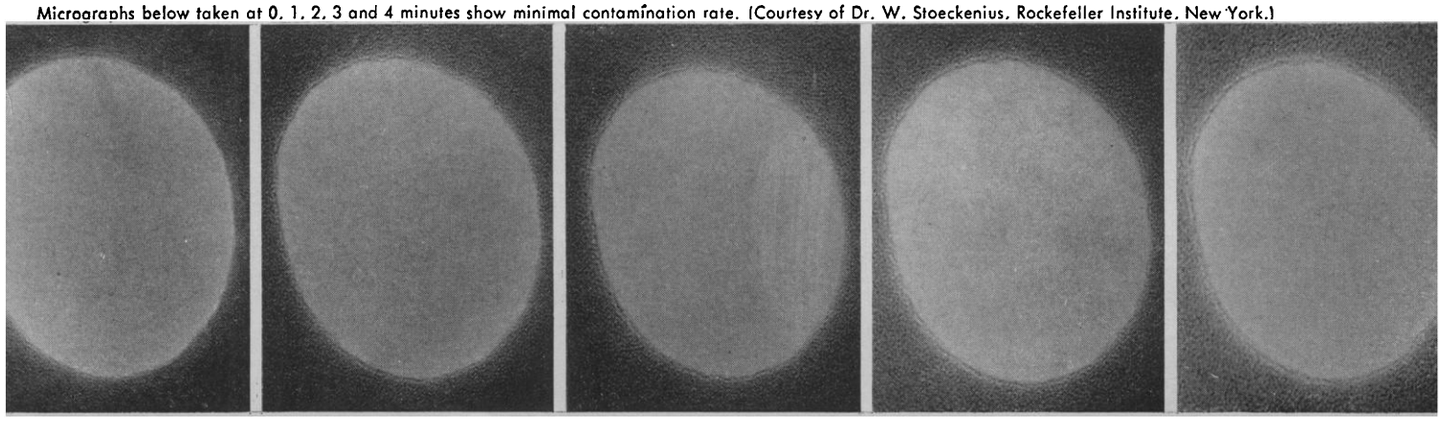
Careful measurements on the original plates indicated (a) At the direct magnification of 250,000, better than 5Å resolution was maintained for each exposure (b) Electronic stability was better than 2 in 10^6 for four minutes (c) The specimen contaminated at a rate of less than 0.5 angstroms per minute.

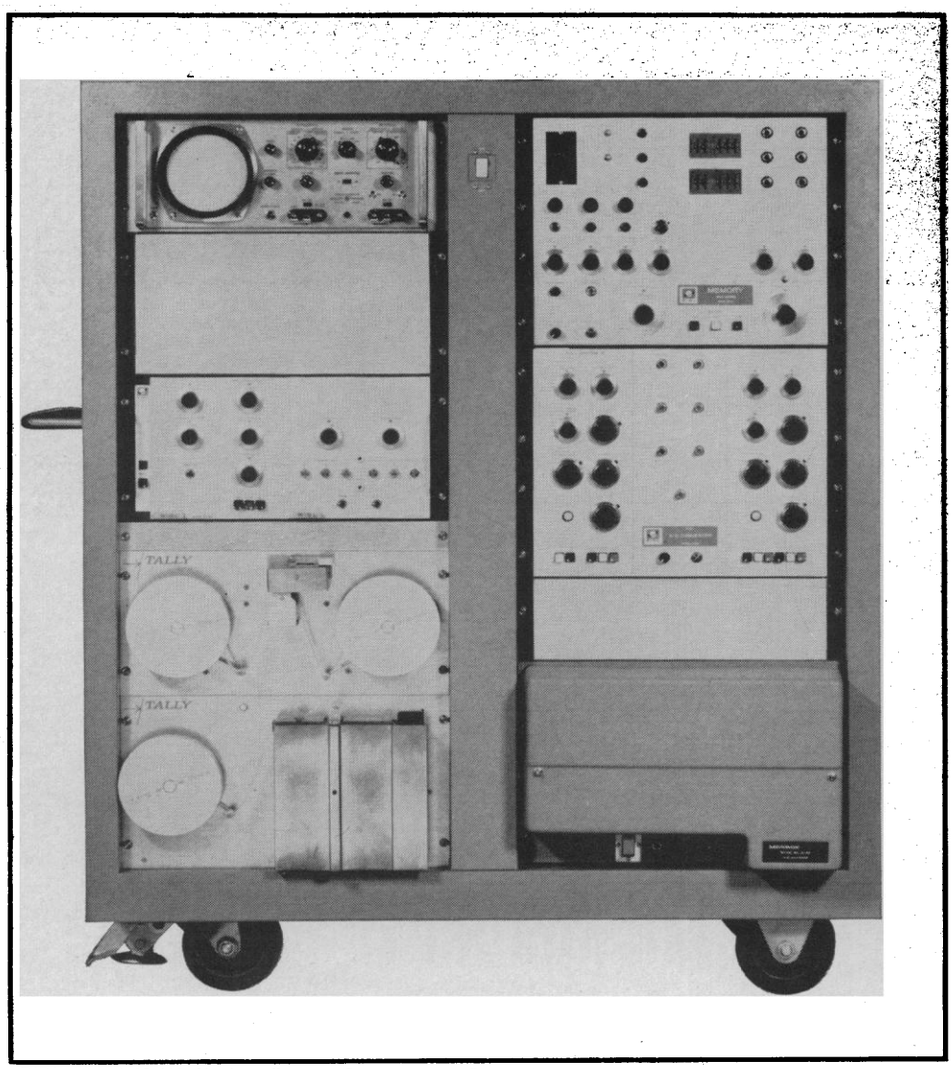
With this constancy of performance, ultra high resolution micrographs can now be obtained similar to that shown above. The (001) lattice image of K_2 Pt Cl_4 Crystal with 4.12 Å spacing is resolved while on the same plate point-to-point resolution of particles as close as 3Å is obtained. This is the highest point resolution yet demonstrated by any electron microscope, approaching the dimensions of single atoms.

A complete set of these micrographs and details on the Model HU-11B can be obtained from the Perkin-Elmer Corporation, Distributor Products Department, 910 Main Avenue, Norwalk, Conn., exclusive sales and service representative for Hitachi Electron Microscopes in North America.

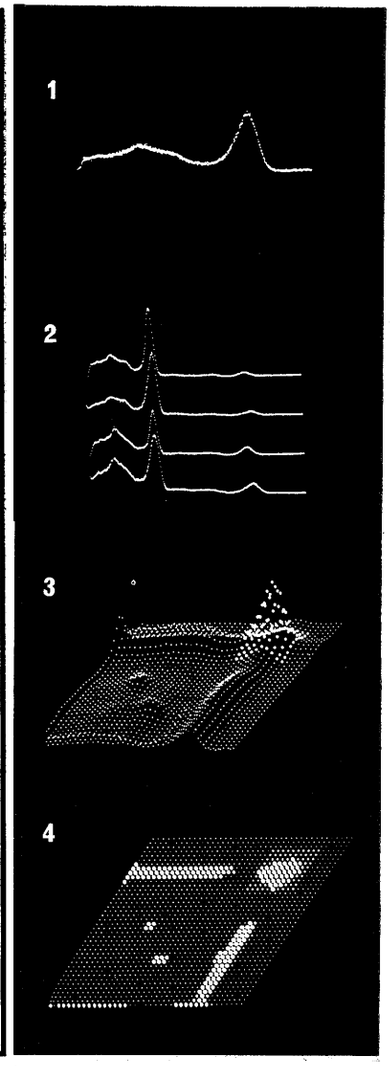
PERKIN-ELMER

Micrographs below taken at 0, 1, 2, 3 and 4 minutes show minimal contamination rate. (Courtesy of Dr. W. Stoeckenius, Rockefeller Institute, New York.)





RIDL Model 22-102 Nuclear Counter-Computer consists of 22-01 1600-Word Memory, 22-03 Dual ADC, 29-1B Instrument Case and Power Supply, 52-56 5-in. Display Oscilloscope, 52-52 Data Processor, 52-53 Punch/Type/Read Matrix, 44-15 Tally Punch, 44-23 Tally Reader, 44-25 Monroe Printer, and 29-23 Cart.



Pictured at right are four of a number of display and operating modes with sodium-22 spectra: **1.** *Single-parameter analysis mode provides resolution consistent with most solid-state detectors.* **2.** *Typical multiple single-parameter application—shown here is 2 x 400 coincidence simultaneously with 2 x 400 anticoincidence. Dual 2 x 800 mode is also available.* **3.** *Multiparameter 40 x 40 coincidence operation with Region of Interest intensification. Other multiparameter coincidence groups are 16 x 100, 8 x 200, 4 x 400, 2 x 800. System can also be used to monitor data for computer input and analysis.* **4.** *Unique peak* volume *integration provided by two-parameter Region of Interest selectors and data level controls which intensify and define area (x and y) in which peak lies and count level above which integration will be performed.*

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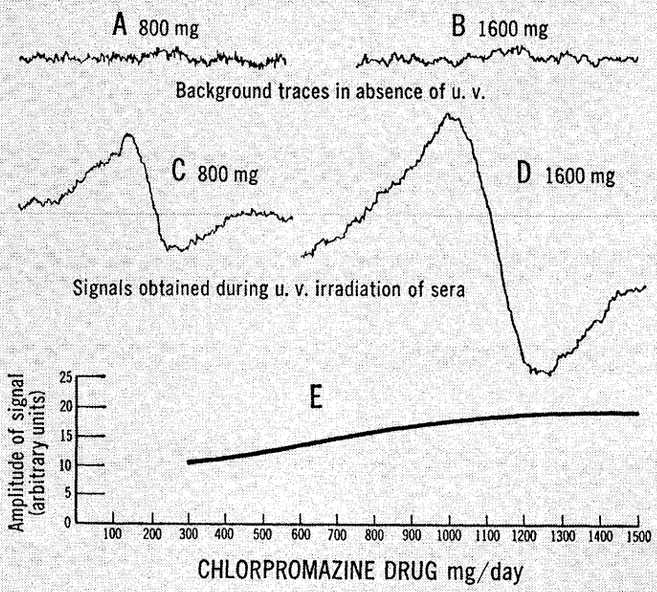
EPR IN THE WORLD OF BIOCHEMISTRY

EPR MONITORING OF DRUG LEVELS IN BLOOD SERA



When a blood serum sample of a mental patient who is being treated with one of the phenothiazine psychotropic drugs is irradiated with an ultraviolet light, a light-induced EPR signal with a line width of 8.35 gauss and a g value of 2.0042 is produced. Figs. A & B illustrate background traces taken in the absence of ultraviolet light. Figs. C & D are typical signals obtained during **in situ** irradiation with ultraviolet light of blood sera. In fig. C, the patient was on 800 mg drug per day. In fig. D, the patient was on 1600 mg drug per day. The amplitude of this signal is proportional to the amount of drug used clinically, as illustrated in E.

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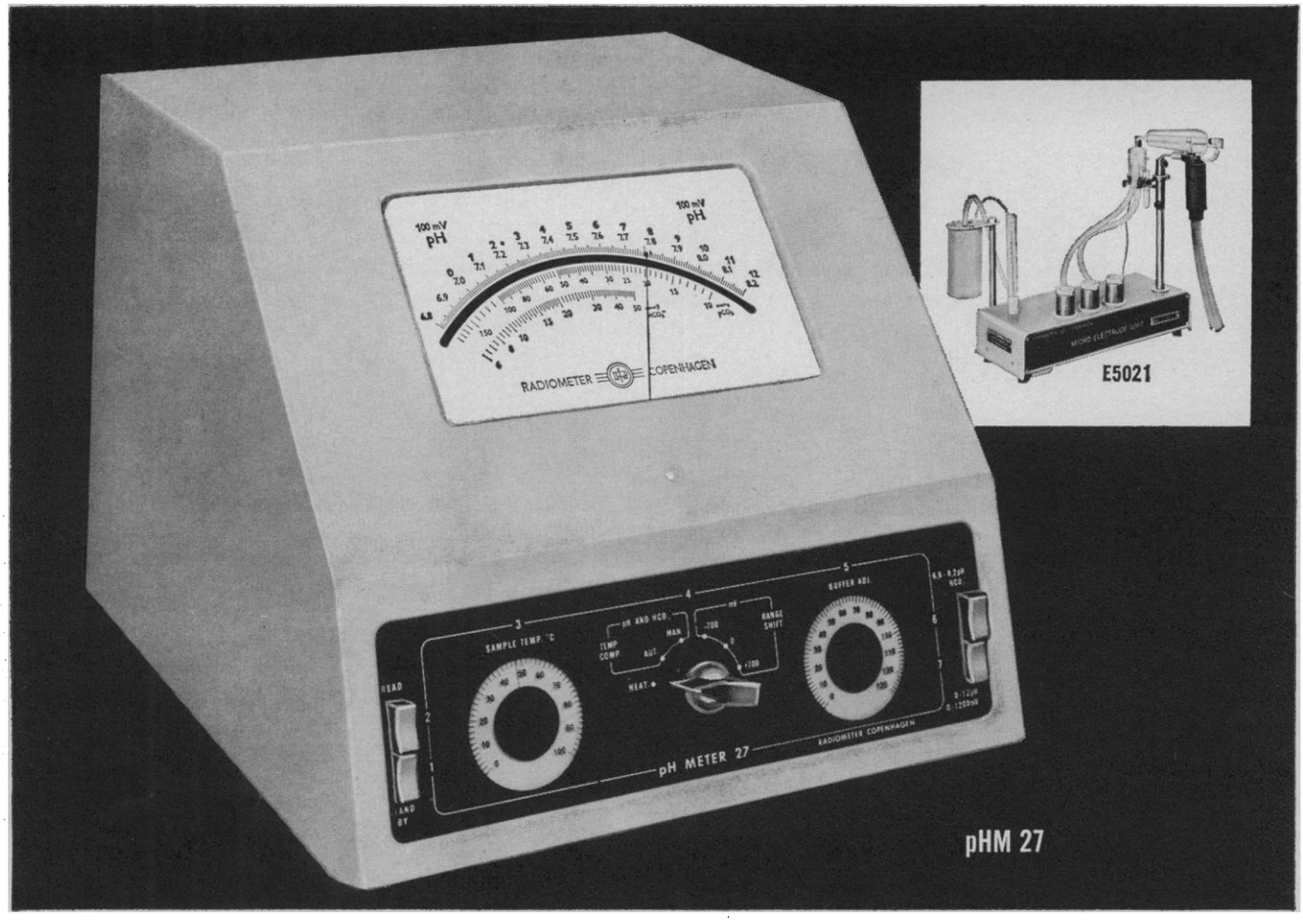

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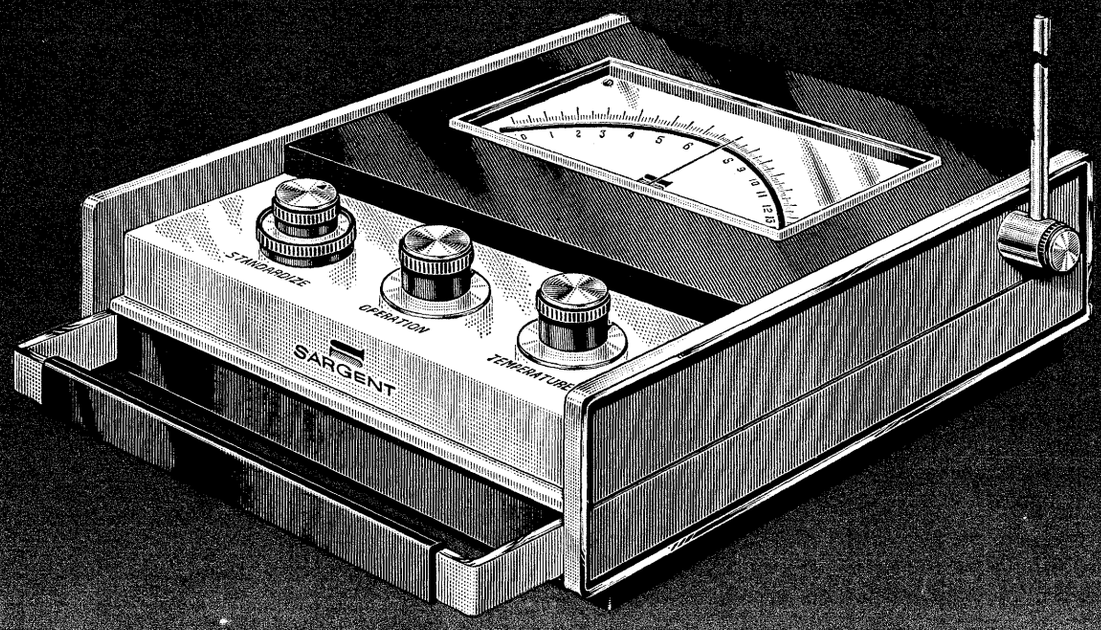

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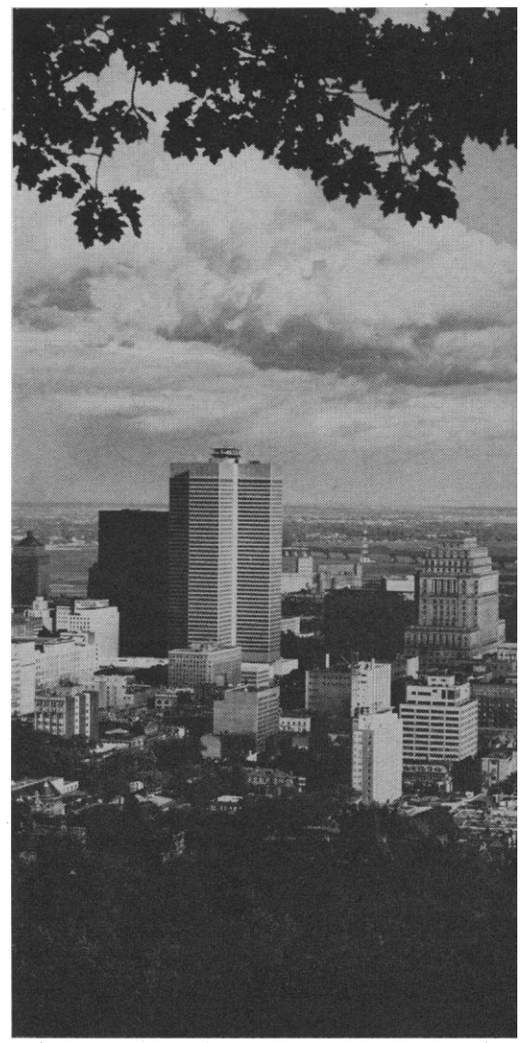

Program Highlights

Moving Frontiers of Science V. C. Wynne-Edwards on self-regulating systems in animal populations; J. M. Harrison on nonrenewable world resources; Philip Morrison, "New Channels in Astronomy"; and Clement L. Markert on role of genes in embryonic development.

Interdisciplinary Symposia Possible meteoric or lunar influences on meteorological phenomena; basic concepts of biochemical differentiation; medical geology and geography; history of the popularization of science.

Special Sessions AAAS Presidential Address by Alan T. Waterman; the Joint Address of Sigma Xi and Phi Beta Kappa by René Dubos; the George Sarton Memorial Address by Lloyd G. Stevenson; the National Geographic Society Illustrated Lecture; and the AAAS Distinguished Lecture by Lord Brain, retiring president, British AAS.

International Conference on Primate Behavior Three AAAS sections and the combined ESA and ASZ Section on Animal Behavior and Sociobiology are sponsors. Six sessions, open to the public, will include 37 speakers from four continents.

AAAS Committees Sessions of the AAAS Committee on Meetings, including two sessions on the sociology of science arranged and chaired by Robert K. Merton; and the Commission on Science Education.

Sections and Societies The 20 AAAS Sections and some 76 participating societies are scheduling specialized symposia; some have sessions for contributed papers.

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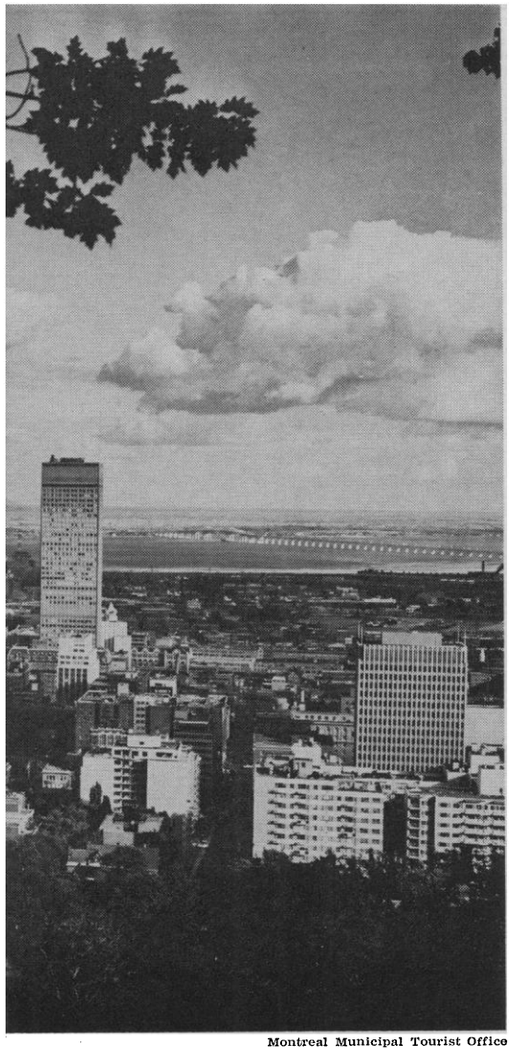

Montreal Municipal Tourist Office

Make sure you have the accommodations you prefer. A list of headquarters hotels of participating societies appears on page 299, 17 July, SCIENCE. The AAAS headquarters is the Queen Elizabeth.

The hotels for the AAAS Montreal meeting have established special, low rates and have reserved large blocks of rooms for the meeting.

Use the coupon below to make your hotel reservation in Montreal. **Send your application to the AAAS Housing Bureau in Montreal, not to any hotel.** Give a definite date and estimated hour of arrival, and also probable date of departure. The Housing Bureau will make the assignment and send you a confirmation promptly.

A rollaway bed can be added to any room at $3.00 per night. Mail your application now to secure your first choice of accommodations.

Hotels with asterisks have unlimited free parking for guests. The Windsor has overnight free parking for guests, but not between the hours of 9 A.M. and 4 P.M.

HOTEL RATES

For a list of the headquarters of each participating society and section, see page 299, 17 July, SCIENCE.

Hotel	Single	Double	Twin	Suite
*Queen Elizabeth	$ 8.50, 10.00	$15.00	$15.00	$30.00–$50.00
*Sheraton-Mount Royal	8.50, 10.00	15.00	15.00	25.00– 45.00
Windsor	8.50	15.00	15.00	25.00– 45.00
*Laurentien (Sheraton)	7.50	12.00	12.00	21.00– 30.00
Ritz Carlton	10.00	15.00	15.00	35.00
Berkeley	7.00	10.00	10.00	17.50

AAAS Housing Bureau
2055 Peel St., Suite 525
Montreal 2, Que., Canada

Date of Application .....

Please reserve the following accommodations for the 131st Meeting of the AAAS in Montreal, 26–31 December 1964

First Choice Hotel ..... **Second Choice Hotel** ..... **Third Choice Hotel** .....

Type of room: Single ☐ Double ☐ Double, twin beds ☐ Suite ☐ Rates: Desired ..... Maximum .....

Number in party ..... Sharing this room will be: .....

(List name and address of each person, including yourself. Attach list if space is insufficient.)

.....

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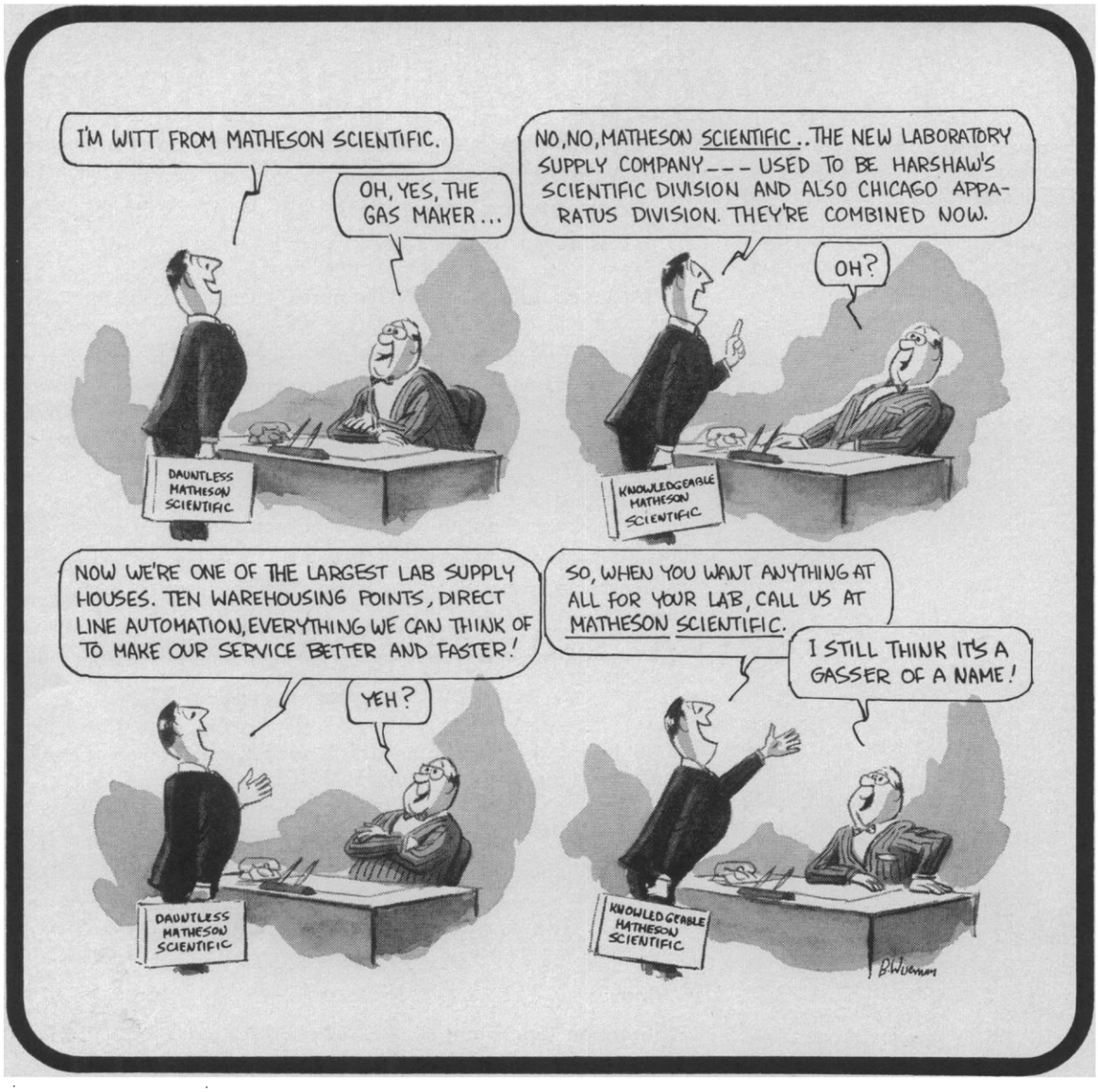
DATES: ARRIVAL ..... A.M. ..... P.M. ..... DEPARTURE .....
(These must be indicated—add approximate hour, A.M. or P.M.)

NAME .....
(Individual requesting reservation) (Please print or type)

ADDRESS .....
(Street) (City) (State/Province) (ZIP Code/Zone)

Mail this coupon now to the Housing Bureau. Rooms will be assigned and confirmed in order of receipt of reservation.



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Dr. C. A. Nanney of Bell Telephone Laboratories, Murray Hill, N. J., uses 50-kg superconducting solenoid for studying electromagnetic wave propagation in various solid-state plasmas.

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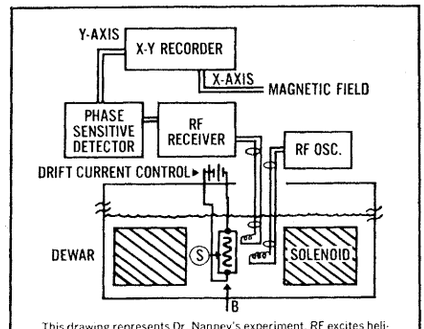

This drawing represents Dr. Nanney's experiment. RF excites helicons which interact with the drift current established by dc current supply. (S) represents solid state plasma wave guide sample.

Write for applications report: A new booklet describes key superconducting magnet applications in the fields of physics, chemistry and biology. For your copy, write Westinghouse Cryogenic Systems Department, P.O. Box 868, Pittsburgh, Pa. 15230.

J-09201

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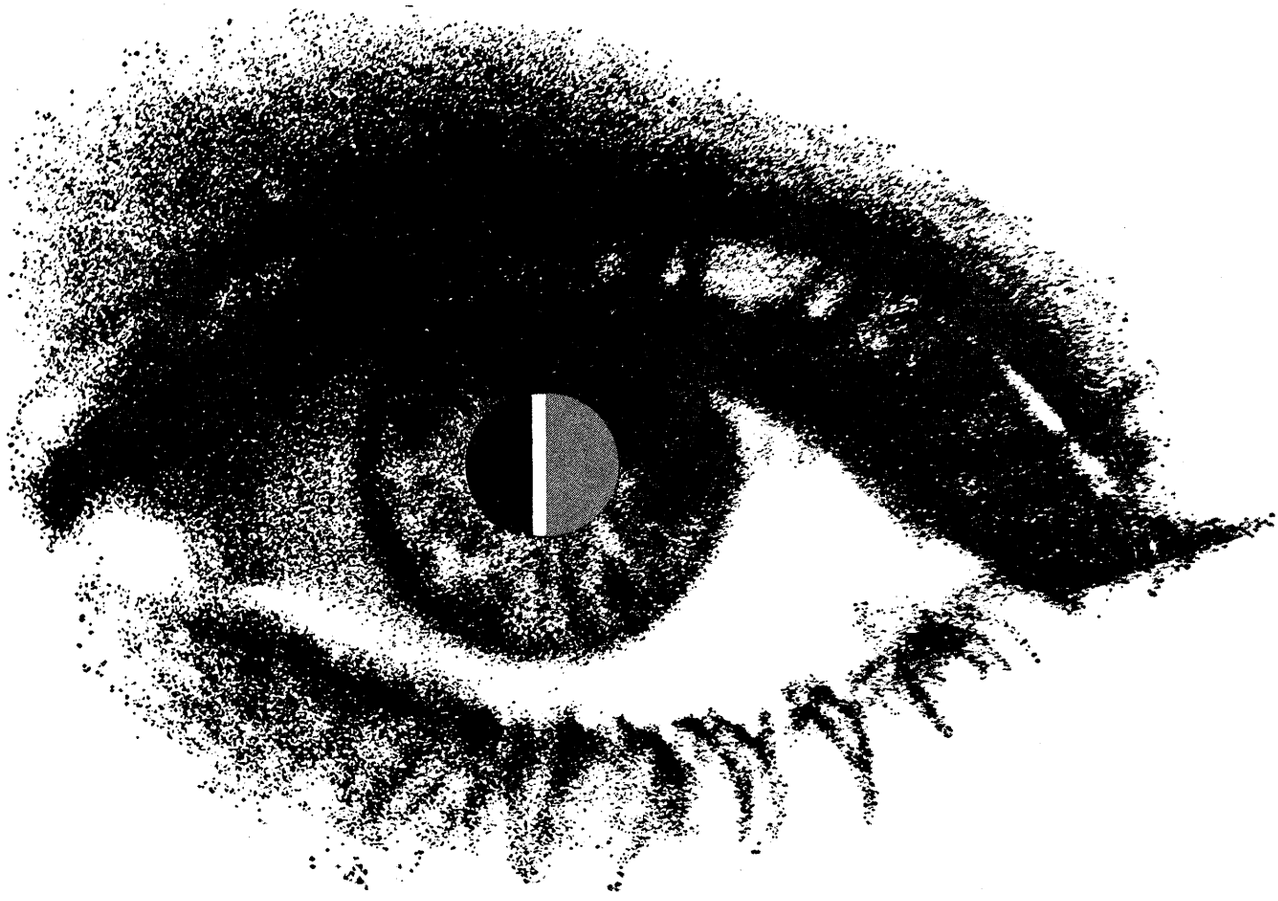

Now you can 'see' temperature deviations as small as 0.2 C at levels of 1000 C

Major improvements in temperature measurement are now possible as the result of the development of L&N's new 8640-Series High Precision Automatic Optical Pyrometers. These instruments offer excellent resolution with commensurate long term stability. They will prove of outstanding value in measurements of high speed temperature transients, for calibration of other optical pyrometers, and for many aspects of research and testing.

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Two new automatic models available

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Plus a new Single Adjustment Manual Pyrometer

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At your request, we will furnish complete information on these new pyrometers, write Leeds & Northrup Co., 4926 Stenton Avenue, Philadelphia, Pa. 19144.

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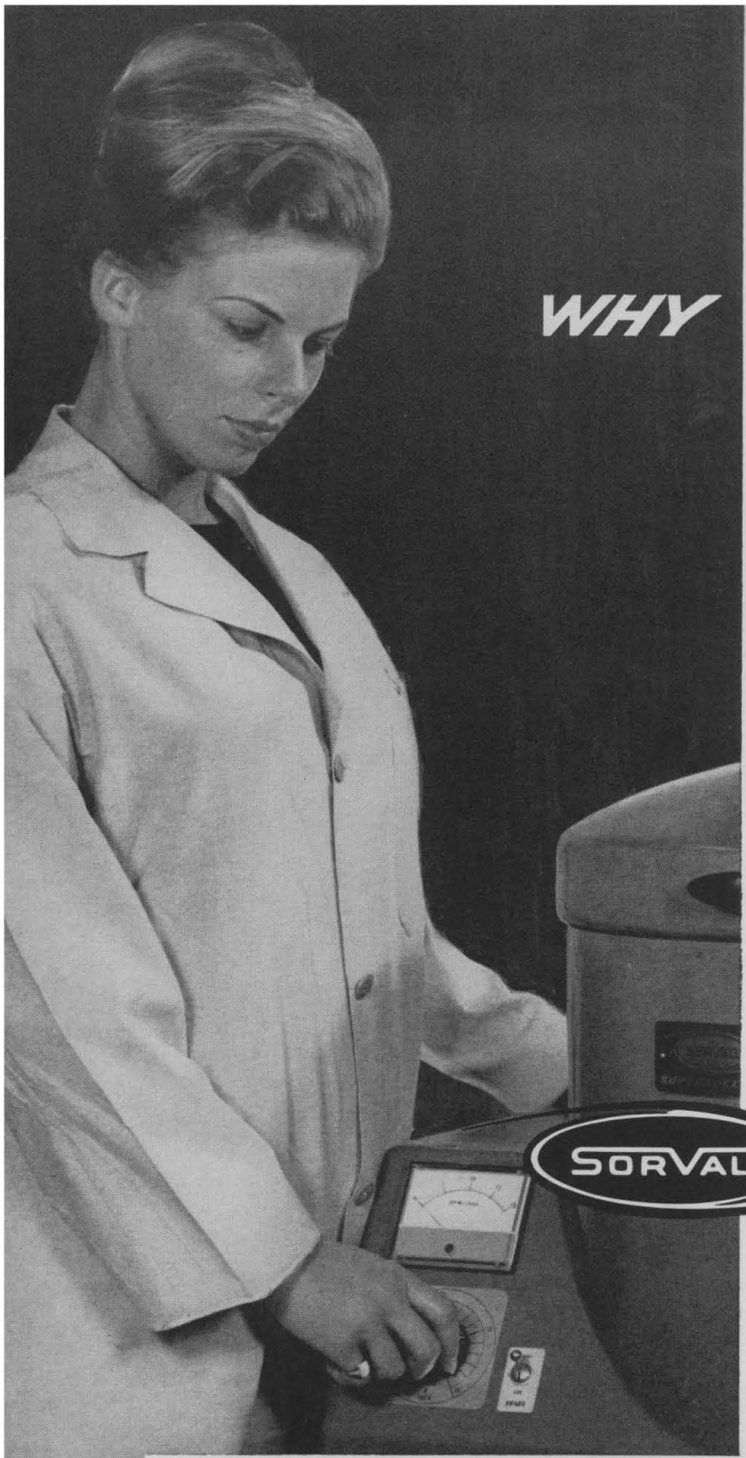

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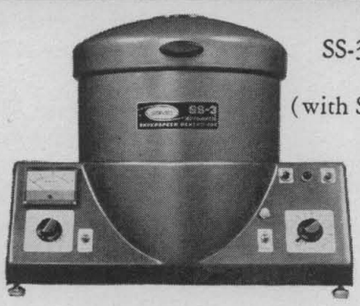

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Five Rotor versatility

Both the SS-3 and the SS-4 are adaptable to
"Szent-Gyorgyi & Blum" Tube-Type Continuous Flow Centrifugation

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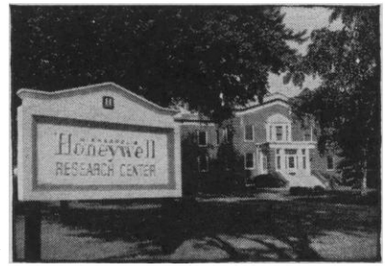


Beam Surface Interactions in Ultra High Vacuum Systems

In high vacuums the quantity of gases adsorbed on the surfaces in the vacuum is much greater than that contained in the volume. New studies of the interactions of beams with surfaces are making possible further understanding of the reactions that occur at the interface of a solid and a gas in a high vacuum environment.

Within an ultra high vacuum system, the reactions that take place at the surface may have an appreciable effect on the surrounding vacuum and on the properties of the solid itself. Continued progress in the fields of semiconductors, thin films, the vacuum phenomena related to space exploration and others have pressed the state of the art of vacuum physics. This field has long been of interest but many tools were lacking. The explosion in vacuum technology since the early 1950's, however, has resulted in considerable basic progress.

Recently lower pressures have been achieved and gauges and other instrumentation improved. We are now able to probe some fundamental questions:

1. What is the surface of a substrate like? What are the surface atom layers like? Is there an oxidized layer?
2. What is sitting down or adsorbed on the surface? With what energy is it bound to the surface?
3. Beams of photons, electrons, ions or atoms may strike the surface. When they do, what happens? What are the interactions?

If we could answer all these questions we could develop a model with specific constants.

Honeywell scientists have chosen a research technique whereby particle beams are used to probe a surface in an ultra high vacuum environment. Components leaving the surface (that is, neutral atoms, neutral molecules and positive or negative ions) are analyzed with a mass spectrometer.

A series of studies is being made to see what effect varying parameters have on the components leaving the surface. The kind of beam used, the kind of substrate and the temperature of the substrate as well as the content of the vacuum environment are varied.

Honeywell scientists use an evacuated system pumped by cryogenic and ion means resulting in a background pressure of about 10^{-10} Torr.

A target with surface temperatures controlled by heaters is mounted in an interaction chamber and bombarded. All particles leaving the target pass through a mass spectrometer analyzer. Probing is done with very low density beams since the detection system permits recording of single ions or partial pressures as low as 10^{-16} Torr.

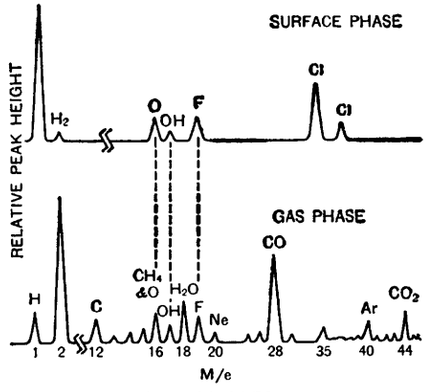


FIG. 1 MASS SPECTRUM

Lower Plot—gas phase components in the system at a total pressure of about 1x10-9 Torr.

Upper Plot—spectrum of surface phase obtained by bombarding single crystal nickel with electrons and analyzing the desorbed ion components.

These experiments have produced several unexpected observations:

1. Electron bombardment will desorb neutral molecules, suggesting an interaction between the electron and the adsorbed molecule.
2. Ions are desorbed at the same time and appear to be fragments of the parent adsorbed molecule, suggesting ion fragment desorption.
3. No parent molecule ion desorption was observed.

These studies indicate the existence of a whole spectrum of electron-induced ion desorbed species, permitting the analysis of surface phase components in a manner similar to that used for gas phase components. The technique also permits continuous observation of surface components as parameters are varied.

Bombardment with U.V. photons has also desorbed neutral molecules. This suggests that photon interaction might be used to clean surfaces in a vacuum without any heating effects.

Work is continuing at Honeywell's Research Center and as more parameters are introduced even more understanding seems possible. As an example, a ruby laser was used to bombard the target causing thermal desorption and permanent degassing of an extremely small area of the target. This technique will permit further exploration and comparisons of the degassed spot and surrounding surfaces.

Although a long way from a final theory, the new techniques already have provided information of value in programs as diverse as electrical contacts, U.V. detectors and space instrumentation.

If you are engaged in vacuum surface physics and wish to know more about Honeywell's work in this area you are invited to write Mr. David Lichtman, Honeywell Research Center, Hopkins, Minnesota. If you are interested in a career at Honeywell's Research Center and hold an advanced degree, write Dr. John Dempsey, Director of Research at this same address.

Honeywell

20 November 1964, Volume 146, Number 3647 **SCIENCE**

EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Phone: 202-387-7171. Cable: Advancesci, Washington. Copies of "Instructions for Contributors" can be obtained from the editorial office. ADVERTISING CORRESPONDENCE: Rm. 1740, 11 W. 42 St., New York, N.Y. 10036. Phone: 212-PE 6-1858.

The Globe Trotters

It is clear enough to most of us that we have gone from famine to feast in attempts to educate and "cross-fertilize" the medical and scientific public. Time was when an international congress was a big event, to be looked forward to as the money was saved for it, and not to be missed at any price. Contrast this with what is going on today. Wolstenholme [*Science* **145**, 1337 (1964)] calls it "obese degeneration of scientific congresses," indicating rigidity of national societies, haphazard expansion of regional meetings, and the cynical extravagance of huge congresses from which both science and friendship are squeezed out. The time has certainly come to reexamine our motives and our needs when we talk of communication on an international level.

Obviously, most international congresses have become so large that the objective of exchanging scientific information has been lost. Who could have any worthwhile idea of what goes on when 20 or more papers of 10 minutes each are being read concurrently, day in and day out, especially when the translators are both overworked and often ineffective? The social gatherings, where one might have a chance to meet new friends, have lost the quality that makes people reach out to one another.

Since the big meetings are satisfying neither the educational nor the social needs of the participants, I suggest it is time we do some experimenting. First, small international clubs could be formed, or dissolved, according to the particular needs of various special groups. The important thing is that they be kept small, so that science rather than politics reigns. Whether these clubs should be on a regional basis or worldwide may be left to the discretion of the participants, but their meetings should be correlated and announced by some central worldwide agency.

Second, symposia could be arranged as the need arose, in which the speakers would be invited and the audience would be free to come or not as it liked. The content of the program could reflect specialized knowledge or, even better, interdisciplinary instruction. Such meetings would have far greater pedagogic value than the more usual symposium, with its 10-minute talks by speakers both good and bad. Meetings of this sort would draw relatively small audiences because of their specialized or interdisciplinary nature and their wide geographical representation.

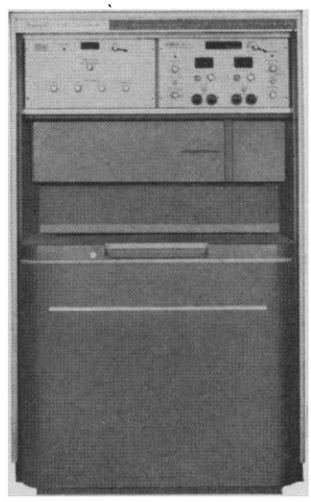
Third, the enormous meetings currently in vogue might be greatly improved by having selected speakers in the morning sessions present their own work when it had matured to the point of having broad significance. In contrast to the morning sessions, the afternoons could be used for individual discussion of submitted abstracts covering much more specific and limited topics, and instead of sitting in a noisy lecture room, with people coming and going, the participants might meet in the speaker's own hotel room. A daily bulletin would indicate where he could be found. Wouldn't it be nice to know that your friend Joe could be consulted in room X of hotel Z between 2:00 and 5:00 p.m., instead of only at the cocktail hour? Wouldn't it be good to meet face to face with the investigator and discuss mutual interests? This arrangement would satisfy the needs of both science and friendship, the two sought-after ingredients of a congress.

Surely there are international secretariats willing to organize new ways of conducting meetings. Equally surely, many of us would understand if a particular experiment failed. And we would welcome the opportunity to applaud if it would get all of us out of the formalistic and generally arid international Brownian movement.

—IRVINE H. PAGE, *Research Division, Cleveland Clinic Foundation, Cleveland, Ohio*

Quench Determination IN NEW TRI-CARB® SPECTROMETERS

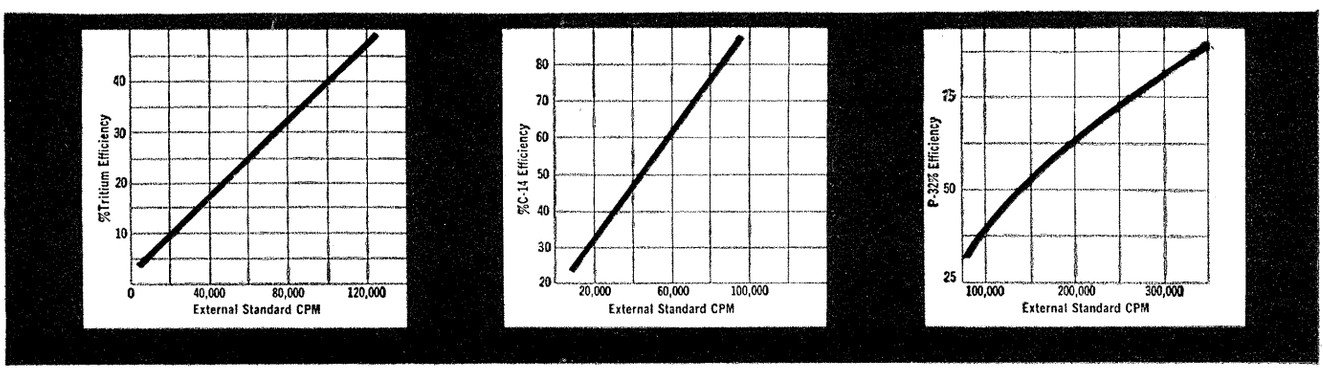
AUTOMATIC EXTERNAL STANDARDIZATION—In liquid scintillation counting, the most accurate quench determinations require that each sample be counted twice . . . with and without a known standard. Originally, this involved the addition of carefully measured amounts of an *internal* standard. Now, a new Packard development automatically introduces an *external* gamma standard into the counting chamber immediately after each sample count is recorded. The tedious and time-consuming addition of internal standards is no longer necessary, and the samples remain unaltered for further counting if desired.



3000 SERIES

The small sealed gamma standard used in Tri-Carb Spectrometers is transported rapidly and reliably by means of a pneumatic tube between a well-shielded, remote storage location and a precisely reproducible position in the counting chamber. It provides gamma radiation with energies well above those of the beta emitters commonly counted in liquid scintillation samples. When positioned adjacent to the counting vial, it generates a Compton electron spectrum in the sample and produces a light output that is affected by quenching substances in essentially the same way as the light produced by beta particles from the sample isotopes.

By adjusting the Tri-Carb Spectrometer to record the energetic portion of the Compton spectrum in one channel, sample counting efficiencies may be determined directly from curves such as those shown in Figures 1, 2 and 3. This method is entirely independent of the radioactivity of the samples, and good precision is obtained with only one-minute counts of the relatively high activity gamma standard regardless of the activity level of the sample.



Automatic External Standardization is standard on all 4000 Series Tri-Carb Spectrometers, and optional on most 3000 Series instruments. Furthermore, in line with Packard's policy of providing new features for existing instruments wherever possible, Automatic External Standardization is also available as a field modification for most 3000 Series Spectrometers.

CHANNELS RATIO—When sample activity is reasonably high and when quenching is not too severe, the Channels Ratio method may be used to determine counting efficiencies. This technique utilizes the radioactivity of the sample itself for determination of the degree of quenching. The change in spectral shape that results when colored or chemical quenching substances are present in a sample is measured by the change in ratio of the net counts in two channels of pulse height analysis selected to span certain portions of the spectrum. These ratios may be directly correlated with counting efficiencies of samples as shown by the curves in Figures 4 and 5.

Various models of 3000 and 4000 Series Tri-Carb Spectrometers provide calculators or true electronic digital computers programmed to present, in *addition* to total net counts *and* net count rate for each channel, all of the possible channel ratios.

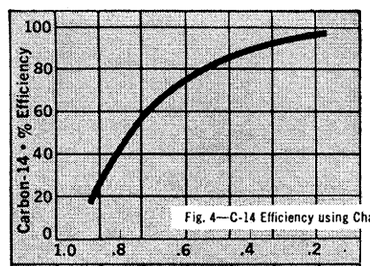


Fig. 4—C-14 Efficiency using Channels Ratio

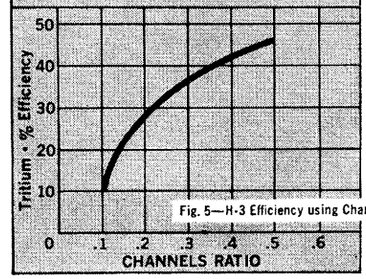


Fig. 5—H-3 Efficiency using Channels Ratio

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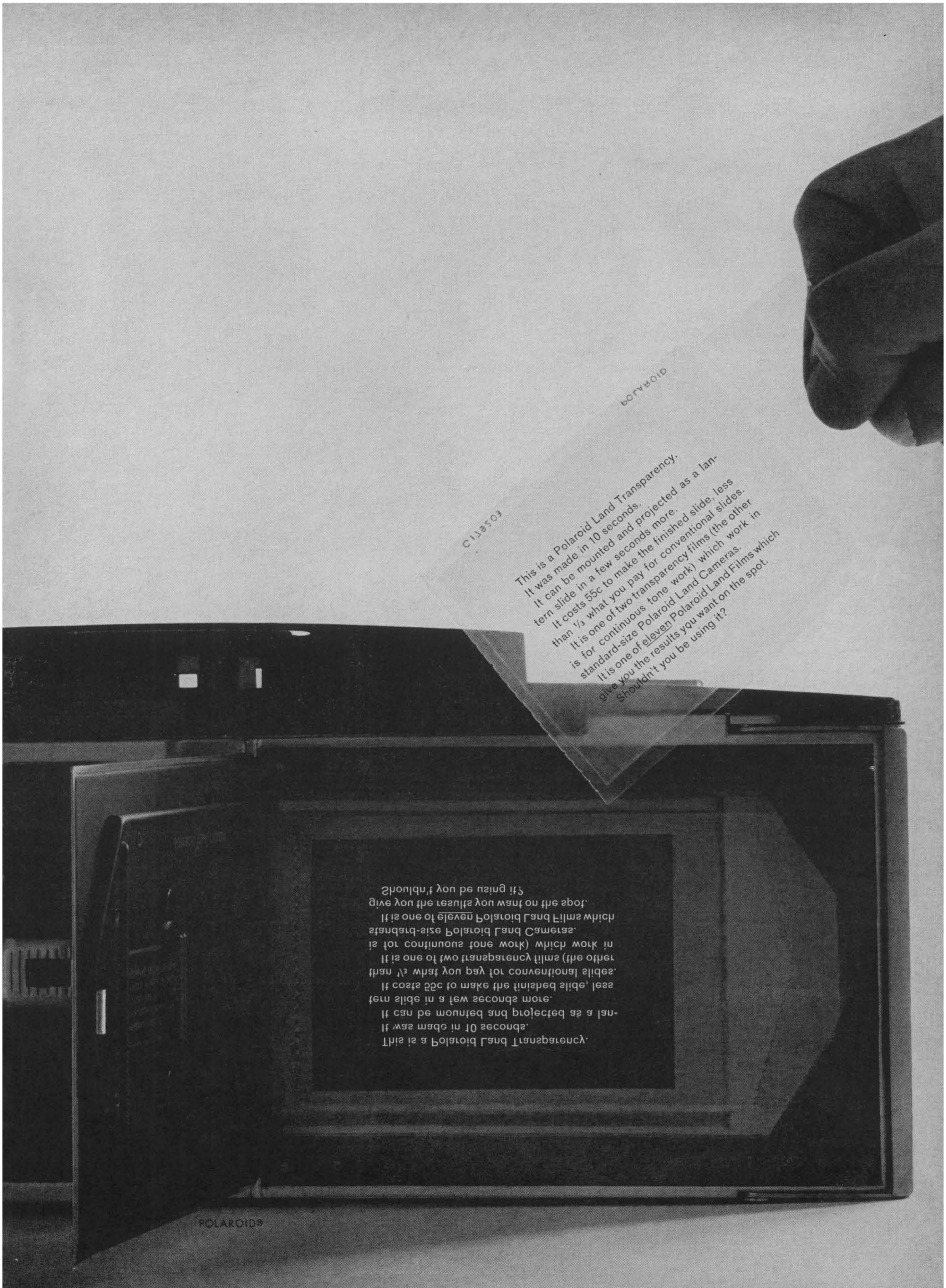
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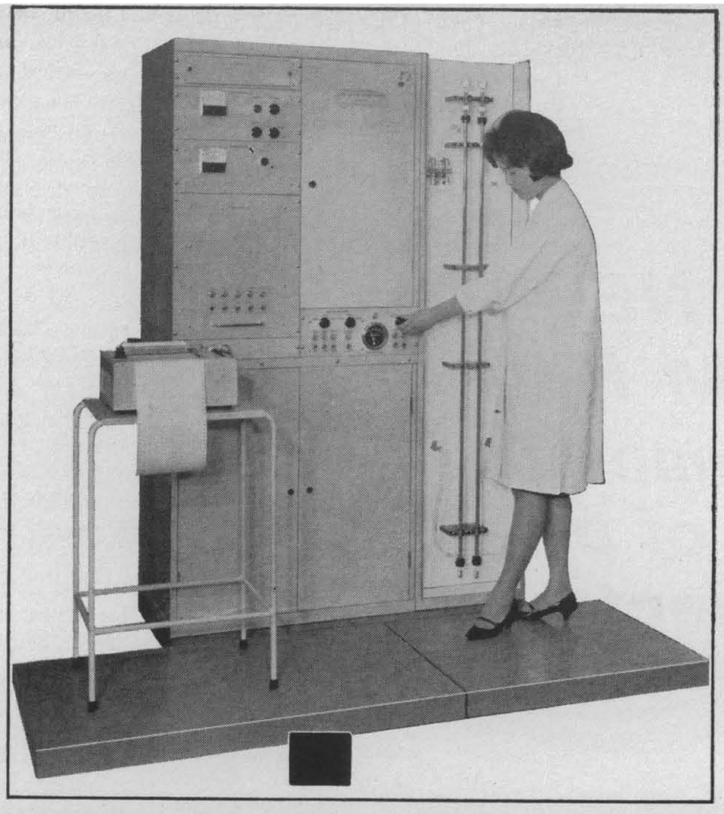

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On the third day Jonathan Lanman (State University of New York, Downstate Medical Center) traced the ontogeny and phylogeny of immunologic responsiveness. The results of his grafting experiments in pregnant animals were discussed in terms of prevalent theories to explain the lack of rejection of the physiologic placental "homograft." The work of Kalmutz on production of antibody by the embryonic opossum was described by Sharman. Suggestions for newer immunologic approaches to the prevention of erythroblastosis were made, based on the differential permeability of the placenta to various γ-globulins. Most of the data indicated that a physical break in the placental "barrier" was required to initiate the events culminating in clinical erythroblastosis. On the final afternoon, Jack Pritchard (Southwestern Medical School) outlined the major topics covered during the preceding three days.

The conference was supported by a grant from the National Institute of Child Health and Human Development. A complete transcript of the proceedings is scheduled for publication prior to next year's meeting.

The goals of this series of conferences over the next four years include discussion of the placental phase of intrauterine development, the birth process, and environmental and social factors concerned with fetal homeostasis.

RALPH M. WYNN

Department of Obstetrics and Gynecology, State University of New York, Downstate Medical Center, Brooklyn

Forthcoming Events

November

30–2. New Horizons in **Solid State Electronics**, seminar, Rochester, N.Y. (A. DeWinter, Rochester Inst. of Technology, Extended Services Division, Rochester 8)

30–2. **Pacific Air Force Medical** conf., Fuchu Air Station, Tokyo, Japan. (Lt. Col. R. J. Carter, USAF Hospital Tachikawa, APO 323, San Francisco, Calif.)

30–2. **Thalamic Regulation of Sensorimotor Activities**, symp., New York, N.Y. (M. D. Yahr, New York Neurological Inst., 710 W. 168 St., New York 10032)

30–3. **Atomic Industrial Forum**, annual, San Francisco, Calif. (Atomic Industrial Forum, 850 Third Ave., New York, N.Y.)

30–3. **Entomological** Soc. of America, annual, Philadelphia, Pa. (ES, 4603 Calvert Rd., College Park, Md.)

30–3. American **Nuclear** Soc., winter meeting, San Francisco, Calif. (W. H. Nutting, Pacific Gas and Electric Co., 245 Market St., San Francisco)

December

1. **Food Standards**, symp., Washington, D.C. (Food Law Inst., Inc., 205 E. 42 St., New York 10017)

1. **New Polyolefin Copolymer Plastics**, regional technical conf., Philadelphia, Pa. (E. A. Jeffreys, Registration Chairman, c/o Allied Chemical Corp., 901 Catalapa Rd., Warminster, Pa.)

2–4. **Communication Wires and Cables**, 13th annual symp., Atlantic City, N.J. (J. Spergel, WCS, U.S. Army Electronics R&D Laboratories, Fort Monmouth, N.J. 07703. Attn: SELRA/PEE)

2–5. **Crystalline Lens**, symp., Minneapolis, Minn. (J. E. Harris, Dept. of Ophthalmology, Univ. of Minnesota Medical School, Minneapolis 55455)

3–5. **American Chemical Soc.**, 20th annual southwestern regional meeting, Shreveport, La. (ACS, 1155 16th St, NW, Washington, D.C. 20036)

3–5. **Sociological Questions Pertaining to the Medical Field**, East German Hygiene Soc., symp., Berlin, East Germany. (German Acad. of Sciences, Mohrenstrasse 39, Berlin W.8.)

3–5. **Texas Acad. of Science**, annual, Dallas. (S. O. Brown, Texas A&M Univ., Box 33, College Station)

4. Central States Society of **Industrial Medicine and Surgery**, Iowa City, Iowa. (Dean, State Univ. of Iowa College of Medicine, Iowa City 52241)

4–5. **American Rheumatism Assoc.**, annual, Washington, D.C. (J. A. Coss, Jr., 20 E. 76 St., New York 10021)

4–5. **American Rheumatism Assoc.**, 11th interim scientific session, National Institutes of Health, Bethesda, Md. (G. W. Speyer, ARA, 10 Columbus Circle, New York 10019)

4–5. Association for Research in **Nervous and Mental Diseases**, New York, N.Y. (R. J. Masselink, ARNMD, 700 W. 168 St., New York 10022)

4–5. **Oxygen in Biosystems**, basic science symp., New York, N.Y. (Miss J. Newkirk, New York Heart Assoc., 10 Columbus Circle, New York 10019)

4–5. **Oxygen**, symp., New York, N.Y. (A. P. Fishman, New York Heart Assoc., 10 Columbus Circle, New York 10019)

4–5. Southern Soc. for **Pediatric Research**, Houston, Tex. (F. K. Edwards, Emory Univ. School of Medicine, Thomas K. Glenn Memorial Bldg., 69 Butler St., Atlanta, Ga. 30303)

4–6. American **Psychoanalytic** Assoc., fall meeting, New York, N.Y. (APA, 1 E. 57 St., New York 10022)

4–9. American Acad. of **Dermatology**, Chicago, Ill. (S. E. Huff, AAD, 636 Church St., Evanston, Ill.)

5–6. Academy of **Psychoanalysis**, midwinter meeting, New York, N.Y. (A. H. Rifkin, AP, 125 E. 65 St., New York)

6. American Acad. of **Dental Medicine**, mid-annual meeting, New York, N.Y. (S. C. Conrad, 133-28 228th Street, Laurelton, Long Island, N.Y.)

6–10. American Inst. of **Chemical Engineers**, annual, Boston, Mass. (J. Henry, AIChE, 345 E. 47 St., New York 10017)

6–12. Latin American Congr. on **Microbiology**, 3rd, Bogota, Columbia. (O. Juliao, Instituto Nacional de Salud, Aptdo, Aereo 3495, Bogota)

7. American Institute of **Mining, Metallurgical and Petroleum Engineers**, annual, Tucson, Ariz. (H. N. Appleton, AIME, 345 E. 47 St., New York 10017)

7–9. Performance of **High Temperature Systems**, Pasadena, Calif. (G. S. Bahn, 16902 Bollinger Dr., Pacific Palisades, Calif. 90272)

7–9. Southern **Surgical** Assoc., meeting, Hot Springs, Va. (G. H. Yeager, University Hospital, Baltimore 1, Md.)

7–11. Chemical Effects Associated with **Nuclear Reactions and Radioactive Transformations**, symp., Vienna, Austria. (P. Ghelardoni, Div. of Scientific and Technical Information, International Atomic Energy Agency, Karntnerring 11, Vienna 1)

8–9. Ciba Foundation Guest Symposium on **Measurement of Oxygen Tension**, London, England. (Ciba Foundation, 41 Portland Pl., London, W.1)

8–11. American Soc. of **Agricultural Engineers**, New Orleans, La. (J. L. Butt, ASAE, 420 Main St., St. Joseph, Mich.)

9. **Space Astronomy**, Washington, D.C. (S. Koslov, Nuclear Test Detection, Advanced Research Projects Agency, Washington, D.C. 20301)

9–11. **Antiviral Substances**, conf., New York Acad. of Sciences, New York, N.Y. (B. K. Forscher, Publications Section, Mayo Clinic, Rochester, Minn.)

11–12. **Cell Replication**, symp., New York Univ. School of Medicine, New York, N.Y. (Dean, New York Univ. School of Medicine, New York 10016)

12–15. American Acad. of **Optometry**, annual, Columbus, Ohio. (C. C. Koch, AAO, 1506-08 Foshay Tower, Minneapolis 2, Minn.)

14–16. **Hahnemann Medical College**, 13th symp., Philadelphia, Pa. (J. H. Moyer, Dept. of Medicine, Hahnemann Medical College, Philadelphia)

14–16. **Reticuloendothelial** Soc., meeting, New York, N.Y. (N. R. Di Luzio, Univ. of Tennessee Medical Units, Memphis)

14–17. **Adipose Tissue Metabolism and Obesity**, conf., New York, N.Y. (B. N. Brodoff, New York Acad. of Sciences, 2 E. 63 St., New York)

14–18. Conference on **Nuclear Electronics**, Bombay, India. (International Atomic Energy Agency, Karntnerring 11, Vienna 1, Austria)

14–22. **International Geological Congr.**, 22nd, New Delhi, India. (Secretary-General of the Congress, c/o Geological Survey of India, 27, Chowringhee, Calcutta 13)

14–22. International **Mineralogical** Assoc., 4th general, New Delhi, India. (J. V. Smith, c/o Dept. of Geophysical Sciences, University of Chicago, Chicago, Ill.)

15–16. **Periodic Functions in Live Matter**, Czechoslovak Meteorological Soc., conf., Prague. (J. Novak, First "Prof. Konopik" Dermatology Clinic, Prague 2, Apolinarska 4)

15–18. **High Energy Astronomy**, symp., Univ. of Texas, Austin. (Office of Aerospace Research, 4th and Independence Avenue, SW, Washington, D.C. 20233)

15-18. **Relativistic Astrophysics**, symp., Univ. of Texas and Southwestern Center for Advanced Studies, Austin. (Mrs. J. Wardlaw, Dept. of Physics, Physics Bldg. 438, Univ. of Texas, Austin 78712)

16–21. Inter-American Congr. of **Psychology**, 9th annual, Miami, Fla. (V. D. Sanua, Yeshiva Univ., 110 W. 57 St., New York 10019)

20–24. **Theoretical and Applied Mechanics**, congr., Kanpur, India. (M. K. Jain, Indian Inst. of Technology, Kharagpur, India)

21–23. American **Physical** Soc., Berkeley, Calif. (W. Whaling, California Inst. of Technology, 1201 East California St., Pasadena)

21–23. **Biology of Marine Microorganisms**, conf., Univ. of California, Berkeley. (R. Newton, Letters and Science Extension, Univ. of California, Berkeley 94720)

26–29. Society of **Systematic Zoology**/ American Soc. Zoologists/Herpetologists' League, annual, Univ. of Tennessee, Knoxville. (J. G. Rozen, Jr., Dept. of Entomology, SSZ, American Museum Natural History, Central Park West and 79th St., New York, N.Y.; A. G. Richards, ASZ, Dept. of Entomology, Univ. of Minnesota, St. Paul 55101; J. M. Legler, HL, Dept. of Zoology, Univ. of Utah, Salt Lake City)

26–31. **American Assoc. for the Advancement of Science**, annual, Montreal, Canada. (R. L. Taylor, AAAS, 1515 Massachusetts Ave., NW, Washington, D.C. 20005)

The following 45 organizations will meet in conjunction with the AAAS annual meeting in Montreal, Canada, 26–31 December:

Academy Conference (J. T. Self, Dept. of Zoology, Univ. of Montreal, Montreal)

Academy of Psychoanalysis (M. Ullman, Maimonides Hospital, 4802 Tenth Ave., Brooklyn 19, N.Y.)

Alpha Epsilon Delta (M. L. Moore, 7 Brookside Circle, Bronxville, N.Y. 10708)

AAAS Commission on Science Education (J. R. Mayor, AAAS, 1515 Massachusetts Ave., NW, Washington, D.C. 20005)

American Astronautical Soc. (E. van Dreist, Director, Space Science Laboratory, North American Aviation, Downey, Calif.)

American Astronomical Soc. (G. C. McVittie, Univ. of Illinois Observatory, Urbana)

American Economic Association (H. E. English, Private Planning Assoc., 712 Sun Life Bldg., Montreal 2)

American Meteorological Soc. (K. C. Spengler, AMS, 45 Beacon St., Boston, Mass.)

American Nature Study Soc. (V. Rockcastle, Cornell Univ., Ithaca, N.Y.)

American Soc. of Naturalists (S. Granick, Rockefeller Inst., 66th St. and York Ave., New York 10021)

American Political Science Assoc. (E. B. Skolnikoff, Massachusetts Inst. of Technology, Cambridge)

American Soc. of Criminology (W. C. Reckless, Dept. of Sociology, Ohio State Univ., Columbus)

American Soc. for Microbiology (S. J. Ajl, Director of Research, Albert Einstein Medical Center, York and Tabor Rds., Philadelphia 41, Pa.)

American Soc. of Zoologists, Animal Behavior and Sociobiology Div. (G. W. Barlow, Vivarium Bldg., Wright and

Healey Sts., Univ. of Illinois, Champaign)

American Sociological Assoc. (W. E. Moore, Russell Sage Foundation, 230 Park Ave., New York, N.Y.)

Animal Behavior Soc. (J. P. Scott, Jackson Laboratory, Hamilton Station, Bar Harbor, Maine)

Association canadienne-française pour l'Avancement des Sciences (M. J. Beauregard, ACFAS, C.P. 6128, Univ. of Montreal, Montreal)

Association for Computing Machinery (M. Woodbury, New York Univ. Medical Center, New York, N.Y.)

Biometric Soc. (D. S. Robson, Cornell Univ., Ithaca, N.Y.)

Canadian Aeronautics & Space Inst. (H. C. Luttman, CASI, 77 Metcalf St., Ottawa 4)

Canadian Assoc. of Geographers (J. T. Parry, Morrice Hall, McGill Univ., Montreal)

Canadian Assoc. of Physicists (A. C. H. Hallett, Dept. of Physics, Univ. of Toronto, Toronto 5)

Canadian Science Fairs Council (H. I. Bolker, Pulp & Paper Research Inst. of Canada, 3420 University St., Montreal 2)

Ecological Soc. of America (G. M. Woodwell, Brookhaven Natl. Laboratory, Upton, L.I., N.Y.)

Engineering Institute of Canada (G. T. Page, EIC, 2050 Mansfield St., Montreal)

Entomological Soc. of Canada (I. S. Lindsay, Defence Research Board, 125 Elgin St., Ottawa)

General Systems Knowledge (O. Wing, Columbia Univ., Dept. of Electrical Engineering, New York 10027)

History of Science Soc. (J. E. Murdoch, Harvard Univ., Cambridge, Mass.)

Institute of Management Sciences (B. V. Dean, Dept. of Management, Case Inst. of Technology, Cleveland, Ohio)

Medical Geology and Geography (H. V. Warren, Dept. of Geology, Univ. of British Columbia, Vancouver 8)

Metric Assoc. (R. P. Fischelis, Ohio Northern Univ., Ada)

National Assoc. of Biology Teachers (R. Beidleman, Colorado College, Colorado Springs)

National Assoc. of Science Writers (L. S. Zahn, Hill & Knowlton, Inc., 150 E. 42 St., New York, N.Y.)

National Council of Teachers of Mathematics (J. Gates, NCTM, 1201 16th St, NW, Washington, D.C.)

National Geographic Soc. (R. W. Gray, NGS, 16th and M Sts., NW, Washington, D.C.)

National Inst. of Social and Behavioral Science (D. P. Ray, NISBS, 863 Benjamin Franklin Station, Washington, D.C.)

National Science Teachers Assoc. (A. F. Eiss, NSTA, 1201 16th St., NW, Washington, D.C. 20006)

Pharmacological Soc. of Canada (C. W. Nash, Dept. of Pharmacology, Univ. of Alberta, Edmonton)

Sigma Delta Epsilon (S. C. Stevens, VA Hospital, Lincoln, Neb.)

Society for Computer Programs in Biology and Medicine (R. S. Ledley, Natl. Biomedical Research Foundation, 8600 16th St, NW, Silver Spring, Md.)

Society for Economic Botany (Q. Jones, New Crops Research Branch, Plant Industry Station, Beltsville, Md.)

Society for General Systems Research (J. H. Milsum, Dept. of Electrical Engineering, McGill Univ., Montreal)

Society for the History of Technology (J. J. Beer, Dept. of History, Univ. of Delaware, Newark)

Society of the Sigma Xi (T. T. Holme, Sigma Xi, 51 Prospect St., New Haven, Conn. 06511)

Society of Technical Writers and Publishers (G. Marx, Director of Communications, Illinois Inst. of Technology, Research Inst., Chicago)

27–29. American **Philosophical** Assoc., Boston, Mass. (L. E. Hahn, Dept. of Philosophy, Southern Illinois Univ., Carbondale 62903)

27–30. American **Statistical** Assoc., Chicago, Ill. (D. C. Riley, ASA, 810 18th St., NW, Washington, D.C. 20006)

28–30. American **Economic** Assoc., annual, Chicago, Ill. (H. F. Williamson, AEA, 629 Noyes St., Evanston, Ill.)

28–30. American **Geophysical** Union, Seattle, Wash. (W. W. Kellogg, Rand Corporation, 1700 Main St., Santa Monica, Calif.)

28–30. **Linguistic** Soc. of America, New York, N.Y. (A. A. Hill, Post Office Box 8120, University Station, Austin, Tex. 79712)

28–30. Western Soc. of **Naturalists**, Univ. of Washington, Seattle. (I. A. Abbott, Hopkins Marine Station of Stanford Univ., Pacific Grove, Calif.)

30. **Scientific Research** Soc. of America, Cleveland, Ohio. (D. B. Prentice, 51 Prospect St., New Haven 11, Conn.)

January

5–7. **Glass Formation, Phase Equilibria, Nucleation and Crystal Growth**, symp., Sheffield, England. (D. Hawksworth, Soc. of Glass Technology, Thorton, 20 Hallam Gate Rd., Sheffield 10)

5–8. **Solid State Physics**, 2nd annual conf., H. H. Wills Physics Laboratory, University of Bristol, England. (Administrative Assistant, Inst. of Physics and Physical Soc., 47, Belgrave Square, London, S.W.1)

6–8. **Industrial Electronics and Control Instrumentation**, 13th annual conf., Philadelphia, Pa. (E. Weiss, Sun Oil Co., Marcus Hook, Pa.)

6–9. **Psychopharmacological** Conf., Czechoslovak Medical Soc., Psychiatry Section, Jesenik Spa. (M. Vojtechovsky, Budejovicka 800, Pavilion A1, Prague, Czechoslovakia)

8–9. **Orthopaedic** Research Society, New York, N.Y. (R. A. Calandruccio, 869 Madison Ave., Memphis, Tenn.)

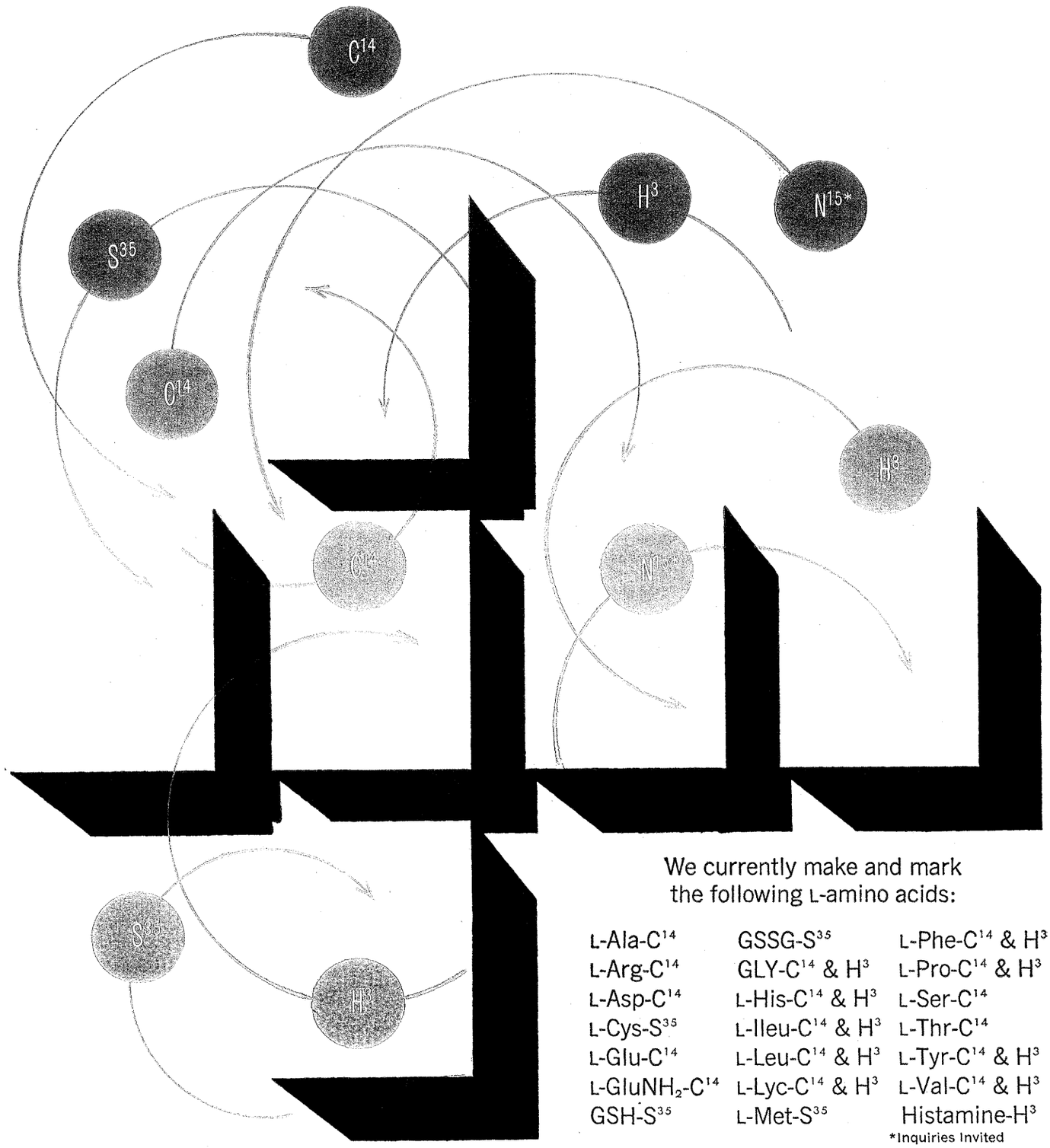
9–14. American Acad. of **Orthopedic Surgeons**, annual, New York, N.Y. (H. K. Hart, AAOS, 29 E. Madison, Chicago 2, Ill.)

11–14. **Civilian and Military Uses of Aerospace**, conf., New York, N.Y. (I. B. Laskowitz, New York Acad. of Sciences, 2 E. 63 St., New York)

12–14. **Reliability and Quality Control**, symp., Miami, Fla. (H. D. Hulme, Westinghouse R&D Center, Bldg. 601-1346, Churchill Boro, Pittsburgh, Pa.)

12–15. **Crustacea**, symp., Cochin, India. (Marine Biological Assoc. of India, Marine Fisheries P.O., Mandapam Camp, S. India)

Labeled L-amino acids



We currently make and mark
the following L-amino acids:

L-Ala-C^{14}	GSSG-S^{35}	L-Phe-C^{14} & H^3
L-Arg-C^{14}	GLY-C^{14} & H^3	L-Pro-C^{14} & H^3
L-Asp-C^{14}	L-His-C^{14} & H^3	L-Ser-C^{14}
L-Cys-S^{35}	L-Ileu-C^{14} & H^3	L-Thr-C^{14}
L-Glu-C^{14}	L-Leu-C^{14} & H^3	L-Tyr-C^{14} & H^3
L-GluNH_2-C^{14}	L-Lyc-C^{14} & H^3	L-Val-C^{14} & H^3
GSH-S^{35}	L-Met-S^{35}	Histamine-H^3

*Inquiries Invited

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BIOCHEMICALS • RADIOCHEMICALS • PHARMACEUTICALS for research, for medicine, for industry

New Products

Mobile laboratory refrigerator can be used as a cold bath, as a refrigerated harvest cart in the continuous culture of microorganisms, or as a coolant supply for heated baths and distillation apparatus. It measures 33½ by 22 by 24 inches, weighs 200 lb, and is mounted on four swivel casters. The cylindrical reservoir is 12⅛ inches in diameter and 13 inches deep, with a capacity of 22.5 lit. Temperature of this reservoir is thermostatically adjustable from −18°C to +10°C. Refrigeration is accomplished by a hermetically sealed, permanently lubricated compressor guaranteed for 5 years. A drain line and shut-off valve facilitate emptying the bath. Available as an accessory is a 20-lit. pyrex carboy holding vessel with rubber stopper, containing stainless-steel inlet, outlet, and exhaust filter. Larger carts, with capacities of 50 and 110 lit., are available.—D.J.P. (New Brunswick Scientific Co., Inc., 1130 Somerset St., New Brunswick, N.J.)

Circle 1 on Readers' Service card

Determination of chloride in blood serum, urine, spinal fluid, tissue extracts, and other biological fluids can be made with the Hellige Chloride Analyzer which utilizes constant-current coulometry. The instrument maintains a constant current flow between two silver-generating electrodes, resulting in the release of free silver ions which combine with the chloride in the sample to produce an insoluble precipitate, silver chloride. With accurate control of the current, the time that the current flows is a true indication of the number of coulombs necessary to produce a quantity of silver ion equivalent to the original chloride concentration. As soon as all of the chloride has been removed by precipitation, the existence of free silver ions is detected amperometrically, and this completes the determination. The results are read directly in milliequivalents per liter from a digital indicator. The instrument is provided with three push buttons, which are depressed in sequence. One push button operates a built-in stirrer; another, the electrical titrating circuit; and the third completes the test and prepares the instrument for the next determination. A control knob permits the selection of any of five ranges (5, 10, 20, 40, and 80 meq/lit.), permitting convenient determinations of chloride to be made in solutions of any concentration. Normal care will permit determinations to be made to within ±0.5 percent, but, by careful measurement of the volume of the test sample, reproducibility as good as 0.1 percent can be obtained. The instrument utilizes solid-state electronics exclusively, so that operation is stable and no warm-up time is necessary. The instrument measures 13 by 9½ by 14 inches and weighs 29 lb.—D.J.P. (Hellige Inc., 877 Stewart Ave., Garden City, N.Y. 11534)

Circle 2 on Readers' Service card

Classroom radioactivity demonstrator is a ratemeter featuring a removable module built into the back, which contains the necessary equipment to allow interesting and informative experiments to be performed. The main unit, the ratemeter, which measures 10 by 10 by 3 inches, indicates counting rate both visually on a 6½-inch meter and audibly through a 2-inch speaker. Front panel controls provide adjustment of speaker volume and selection of detector voltage from 0 to 1500 volts; and count-rate ranges from 0 to 1,000, 0 to 10,000, or 0 to 100,000 counts per minute. The solid-state ratemeter circuitry is on printed circuit boards. The removable module includes two cobalt-60 sources of 10 μc each, a Geiger tube with a chromium-plated cylindrical shield and 35 mg/cm² window thickness, and a complete set of absorbers and scatterers. Also, an expandable bench which permits positioning of sources from ½ to 60 inches away from the detector is part of the module. This set-up will allow detection of high-energy beta and gamma rays, and, with the addition of optional sodium-iodide and solid-state detectors, experiments with alpha rays and neutrons may also be performed. Supplied with each instrument is a 200-page experiment manual with instructions for experiments ranging from elementary counting to radiochemical analysis.—D.J.P. (Atomic Laboratories, Inc., 3100 Crow Canyon Rd., San Ramon, Calif. 94583)

Circle 3 on Readers' Service card

Automatic dilution and dispensing of a variety of fluids from corrosive acids to body fluids can be performed with a reproducibility of ±0.5 μl with the Fisher Dilumat. Depressing the control switch activates the air compressor which drives the pumps, drawing up a preset volume of sample and simultaneously filling a diluent pump. Another tap on the switch dispenses and mixes the sample and diluent in another container. A model is also available which adds and mixes a second reagent at the same time. A multi-port Teflon and polypropylene valve with silicone O-rings directs the air from the compressor to the pumps and also controls the flow of sample and diluent through the pumps to the delivery tips. These glass tips attach to nylon delivery tubes which extend from an adjustable arm on the top of the unit. The tops of the pumps also extend out from the top and provide a micrometer-type control for selecting sample and reagent volume. Four pumps are available with volumes of 0.25, 1.0, 5.0, and 15.0 ml, with the micrometer dials readable to 0.1, 1.0, 10.0, and 10.0 μl, respectively. Accuracy of delivery is ±0.5 percent, with reproducibility ±0.5 μl. Model 112 samples, dilutes with one reagent, and dispenses a second reagent; Models 113 and 114 sample, dilute with one reagent, and dispense the diluted sample. Unit is approximately 7½ by 9 by 13¼ inches.—D.J.P. (Fisher Scientific Co., 415 Fisher Bldg., Pittsburgh, Pa.)

Circle 4 on Readers' Service card

The material in this section is prepared by the following contributing writers:

Denis J. Prager (D.J.P.), Laboratory of Technical Development, National Heart Institute, Bethesda 14, Md. (medical electronics and biomedical laboratory equipment).

Joshua Stern (J.S.), Basic Instrumentation Section, National Bureau of Standards, Washington 25, D.C. (physics, computing, electronics, and nuclear equipment).

The information reported here is obtained from manufacturers and from other sources considered to be reliable. Neither *Science* nor the writers assume responsibility for the accuracy of the information. A Readers' Service card for use in mailing inquiries concerning the items listed is included on pages 989 and 1087. Circle on this card the department number of the items in which you are interested.

(Continued from page 1034)

ment for gas chromatography" by G. S. Learmonth; "Centrifugal chromatography" by Z. Deyl, J. Rosmus, and M. Pavlíček; "Chromatography of free nucleotides" by J. J. Saukkonen; "Paper chromatography of iodoamino acids and related compounds" by L. G. Plaskett; "Chromatographic techniques for pesticide residue analysis" by G. Zweig; "Liquid ion exchangers: Separations on inert supports impregnated with liquid ion exchangers" by E. Cerrai; "Polymeric coordination compounds: The synthesis and applications of selective ion-exchangers and polymeric chelate compounds" by G. Nickless and G. R. Marshall; and "Application of paper ionophoresis and electrochromatography to the study of metal complexes in solution" by E. Blasius and W. Preetz.

Collected Papers of P. L. Kapitza. vol. 1, 1916–1934. D. ter Haar, Ed. Pergamon, London; Macmillan, New York, 1964. 519 pp. Illus. $20.

Coordination Chemistry. The chemistry of metal complexes. Fred Basolo and Ronald C. Johnson. Benjamin, New York, 1964. 192 pp. Illus. Paper, $1.95; cloth, $3.95.

Counterexamples in Analysis. Bernard R. Gelbaum and John M. H. Olmsted. Holden-Day, San Francisco, 1964. 218 pp. Illus. $7.95.

Electrochemistry of Molten and Solid Electrolytes. vol. 2. M. V. Smirnov, Ed. Translated from the Russian edition (Sverdlovsk, 1963). Consultants Bureau, New York, 1964. 102 pp. Illus. Paper, $17.50. Thirteen papers.

Electronic Analog and Hybrid Computers. Granino A. Korn and Theresa M. Korn. McGraw-Hill, New York, 1964. 608 pp. Illus. $17.50.

Electrospark Machining of Metals. vol. 2. B. R. Lazarenko, Ed. Translated from the Russian edition (Moscow, 1961). Consultants Bureau, New York, 1964. 205 pp. Illus. Paper, $22.50. Fourteen papers.

Elementary Concepts of Modern Mathematics. pts. 1–3. pt. 1, *Elementary Theory of Sets* (247 pp., $2.45); pt. 2, *Introduction to Mathematical Logic* (132 pp., $1.45); pt. 3, *Abstract Mathematical Systems* (107 pp., $1.45). Flora Dinkines. Appleton, Century, Crofts (Meredith), New York, 1964. Illus. Paper. Also available bound in one volume (469 pp., cloth, $6.50).

Elementary Dynamics of Particles. H. W. Harkness. Academic Press, New York, 1964. 229 pp. Illus. Paper, $2.95; cloth, $6.

Elementary Plane Rigid Dynamics. H. W. Harkness. Academic Press, New York, 1964. 204 pp. Illus. Paper, $2.95; cloth, $6.

Elements of Numerical Analysis. Peter Henrici. Wiley, New York, 1964. 244 pp. Illus. $8.

Exponential and Critical Experiments. vols. 1–3. Proceedings, IAEA symposium (Amsterdam), September 1963. International Atomic Energy Agency, Vienna, 1964 (order from International Publications, New York). vol. 1, 488 pp., $10; vol. 2, 614 pp., $12; vol. 3, 489 pp., $10. Illus. Paper. 71 papers, presented in their original languages (54 in English, 10 in French, 5 in Russian, and 2 in Spanish)

with an abstract in English, French, Russian, and Spanish. Discussions are in English.

Geometry of Manifolds. Richard L. Bishop and Richard J. Crittenden. Academic Press, New York, 1964. 285 pp. Illus. $10.50.

Gold: Recovery, Properties, and Applications. Edmund M. Wise, Ed. Van Nostrand, Princeton, N.J., 1964. 377 pp. Illus. $12. 28 chapters contributed by Donald H. McLaughlin, A. R. Raper, and Ann E. Rea, J. H. Ray, Martin S. Frant, W. Z. Friend, John Strong, W. T. Sweeney, Claire L. Burns, Edward Liebig, C. H. Chatfield, Joseph Ogden, Arnold S. Rose, Edward D. Zysk, F. E. Beamish, J. G. Sen Gupta, A. Chow, Arnold J. Lincoln, J. C. Kohler, and Edmund M. Wise.

Group Theory. W. R. Scott. Prentice-Hall, Englewood Cliffs, N.J., 1964. 479 pp. Illus. $13.25.

Handbook of Industrial Infrared Analysis. Robert G. White. Plenum Press, New York, 1964. 454 pp. Illus. $19.50.

The Impact of Computers on Accounting. T. W. McRae. Wiley, New York, 1964. 318 pp. Illus. $6.

Introduction to the Crystallography of Martensitic Transformations. C. M. Wayman. Macmillan, New York, 1964. 205 pp. Illus. Paper, $4.40.

Invariance Principles and Elementary Particles. J. J. Sakurai. Princeton Univ. Press, Princeton, N.J., 1964. 336 pp. Illus. $8.50.

Lectures on Invariant Subspaces. Henry Helson. Academic Press, New York, 1964. 142 pp. Illus. $5.

Linear Network Theory. K. F. Sander. Pergamon, London; Macmillan, New York, 1964. 178 pp. Illus. Paper, $3.75.

Mechanical Engineering. Marvin I. Naparstek. Macmillan, New York, 1964. 235 pp. Illus. $7.

Micro- and Thin-Film Electronics. Readings. Sumner N. Levine, Ed. Holt, Rinehart, and Winston, New York, 1964. 334 pp. Illus. Paper, $3.75. Twenty-four papers on Design and Reliability; Fabrication and Technology; and Thin Films.

Mössbauer Effect: Principles and Applications. Gunther K. Wertheim. Academic Press, New York, 1964. 124 pp. Illus. Paper, $2.45; cloth, $5.50.

Natural Electromagnetic Phenomena, Below 30 KC/S. Proceedings, NATO Advanced Study Institute (Bad Homburg, Germany), July and August 1963. D. F. Bleil, Ed. Plenum Press, New York, 1964. 478 pp. Illus. $17.50. Fifteen papers: "Some aspects of the structure and dynamics of terrestrial magnetosphere" by W. I. Axford; "On the penetration of interplanetary plasma into the magnetosphere" by H. Alfven, L. Danielsson, C-G. Fälthammar, and L. Lindberg; "Geomagnetic storms" by M. Sugiura; "The aurora" by A. McNish; "The ionosphere: Propagation theory" by J. J. Gibbons; "Experimental results and tentative explanation for geomagnetic effects caused by high altitude nuclear detonations" by E. Selzer; "Observations of enhanced radiation in the kc/s band (5 and 8 kc/s) during auroral and geomagnetic disturbances" by L. Harang and R. Larsen; "ELF (500–1000 cps) emission at high latitude" by A. Egeland; "Whistler mode and theory of VLF emissions" by R. M. Gallet; "Terrestrial ex-

tremely-low-frequency propagation" by J. Galejs; "Whistlers and VLF emission" by J. Katsufrakis; "Micropulsation at near-conjugate stations in the auroral zones and their association with other ionospheric phenomena" by Sir Charles Wright; "Micropulsations of the earth's electromagnetic field in the frequency range 0.1 to 10 CPS" by J. A. Jacobs; "A summary of the observed characteristics of geomagnetic micropulsations" by J. Heirtzler; "Instrumentation for receiving electromagnetic noise below 3000 CPS" by J. E. Lokken; and "Spectral, cross-spectral, and bispectral analysis of low frequency electromagnetic data" by T. Madden.

Oceanographical Engineering. Robert L. Wiegel. Prentice-Hall, Englewood Cliffs, N.J., 1964. 544 pp. Illus. $18.

Physical Acoustics: Principles and Methods. vol. 1, pt. B, *Methods and Devices*. Warren P. Mason, Ed. Academic Press, New York, 1964. 390 pp. Illus. $13.50. Seven papers: "The use of high- and low-amplitude ultrasonic waves for inspection and processing" by Benson Carlin; "Physics of acoustic cavitation in liquids" by H. G. Flynn; "Semiconductor transducers —General considerations" by Warren P. Mason; "Use of semiconductor transducers in measuring strains, accelerations, and displacements" by R. N. Thurston; "Use of *p-n* junction semiconductor transducers in pressure and strain measurements" by M. E. Sikorski; "The depletion layer and other high-frequency transducers using fundamental modes" by D. L. White; and "The design of resonant vibrators" by Edward Eisner.

Point Set Topology. Steven A. Gaal. Academic Press, New York, 1964. 331 pp. Illus. $9.75.

Potential Barriers in Semiconductors. B. R. Gossick. Academic Press, New York, 1964. 163 pp. Illus. Paper, $2.45; cloth, $5.50.

The Precession Method: In X-ray Crystallography. Martin J. Buerger. Wiley, New York, 1964. 294 pp. Illus. $13.50.

Radiation Chemistry. Proceedings of a symposium (Tihany, Hungary), September 1962. János Dobó, Ed. Akadémiai Kaidó, Budapest, Hungary, 1964. 482 pp. Illus. $14. Fifty papers presented at a symposium organized to give a general view of the research in radiation chemistry done in Hungary during the past few years.

Statistical Inference. vols. 1 and 2. vol. 1, *A Non-Mathematical Exposition of the Theory of Statistics* (678 pp. A revised edition of *Introduction to Statistical Inference*, 1957); vol. 2, *The Multiple Regression and Its Ramifications* (589 pp.). Jerome C. R. Li. Edwards, Ann Arbor, Mich., 1964. Illus. $10 each volume.

Strong-Interaction Physics. A lecture note volume. Maurice Jacob and Geoffrey F. Chew. Benjamin, New York, 1964. 166 pp. Illus. Paper, $4.95; cloth, $9.

Symmetry in the Solid State. Robert S. Knox and Albert Gold. Benjamin, New York, 1964. 356 pp. Illus. Paper, $5.95; cloth, $10.

Theory of Superconductivity. J. R. Schrieffer. Benjamin, New York, 1964. 296 pp. Illus. $10.

Thermal Imaging Techniques. Proceedings of a conference (Cambridge, Mass.), October 1962. Peter E. Glaser and Ray-

mond F. Walker, Eds. Plenum Press, New York, 1964. 288 pp. Illus. $12.50. Twenty-two papers arranged under the following subheads: Imaging Furnace and Radiation Source Development (8 papers); Instrumentation and Measurement Techniques (5 papers); Crystal Growth (3 papers); and Experimental Procedures (6 papers).

Topics in Phosphorus Chemistry. vol. 1. Martin Grayson and Edward J. Griffith, Eds. Interscience (Wiley), New York, 1964. 270 pp. Illus. $12. Five topics: "Synthesis of organophosphorus compounds from elemental phosphorus" by M. M. Rauhut; "Nucleophilic displacement reactions on phosphorus halides and esters by Grignard and Lithium reagents" by K. Darrell Berlin, T. Howard Austin, Melbert Peterson, and M. Nagabhushanam; "The Michaelis-Arbuzov and related reactions" by Ronald G. Harvey and Eugene R. DeSombre; "Lower oxo acids of phosphorus and their salts" and "Condensed phosphates containing other oxo acid anions" by Shigeru Ohashi.

Unified Theory of Nuclear Models. G. E. Brown. North-Holland, Amsterdam; Interscience (Wiley), New York, 1964. 186 pp. Illus. $7.25.

Vibrational Spectra of High Polymers. Giulio Natta and Giuseppe Zerbi, Eds. Interscience (Wiley), New York, 1964. 232 pp. Illus. Paper, $10. Fifteen papers presented at the conference organized under the sponsorship of the Chemistry Committee of the National Research Council of Italy through its National Center for the Chemistry of Macromolecules, and held at Milan in July 1963.

Vitreous Lithium Silicates. Properties and applications. Sarra Konstantinovna Dubrovo. Authorized translation from the Russian edition (Leningrad, 1964) by E. B. Uvarov. Consultants Bureau, New York, 1964. 50 pp. Illus. Paper, $12.50.

Biological and Medical Sciences

Abnormalities of the Sex Chromosome Complement in Man. W. M. Court Brown, D. G. Harnden, Patricia A. Jacobs, N. Maclean, and D. J. Mantle. Her Majesty's Stationery Office, London, 1964 (order from British Information Services, New York). 247 pp. Illus. Paper, $5.50.

Acute Psychotic Reaction. Werner M. Mendel and Leon J. Epstein, Eds. American Psychiatric Assoc., Washington, D.C., 1963. 112 pp. Illus. Paper, $2. Eight papers given at a regional research conference held at Los Angeles, Calif., in January 1962, under the joint auspices of the University of Southern California School of Medicine, Department of Psychiatry, and the American Psychiatric Association's Committee on Research (1961–62). The papers are "Towards a theoretical model of the determinants of acute schizophrenic behavior" by Edward Stainbrook; "The acute brain syndrome in geriatric patients" by Alexander Simon and Robert B. Cahan; "On some subjective, clinical, and theoretical aspects of the acute psychotic reaction" by J. Victor Monke; "Acute psychosis in a college population" by Pauline R. Langsley, Burleigh Kammerer, and Saxton Pope; "The self concept in the acute psychotic reaction" by Seymour Pollack; "Non-verbal techniques in the re-